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September 22, 2021

Attention:
Jennifer Volpato, District Engineer
Ministry of the Environment, Conservation and Parks
Guelph District Office
1 Stone Road West, 4th Floor
Guelph, ON N1G 4Y2

Project Name: Former IMICO Brownfield
Project Number: 694757

Subject: Compilation of Documents for Tier 3 Risk Assessment No. 6417-B9XQGZ
200 Beverley Street, Guelph, ON

Dear Ms. Volpato,

As requested, the final accepted Tier 3 Risk Assessment (RA) report for the property located at 200 Beverley Street, Guelph and the associated Ministry of the Environment, Conservation and Parks (MECP) correspondence has been attached to this letter as follows:

1. *Risk Assessment for 200 Beverley Street, Guelph, Ontario.* Prepared by Jacobs Engineering Group Inc. for the City of Guelph, Revision 2, dated May 2021

The RA revision was submitted in response to a Notice of Circumstance issued by the MECP dated March 18, 2021. Appendix A4 of the RA (Attachment 1 of this letter) provides the Notice of Circumstance and associated Schedule A.

2. Email RE: *Request for Additional Information - RA for 200 Beverley Street, Guelph, Ontario [RA1748-19c; IDS#6417-B9XQGZ].* From Katherine Appleby, Jacobs Engineering Group Inc., received by TASDB on September 14, 2021, with the following documents attached:
   - IMICO_RA_Sec4-HHRA_14Sept2021
   - IMICO_RA_Fig7-2_AdminReqs_NAPL_14Sept2021

The revised Section 4 contained in Attachment 2 of this letter wholly replaces Section 4 appearing in the RA (Attachment 1 of this letter). Attachment 2 also contains a stand-alone copy of Figure 7-2, which was reported to not be loading property in the compiled RA PDF (Attachment 1 of this letter).

September 22, 2021
Compilation of Documents for Tier 3 Risk Assessment No. 6417-B9XQGZ
200 Beverley Street, Guelph, ON

We trust this document provides the requested documentation of the final accepted MGRA. Please do not hesitate to contact the undersigned if there are any questions.

Yours sincerely

Katherine Appleby, B.E.S., E.P., QPRA
katherine.appleby@jacobs.com

Attachments

1 - MGRA Revision 2 (May 2021)
2 – Additional Email Correspondence (Request for Additional Information):
- Email
- Section 4 Text
- Figure 7-2

Copies to:
Tania McCarthy, Jacobs
Ed Taves, Jacobs
Prasoon Adhikari, City of Guelph

Attachment 1
Tier 3 RA Revision 2 (May 2021)

200 Beverley Street, Guelph, Ontario

Risk Assessment

Rev ~~1~~2

~~November 2020~~May 2021

City of Guelph

Risk Assessment for 200 Beverley Street, Guelph, Ontario

Project No:	694757CH
Document Title:	Risk Assessment
Document No.:	PPS0605200801KWO
Revision:	~~Rev 01~~Rev 02
Date:	~~November 2020~~May 2021
Client Name:	City of Guelph
Project Manager:	Ed Taves
Author:	Jacobs Engineering Group Inc.

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Acronyms and Abbreviations

µg	microgram
µg/g	microgram per gram
µg/L	microgram per litre
µg-soil/m^3	microgram soil per cubic metre
1,1-DCE	1,1-Dichloroethylene
ABN	acid, base, and neutral compound
AEP	Alberta Environment and Parks
APEC	area of potential concern
APV	aquatic protection value
AST	aboveground storage tank
atm/m^3/mol	atmosphere(s) per cubic metre per mole
B(a)P	benzo(a)pyrene
B(a)PE	benzo(a)pyrene equivalence
BTEX	benzene, toluene, ethylbenzene, and xylene
BLL	blood lead level
BW	body weight
C	chemical concentration
CCME	Canadian Council of Ministers of the Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M	CH2M HILL Canada Limited
cis-1,2-DCE	cis-1,2-dichloroethylene
City	City of Guelph
CF	conversion factor
CR	contact rate
cm	centimetre
cm^2	centimetres(s) square
CoA	Certificate of Analysis
COC	contaminant of concern
CPU	Certificate of Property Use
CSM	conceptual site model
EC	electrical conductivity
ECA	environmental compliance approval

EcoBMC	ecological benchmark concentration
Eco-SSL	ecological soil screening level
EcoCSM	ecological conceptual site model
EP	Environmental Professional
EPA	U.S. Environmental Protection Agency
EPSS	ecological property-specific standard
ERA	Ecological Risk Assessment
ESA	Environmental Site Assessment
F	fraction
F4G	F4 gravimetric
FA	financial assurance
FCTC	fill cap target concentrations
FIP	fire insurance plan
GC-FID	gas chromatography with a flame ionization detector
GW3	groundwater to surface water
H	Henry's Law Constant
HHCSM	human health conceptual site model
HHRA	Human Health Risk Assessment
HSP	health and safety plan
HQ	hazard quotient
IA	indoor air
ILCR	incremental lifetime cancer risk
IMICO	International Malleable Iron Company
J&E	Johnson and Ettinger
Jacobs	Jacobs Engineering Group Inc.
km	kilometre
km^2	square kilometre
kg/mg	kilogram(s) per milligram
L/sec	litre(s) per second
LNAPL	light nonaqueous phase liquid
m	metre(s)
m^2	square metre(s)
m^3	cubic metre(s)
m/m	metre(s) per metre
m/s	metre(s) per second

mL	millilitre(s)
masl	metre(s) above sea level
mbgs	metre(s) below ground surface
MDL	method detection limit
mg/kg/d	milligram per kilogram per day
mg/µg	milligram per microgram
MGRA	Modified Generic Risk Assessment
MECP	Ontario Ministry of Environment, Conservation and Parks
MNRF	Ontario Ministry of Natural Resources and Forestry
NAD	North American Datum
NAPL	nonaqueous phase liquid
NHIC	Natural Heritage Information Centre
O. Reg.	Ontario Regulation
OCP	organochlorine pesticide
ORP	other regulated parameters
OGS	Ontario Geological Survey
P.Eng.	professional engineer
PAH	polycyclic aromatic hydrocarbon
PCA	potentially contaminating activity
PCB	polychlorinated biphenyl
Phase One Study Area	surrounding area within 250 m of the RA Property
PHC	petroleum hydrocarbon
PCE	Tetrachloroethylene
PPE	personal protective equipment
ppm	part(s) per million
PSF	Pre-submission Form
PSS	property-specific standard
QA	quality assurance
QC	quality control
QP	qualified person
QPESA	MECP Qualified Person for ESAs
QPRA	MECP Qualified Person for RAs
RA	Risk Assessment

Rationale Document	*Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*
RBC	risk-based concentration
RMM	risk management measure
RMP	risk management plan
RSC	Record of Site Condition
S1	soil direct contact component
S-IA	soil to indoor air component
SARA	Species at Risk Act
SCS	Site Condition Standards
SG	silica gel
S-GW3	soil leaching to groundwater with subsequent discharge to surface water
SGMP	soil and groundwater management plan
Site	Risk Assessment Property
SMP	soil management plan
Table 2 Standard	Table 2 *Full Depth Generic Site Condition Standards in a Potable Ground Water Condition*
Table 6 SCS	Table 6 *Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition*
TEF	Toxic equivalency factor
TCE	trichloroethylene
Torr	Torricelli
TPH	total petroleum hydrocarbon
TRV	toxicity reference value
trans-1,2-DCE	trans-1,2-dichloroethylene
UTM	Universal Transverse Mercator
VEC	valued ecosystem component
VI	vapour intrusion
VOC	volatile organic compound

1. Summary of Recommendations and Findings

1.1 Risk Assessment Objectives and Approach

The City of Guelph (City) has retained CH2M HILL Canada Limited (CH2M), now Jacobs Engineering Group Inc. (Jacobs), to provide environmental services for the property identified the former International Malleable Iron Company (IMICO) located at 200 Beverley Street in Guelph, Ontario, hereafter referred to as the "Risk Assessment (RA) Property" or "Site" (Figure 1-1). Jacobs completed a Phase One Environmental Site Assessment (ESA) (CH2M, 2017) and Phase Two ESA investigations (Jacobs, 2020; draft) to support site characterization, development of a conceptual site model (CSM) and RA in advance of redevelopment of the Site to mixed residential and commercial use. Since the previous site land use was industrial/commercial, a change in land use to a more sensitive mixed residential, parkland, and commercial land use requires a Record of Site Condition (RSC) under Section 168.3.1 of the Environmental Protection Act (MECP, 1990).

The RA Property is approximately 5.2 hectares (ha) in size and is located east of the City's downtown. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place (Figure 1-2).

The applicable site condition standards (SCS) are the *Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* (Residential/ Parkland/Institutional Property Use) (Table 6 SCS) (MECP, 2011c) since bedrock has been encountered at less than 2 metres below ground surface (mbgs) and the groundwater in the vicinity of the RA Property does and will serve as a raw water supply for a drinking water system.

This RA was prepared in accordance with Ontario Regulation (O. Reg.) 153/04 (MECP, 2011a). Therefore, this RA is based on the principles and guidelines for RAs as described in the Ontario Ministry of the Environment, Parks and Conservation (MECP) documents *Procedures for the Use of Risk Assessment under Part XV.1 of the Environmental Protection Act* (MECP, 2005), together with Schedule C, Table 1 of O. Reg. 153/04 (MECP, 2011a), and the *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* (Rationale Document) (MECP, 2011b). Additional guidance was also inferred from the *Modified Generic Risk Assessment Model* (MECP, 2016).

The MECP framework for RA is compatible and consistent with the RA frameworks of other agencies, including Health Canada (2010) and the U.S. Environmental Protection Agency (EPA) (1989).

The objectives of the RA are as follows:

- Assess the risk from potential exposure to soil and groundwater to existing and potential future human receptors who may use the RA Property, assuming most of the contaminants of concern (COCs) are managed in place.
- Assess risk to terrestrial ecological receptors from potential exposure to COCs in soil and groundwater at the RA Property.
- Develop Property-specific Standards (PSSs) for COCs in soil and groundwater at the RA Property.
- Develop a risk management plan (RMP) to mitigate or minimize unacceptable risks.

1.2 Deviations from Pre-submission Form

Jacobs submitted the Pre-submission Form (PSF) to the MECP on February 27, 2019, which is provided in Appendix A1. Jacobs received the MECP's review comments on the PSF on May 6, 2019 and the Phase Two conceptual site model (CSM) on October 10, 2019. The MECP comments on the PSF and CSM, and Jacobs response to comments are provided in Appendix A2. The following are deviations from the information provided in the PSF:

- A supplemental soil and groundwater investigation was completed between March and April of 2019; five existing wells were sampled and seven boreholes were advanced. Between February and March 2020, an additional soil and groundwater investigation was completed and 4 boreholes were advanced and 90 monitoring wells were sampled. In February 2020, 5 test pits were also advanced. The results of the additional soil and groundwater sampling are provided in Appendix D3. As a result, the screening tables (Table F1-1 and F1-2) were updated to reflect the additional soil and groundwater data.
- As a result of the additional groundwater monitoring programs, the minimum depth to groundwater remained unchanged, but the average groundwater depth used in the RA (outdoor air pathway) changed to 2.70 mbgs for the Overburden and Bedrock Contact Zone.
- Toxicity reference values (TRVs) and toxicity profiles, when required, were updated to reflect the current MECP toxicity selections and reviewed for updates from other applicable agencies as appropriate. TRVs are presented in Table 4-26 and toxicity profiles are presented in Appendix H of the RA.
- The human health conceptual site model (HHCSM) (Figures 4-1 and 4-2) and ecological conceptual site model (EcoCSM) figures were updated in response to MECP comments (Figures 5-1 and 5-2).
- The Eastern Garter Snake was listed as an aquatic VEC in the PSF in error and has been updated to the Midland Painted Turtle in Section 5 of the RA
- An updated Plan of Survey for the RA Property is provided at the end of Appendix D2.

1.3 Revisions from First Submission of Risk Assessment

Jacobs submitted the RA to MECP on June 19, 2020. The MECP Director's Notice, including comments on the RA, were received on October 16, 2020. Appendix A3 provides the MECP comments on the RA, and Jacobs' responses to the comments. This RA report was revised to incorporate the following changes in response to MECP comments:

- A new subsection (3.2.1) was added to Section 3 to discuss what is known about the NAPL onsite.
- Section 4 was updated to clarify the process for the selection of the COCs to be assessed for trench inhalation; the use of sub-chronic TRVs; the assessment of offsite risks from soil gas migration; the applicability of Sections 41 and 43.1 of O. Reg. 153/04; and the basis for determining whether groundwater COCs are considered mobile or not. Clarifying footnotes were also added to a few tables associated with Section 4 to address specific MECP comments.
- A qualitative assessment of the soil odour pathway was added to Section 4 to support changes made in Section 6 with regards to the development of the Fill Cap Target Concentrations.
- The human health (HH) and ecological conceptual site models (CSM) (Figure 4-1, 4-2, 5-1, and 5-2) were updated to note the presence of NAPL onsite and other minor consistency issues within the HH CSM were corrected.
- Section 5 was updated to acknowledge that reptiles could be present onsite; to qualitatively assess indirect risks to birds and mammals from groundwater via the diet pathway; to clarify the applicability of Sections 41 and 43.1 of O. Reg. 153/04; and acknowledge the potential risks to ecological receptors from contact with petroleum-related NAPL.

- Section 6 was updated to clarify which exposure pathways the Fill Cap Target Concentrations are protective of.
- Section 6 was updated to present rationale related to why NAPL removal is considered technically impractical. Additional edits were made to align the existing discussion with text that was added or modified in other sections of the RA report.
- Section 7 has been revised to include a restriction on the construction of subgrade spaces in areas where NAPL has been observed, unless it can be demonstrated to the MECP that the NAPL has been removed and the groundwater monitoring plan has been updated to include the monitoring of two additional upgradient well nests and three monitoring wells where NAPL has been observed with conditions for triggering notification to the MECP.
- Minor clarifications were made to the text of Section 7 and Appendix I to address MECP comments.
- Minor inconsistencies or typographic errors within the text have been corrected.
- The dates of the mandatory certifications for the RA have been updated to reflect the most recent revision date of the RA (Appendix C).
- Appendix D2 was updated to expand the discussion of the hydrogeological and geological interpretations which differ from the assumptions used in the derivation of the generic standards.
- Appendix D3 was updated to provide clarity with respect to the presence of NAPL in response to reviewer comments.

1.4 Revisions from Second Submission of Risk Assessment

Jacobs submitted the revised RA to MECP on November 17, 2020. The MECP Director's Notice, including comments on the RA, were received on March 18, 2021. Appendix A4 provides the MECP comments on the RA, and Jacobs' responses to the comments. This RA report was revised to incorporate the following changes in response to MECP comments:

- Section 3 was updated to document the previous light nonaqueous phase liquid (LNAPL) recovery efforts that have been conducted at the RA Property.
- Section 4.4.2 was updated to expand the discussion regarding the potential for lateral migration of soil gas offsite from onsite soil sources.
- Bismuth, calcium, iron, and magnesium in soil have been carried through as COCs for the RA Property based on exceedances of the Ontario Typical Range (OTRs) values (or no criteria, in the case of bismuth). The RA was updated as follows to account for the new soil COCs:
    - Appendix D2 - Table 6-7b was updated to remove the removal of the aforementioned analytes as COCs.
    - Appendix D3 - The Phase Two Conceptual Site Model was updated. Jacobs requested new Certificates of Analysis (COAs) reporting the results for these four parameters for all samples analyzed for metals as part of the Phase Two ESA to ensure that adequate Site coverage for delineation purposes was achieved. Results from more than 100 additional samples across the RA Property for each of these COCs were considered in the Phase Two CSM and the RA. The CSM was updated with "Section 1.8.10 – Parameters without MECP Standards", new plan view Figure 6-12 was added to show the results, with Figures 6-12a through 6-12c providing the cross-sections. All the subsequent figure numbers were shifted up by one to account for the new series of figures.

- Appendix D4 - Twelve COAs were replaced with the updated versions.
- Section 3 was updated to reference the change in figure numbers that occurred in Appendix D3.
- The human health risk assessment (Section 4) for soil was updated. Iron was quantitatively assessed, while the other new COCs were qualitatively assessed (Section 4.4.3 and Table 4-39). A toxicity profile for the iron TRV adopted for use in the human health RA has been added to Appendix H.
- The ecological risk assessment (Section 5) for soil was updated for the new COCs. Ecological Benchmark Concentrations (EcoBMCs) were only identified for bismuth for the evaluation of Soil Invertebrates/Plants; the OTRs were adopted as the EcoBMCs for the evaluation of the remaining new COCs for Soil Invertebrates/Plants as well as Birds/Mammals.

- The ecological fill cap targets in Table 5-13 were updated to consider the generic soil leaching to groundwater with discharge to surface water (S-GW3) pathway. These values were subsequently carried through to the overall fill cap targets table (Table 6-3).
- Section 5 was updated to fix inconsistencies in the list of parameters in groundwater that were estimated to result in a potential risk to offsite aquatic receptors.
- Additional supporting information has been provided in Appendix A4 (Figures A4-1 and A4-2) to demonstrate that the use of measured groundwater data at the Site was appropriate to directly evaluate COCs that had concentrations greater than the S-GW3 component values within the ERA.
- Section 7 and Appendix I were revised to remove some references to existing trees that were inadvertently missed being removed during the last RA revision.
- Section 7 and Appendix I were revised to more clearly state where barriers are required across the RA Property following redevelopment (that is, across the entire Site).
- Figure 7-2 has been revised with respect to the inferred extent of area where LNAPL restrictions should apply.
- Appendix D2 (Phase Two Environmental Site Assessment Summary) was updated to expand the discussion regarding assumptions that differed from the MECP in the derivation of the generic standards.
- Table F-1 in Appendix F was revised to provide additional information regarding why tin in soil was not retained as a COC for the RA Property.
- The City received public comments on the RA which were forwarded to Jacobs. The public comments and responses are provided in Appendix J2; Section 8 has been updated to reference the new appendix. The previously provided Public Communication materials remain unaltered as Appendix J1. Changes made in the RA to address the public comments were as follows:
    - A qualitative assessment of the potable groundwater odour pathway was added as Section 4.4.3.10. The results and conclusions of the HHRA remain unchanged, as does the proposed RMMs.

- A qualitative assessment of the soil leaching to potable groundwater pathway was added as Section 4.4.3.11. The results and conclusions of the HHRA remain unchanged, as does the proposed RMMs.
- Section 4.4.6 was revised to fix a discrepancy in the groundwater flow direction wording to be consistent with the Phase Two CSM wording.
- Figures 4-1 and 4-2 were revised to add "residents" to a footnote.

~~1.4~~1.5 Risk Assessment Standards

Table 1-1 presents the PSSs for COCs identified at the RA Property. The COCs broadly include:

- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Volatile Organic Compounds (VOCs)
- Metals and inorganics
- Polychlorinated biphenyl (PCB)
- Petroleum hydrocarbons (PHCs)
- Polycyclic aromatic hydrocarbons (PAHs)

Development of PSSs involved considering both human health and ecological receptors that currently exist and that may be present at the RA Property in the future.

~~1.5~~1.6 Risk Assessment Assumptions

The RA was conducted, using the following assumptions:

- The Site currently consists of vacant land historically used for industrial purposes and will be redeveloped to mixed residential, parkland, and commercial use.
- Groundwater is considered potable.
- The soil texture is considered coarse, as defined by O. Reg. 153/04 (as amended).
- The measured groundwater elevations (water table) taken between March 2010 and February 2020 ranged from 311.48 to 314.56 metres above sea level (masl) (0.93 to 4.97 mbgs). The calculated average depth to groundwater is 2.70 mbgs. It is, therefore, assumed that direct contact with groundwater would be limited to subsurface excavations that intercept the groundwater table.
- Subsurface and surface soils are assumed to mix during redevelopment and construction. In the future, subsurface soil could become surface soil and vice versa, so soil data were not segregated into subsurface and surface categories, but were grouped and screened as a single unit.
- Receptors exposed to groundwater could be exposed to COCs observed in groundwater at any depth or from any of the groundwater units identified at the RA Property. Consequently, all units were treated as one unit, and groundwater data sets were aggregated.
- Human receptors are currently present at the RA Property, and may also exist in the future, assuming the potential future land uses mentioned. Consequently, human receptors could be exposed to COCs, and risks were assessed based on future Site conditions, assuming no risk management measures (RMMs) were in place.
- Ecological receptors are currently present and may also exist in the future at constructed ornamental gardens or unmaintained areas. Risks were assessed assuming no RMMs (that is, no clean fill capping layer).

- Exposure events will involve contact with estimated maximum concentrations of COCs, which are estimated based on the observed maximum plus 20 percent (as applied within the MECP Modified Generic Risk Assessment [MGRA] Model [MECP, 2016]), or by applying the method detection limit (MDL).
- Noncancer endpoints for the HHRA assume a maximum target hazard quotient (HQ) of 0.2 for all COCs except PHCs and inhalation of trichloroethylene, which assume a maximum target HQ of 0.5.
- Cancer endpoints for the HHRA assume a maximum target incremental lifetime cancer risk (ILCR) of 1 in 1 million (1×10^{-6}).
- Ecological health endpoints assume a maximum target HQ of 1.0.
- PSSs were based on the site characterization of soil and groundwater. The PSSs were developed based on the estimated Site maximums (Table 1-1). The estimated Site maximums were derived by applying the greater of the maximum detected concentration, multiplying it by 1.2, and then rounding it down to two significant digits, as appropriate, or by applying the MDL.

~~1.6~~1.7 Risk Management Requirements

The following risk management requirements were identified:

- Place clean fill meeting the Fill Cap Target Concentrations (FCTCs) (Section 6) to create fill cap barriers at newly landscaped areas where existing Site soil does not meet the FCTCs, as described in Section 7, for ecological and human health risk management.
- Construct other barriers – such as paving stones, ornamental gardens, concrete, roadways, sidewalks, and buildings—to prevent human receptors' future contact with soil that does not meet FCTCs, as described in Section 7, for ecological and human health risk management.
- Use engineered methods to control vapour intrusion (VI) into future buildings.
- Conduct indoor air and/or subslab vapour monitoring as required to support the design of VI mitigation measures; dependent on a future construction.
- Prohibit the construction of buildings with subgrade spaces in the area of the Site where NAPL has been encountered, unless it can be demonstrated to the MECP that the NAPL has been removed.
- Prohibit the planting of vegetable gardens at the RA Property except in aboveground containers or containerized plots.
- Implement a soil and groundwater management plan (SGMP) for future subsurface work when impacted soil, groundwater, or nonaqueous phase liquid (NAPL) could be encountered.
- Implement a Site-specific health and safety plan (HSP) for workers who may encounter subsurface soil, groundwater, or NAPL during construction activities or maintenance of subsurface utilities.
- Carry out a groundwater and NAPL monitoring program.
- On an ongoing basis, inspect and maintain cap or soil barriers where Site soils do not meet FCTCs to prevent contact with contaminated soils beneath such caps or barriers and erosion; reinstate these caps or soil barriers if subsurface soils are exposed.
- Inspect vapour controls or barriers on an ongoing basis, and maintain these to prevent VI, if required.
- Restrict the construction of single-family freehold dwelling on the RA Property.
- Restrict the use of groundwater from the RA Property as a source of water, either domestic or commercial.

~~1.7~~1.8 References

CH2M HILL Canada (CH2M). 2017. *Phase One Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. August 18, 2017.

Jacobs Engineering. 2020. Phase Two Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph, Ontario. Draft. Prepared for the City of Guelph.

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Jacobs Engineering Group (Jacobs). 2020. *200 Beverley Street, Guelph, Ontario, Phase Two Environmental Site Assessment*. Draft. April.

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Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*. Prepared by Standards Development Branch. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011c. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*. April 15.

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U.S. Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A)*. EPA/540/1-89/002. December.

2. Risk Assessment Team Membership

2.1 Environmental Site Assessment

Ed Taves, M.Sc., C.Chem., QPESA, P.Geo. (Limited)

Ed Taves has over 30 years of professional experience in environmental consulting. He specializes in environmental due diligence assessments (Phase One and Two ESAs), site characterization, risk assessment, remedial option analysis, contaminant hydrogeology, facility decommissioning and brownfield redevelopment, and the preparation of Records of Site Condition (RSCs). Clients have included federal and provincial departments and ministries, municipal governments, and private industries, as well as members of the legal, financial, accounting, and land development communities. Projects have been completed for a wide variety of contaminants, including petroleum hydrocarbons, a variety of volatile organic compounds including chlorinated aliphatic hydrocarbons, metals, polychlorinated biphenyls, pesticides, nutrients, energetics, unexploded ordnance, chemical warfare agents, and radiologicals. Ed has fulfilled a number of roles, including project manager, task manager, senior technical consultant, and public and regulatory agency liaison.

Tania McCarthy, B.A.Sc., P.Eng.

Tania McCarthy has over 16 years of experience in environmental services, specializing in Phase I and II and One and Two Environmental Site Assessments (ESAs), contaminated site characterization, remedial investigations, Risk Assessments (RAs), and preparation of Records of Site Condition (RSCs) for various sites in Canada. Her experience also includes fill/soil management plans, solid waste management and landfill gas (LFG) projects within Ontario; and site assessments, remediation, and monitoring reports for projects within the United States (U.S.).

Victoria Peters B.Sc.Env., GIT

Victoria joined Jacobs as a Junior Environmental Scientist in 2017, working in the Federal and Environmental Solutions Group from Jacobs' Kitchener office. Victoria has experience preparing technical reports, including Phase One and Two Environmental Site Assessments (ESAs), sediment characterization technical memorandums, and soil management plans. She also has experience working on remedial excavations and environmental monitoring projects, including soil and groundwater sampling, surface water and sediment sampling, and test pit installation and confirmatory sampling. Victoria has experience with the Ontario Clean Water Act and source water protection and has conducted drinking water threat inventories for a regional municipality.

2.2 Hydrogeology

Jinlong Zang, B.A.Sc., M.Sc., P.Eng.

Jinlong is a hydrogeologist with over 21 years of quantitative and physical hydrogeology experience in:

- ESAs
- Contaminated groundwater evaluation
- Groundwater resources management
- Oil sands mine closure and reclamation
- Mining industry

He specializes in quantitative hydrogeological evaluations and the application of numerical and analytical groundwater simulation tools, which include primarily groundwater flow and contaminant transport modelling at local and regional scales. He has solid experience in hydrogeological investigation for both clean water and contaminated sites, including:

- Hydrogeological baseline studies
- Environmental impact assessments (EIAs)
- ESAs
- Remediation options design and evaluation

He has experience in project management, including:

- Project planning and delivery
- Costing
- Technical reporting
- Liaising with clients, contractors, and regulatory agencies

Alex Biczok, B.A.Sc.

Alex's key roles have included:

- Modelling soil and groundwater contamination
- Interpreting project site hydrogeology
- Analyzing water quality trends
- Carrying out field investigations

He holds a degree in environmental engineering, and his background includes environmental management in the civil services, mining, and energy industries.

2.3 Human Health Risk Assessment

Katherine Appleby, B.E.S., E.P. (QPRA)

Katherine will be the QPRA for this RA. Katherine has 14 years of experience in the field of RAs and ESAs. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening-level risk assessments (SLRAs), and comprehensive RAs. Katherine has experience performing, reviewing, and supervising the completion of both HHRAs and ERAs for land- and water-based sites. Her skills include:

- Developing RA conceptual site models (CSMs)
- Selecting ecological and human health receptors
- Exposure modelling
- Selecting toxicity reference values (TRVs)
- Calculating risk estimates
- Developing risk management measures (RMMs)
- Reporting
- Performing peer review
- Responding to client and regulator comments on RA reports

Katherine has authored, led, or contributed to the completion of over 60 focused, comprehensive, or screening-level RA reports using both provincial (Ministry and Environment Yukon) and federal (Health Canada and Canadian Council of Minister of the Environment [CCME]) frameworks. She is familiar with provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended) and the RSC filing process.

Brandi Wilson, B.Sc.

Brandi Wilson is an Environmental Scientist with 4 years of experience in the environmental consulting industry. Her areas of expertise include environmental assessments, including conducting HHRAs and Phase One ESAs; data entry and processing; writing technical memoranda; and performing field investigation activities, including sediment and groundwater sampling. She has prepared numerous technical reports, including PSFs, SLRAs, and comprehensive RAs. Her skills include developing exposure modelling, calculating risk estimates, reporting, and responding to client and regulator comments on RA reports. Brandi also has experience with stormwater management (SWM) pond sediment chemistry related disposal versus beneficial use evaluations.

2.4 Ecological Risk Assessment

Katherine Appleby, B.E.S., E.P. (QPRA)

Katherine will be the QPRA for this RA. Katherine has 14 years of experience in the field of RAs and ESAs. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening-level risk assessments (SLRAs), and comprehensive RAs. Katherine has experience performing, reviewing, and supervising the completion of both HHRAs and ERAs for land- and water-based sites. Her skills include:

- Developing RA conceptual site models (CSMs)
- Selecting ecological and human health receptors
- Exposure modelling
- Selecting toxicity reference values (TRVs)
- Calculating risk estimates
- Developing risk management measures (RMMs)
- Reporting
- Performing peer review
- Responding to client and regulator comments on RA reports

Katherine has authored, led, or contributed to the completion of over 60 focused, comprehensive, or screening-level RA reports using both provincial (Ministry and Environment Yukon) and federal (Health Canada and Canadian Council of Minister of the Environment [CCME]) frameworks. She is familiar with provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended) and the RSC filing process.

Jennifer Mannisto, B.Sc.

Jennifer Mannisto is an Environmental Scientist with 2 years of experience in the environmental consulting industry. Her areas of expertise include environmental assessments, including conducting HHRAs, ERAs, and Phase One ESAs; data entry and processing; client communication; and writing technical memoranda. She has prepared numerous technical reports including PSFs, SMPs, and comprehensive RAs, and has written Phase I/One ESAs in Ontario, British Columbia, and Alberta. Her skills include calculating risk estimates, reporting, and data management. She is familiar with provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended) and the RSC filing process.

2.5 Engineering

Jennifer Caron, P.Eng., QPRA

As a project engineer with over 25 years' experience in environmental consulting, Jennifer Caron has been involved in the management and execution of groundwater and soil cleanup programs for a variety of industrial and municipal clients. She has extensive experience in contaminant hydrogeology and site characterization, and has over 20 years of experience with RA projects. Her role in RA projects during the past 15 years has been primarily as lead risk assessor responsible for completing the majority of the RA reports, including the conceptual site model (CSM); the modelling, exposure,risk characterization calculations; the evaluation of existing site data; and risk management.

Jennifer's experience has been with a variety of organic and inorganic chemicals, including extensive experience in assessing the fate and transport of chlorinated organic compounds.

Travis Tan, M.A.Sc., P.Eng., QPESA, QPRA

Travis has over 11 years of experience in the environmental field, specializing in providing solutions for brownfield redevelopment, including risk assessment, risk management, and remediation.

Travis is a Qualified Person for ESA (QPESA) as defined by O. Reg. 153/04. He has managed and provided senior technical oversight on ESA work for more than 100 sites across Ontario and Alberta. These sites include a 69-hectare (ha) (170-acre) former power plant, an operating aircraft manufacturing facility, a 101-ha (250-acre) former chemical manufacturing plant, a 36-ha (90-acre) former wood treatment plant, and retail gasoline stations.

Travis has extensive experience in providing solutions for brownfield redevelopment and management of environmental liability. He has been involved in planning and managing risk assessments, including risk management plans (RMPs), and environmental remediation for complex brownfield sites. As a Qualified Person for RA (QPRA) as defined by O. Reg. 153/04, Travis has worked on approximately 30 risk assessments (RAs) on sites across Ontario, of which 15 have been accepted by the Ministry and Records of Site Condition (RSCs) were subsequently filed.

Travis has provided due diligence consultation on numerous property transactions, including one valued at more than $200 million. He has also provided technical support for some of the top environmental attorneys in Ontario, and served as expert witness on environmental litigation.

Travis holds a Bachelor of Engineering degree in Environmental Engineering from the National University of Singapore and a Master of Applied Science degree in Chemical Engineering from the University of Toronto. He is a registered Professional Engineer in Ontario and Alberta.

3. Property Information, Site Plan, and Geological Interpretation

Additional supporting documentation and interpretation for the information included in this section is provided in Appendix D.

3.1 Property Information

3.1.1 Risk Assessment Property Location and Ownership

The Risk Assessment Property (RA Property or Site) is located at 200 Beverley Street in Guelph, Ontario (Figure 1-1). The current land use is industrial, and the proposed future land use may include residential, parkland, and commercial uses. The Universal Transverse Mercator (UTM) coordinates (North American Datum [NAD] 83, Zone 17) for the RA Property are 562213 Easting (E) and 4822326 Northing (N).

The City of Guelph (City) is the current owner of the RA Property. Table 3-1 presents the property information for the RA Property. Table 3-2 presents the current owner contact information related to the RA Property.

3.1.2 Physical Characteristics of Risk Assessment Property

The RA Property (Figure 1-1), is approximately 5.2 hectares (ha) in area, and roughly triangular in shape. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place. The RA Property is surfaced with vegetation where concrete floor slabs are not present (Figure 1-2).

No surface water features were identified onsite or within 30 m of the RA Property. The nearest surface water features are the Eramosa River (0.5 kilometres [km] south), and the Speed River (1.1 km west).

The Site lies at an average elevation of approximately 315.5 metres above sea level (masl), with a topographic high of approximately 316.5 masl at OW13, which lies in the southeastern portion of the Site. The final grading and drainage of the RA Property under redevelopment conditions are yet to be determined, but it is anticipated that drainage will be directed toward the City's stormwater system. This decision will be made as part of the redevelopment activities.

3.1.3 Additional Property Information

The following subsections summarize additional property information which Jacobs used in the development of the conceptual site model and supported the preparation of the RA report.

3.1.3.1 Site History and Past Uses

The Phase One ESA (CH2M, 2017) provides the history of the RA Property, summarized herein.

Based on a review of available information, the RA Property was considered to be first developed in 1913 when it was acquired by the International Malleable Iron Company (IMICO) for use as an iron-jobbing foundry. Historical onsite buildings/structures and manufacturing areas were identified from fire insurance plans (FIPs) and site plans in previous reports, including the foundry, annealing room, chipping room, galvanizing buildings, warehousing, storage (coal, sand, bricks, polychlorinated biphenyl [PCB] materials), paint shop, and offices.

The foundry closed in 1989, and the Site was generally vacant from that time on, with the exception of some reported community-type occupancy during the time of the Assembly of the Church of the Universe ownership (1993 to 1997). A number of fires occurred during this period, and in 1997, the City took over the Site. Demolition of the buildings and removal of various wastes from the Site (including some excavated soil and PCB materials and a large above-ground storage tank [AST]) occurred in 1998 through 1999.

3.1.3.2 Current Site Use

Currently, the RA Property is currently vacant with no onsite operations occurring. No buildings or structures are located onsite; however, the majority of the concrete floors, foundations, and footings of historical buildings were present at the time of the site reconnaissance (June 21 and 29, 2017). The RA Property is considered an industrial/commercial/community land use under O. Reg. 153/04. Since the historical land use has been predominantly industrial, and the future land use is mixed residential, parkland, and commercial use, the RA Property requires a record of Site Conditions (RSC) for a change to a more sensitive land use under Section 168.3.1 of the *Environmental Protection Act* (MECP, 1990).

3.1.3.3 Current and Past Use of Adjacent Properties

The RA Property is surrounded by a mix of industrial, commercial, and residential lands. The RA Property is bound:

- To the north by residential, commercial, and industrial properties
- To the east by residential, commercial, and industrial properties
- To the west, bounded by Stephenson Street South and beyond that are residential and commercial properties
- To the south, bounded by Beverley Street and beyond that are residential, commercial, and industrial properties

Figure 1-2 provides an aerial view of the RA Property and the current land use of the adjacent properties.

3.1.3.4 Potential Offsite Sources of Contamination

The Phase One ESA (CH2M, 2017) identified the following offsite potentially contaminating activities (PCAs) within the Phase One Study Area (that is, the area within 250 m of the Eastern Site):

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 10 – Commercial Autobody Shops
- 11 – Commercial Trucking and Container Terminals
- 12 – Concrete, Cement and Lime Manufacturing
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing or Bulk Storage
- 43 – Plastics (including Fiberglass) Manufacturing and Processing
- 45 – Pulp, Paper and Paperboard Manufacturing and Processing
- 46 – Rail Yard, Tracks, and Spurs
- 49 – Salvage Yard, including Automobile Wrecking
- 55 – Transformer Manufacturing, Processing and Use
- 57 – Vehicles and Associated Parts Manufacturing

3.1.3.5 Potential Offsite Receptors

The current land use immediately surrounding the RA Property is residential and industrial/commercial. Therefore, offsite human receptors include residents, patrons, and workers at nearby homes, businesses, or facilities. The land use surrounding the RA Property in the future is unknown, but the human receptors inferred to be present under current conditions are likely to also be present under future conditions.

Given that the surrounding land uses are urban and developed, offsite terrestrial ecological receptors are anticipated to include mowed grass, trees, shrubs, and herbaceous vegetation in constructed ornamental gardens as well as mammals and birds tolerant of habitat disturbances and human activities within an urban setting, as well as species with a greater range, which migrate between habitats and areas. No surface water features are located on or in the immediate vicinity of the RA Property where aquatic ecological receptors may reside. The closest water body is the Eramosa River located approximately 500 m to the south.

3.1.3.6 Proposed Future Site Use

The future redevelopment plans at this time are unknown, but may include one or more of residential, parkland, and commercial use.

3.2 Site Plan and Hydrogeological Interpretation of RA Property

Exhibit 3-1 provides a summary of the Phase Two Conceptual Site Model (CSM) that was relied upon in the preparation of the RA. Appendix D3 provides the full Phase Two CSM, which satisfies the mandatory reporting requirements for this subsection of the RA report.

Exhibit 3-1. Phase Two Conceptual Site Model Summary

Phase Two CSM Element	Summary	Figure Reference (Appendix D3)
Potentially Contaminating Activities (PCA)	• 77 PCAs identified, 48 offsite and 29 onsite	4-1a and 4-1b
Areas of Potential Environmental Concern (APEC)	• 33 APECs identified, 4 attributable to offsite PCAs and 29 attributable to onsite PCAs	4-2
Subsurface Structures and Utilities	• Some concrete foundations, slabs and footings from the former buildings remain onsite • Although utilities have been disconnected on Site, piping and bedding have not been removed and, therefore, there is a potential for utility corridors to act as preferential route of contaminant. The locations of former utilitiy corridors are not known	2-2

Stratigraphy	From the surface:
	• Fill
	• Sily fine sand
	• Eramosa Formation
	  o Stone Road Member
	  o Reformatory Quarry Member
	  o Vinemount Member
	• Goat Island Formation
		6-1, 6-1a to 6-1h

Exhibit 3-1. Phase Two Conceptual Site Model Summary

Phase Two CSM Element	Summary	Figure Reference (Appendix D3)
Hydrogeological Characteristics		
Overburden and bedrock contact zone	• Flow Direction: Northeast to southwest • Average Hydraulic Conductivity: 3.9 x 10^{-5} m/s • Horizontal Hydraulic Gradients: 0.002 to 0.019 m/m • Groundwater Velocity: 25 to 230 m/y • Vertical Hydraulic Gradients: Predominantly downward ranging in magnitude from 0.001 to 0.17 m/m	6-2a, 6-2b, 6-2c
Eramosa Formation	• Flow Direction: East • Average Hydraulic Conductivity: 5.7 x 10^{-7} m/s • Horizontal Hydraulic Gradients: 0.0004 and 0.002 m/m • Groundwater Velocity: 0.7 to 3.5 m/y	6-2d, 6-2e, 6-2f
Goat Island Formation	• Flow Direction: Not available • Average Hydraulic Conductivity: 3.7 x 10^{-5} m/s • Horizontal Hydraulic Gradients: Not available • Groundwater Velocity: Not available	NA
Depth to Bedrock	• 1.0 to 3.4 mbgs	6-1a to 6-1h
Depth to Water Table	• Minimum: 0.93 mbgs • Average: 2.78 mbgs • Maximum: 4.97 mbgs	6-1a to 6-1h
Applicablility of Sections 35, 41, or 43.1	• Section 43.1 applies (shallow soils) • Section 35 and 41 are not applicable • Table 6 selected as the SCS (MECP, 2011b)	NA
Areas where Soil has been Brought to the RA Property	• Historical fill present, no soil brought to the RA Property as part of the Phase Two ESA	NA
Proposed Building Locations	• Final redevelopment plans are unknown, potential future residential or commercial buildings	NA
Contaminants in Soil	• Metals (sitewide, delineated to bedrock) • EC (northeast corner in backfill material from previous excavation completed by others) • BTEX (localized in two areas: western boundary and south-central portion, delineated to bedrock) • PHCs (localized to three areas: western area and central-southern area, and northeastern and eastern area, delineated to bedrock) • PAHs (localized to four areas: western boundary, south-central area, northern boundary, and eastern area, delineated to bedrock in most areas) • VOCs (localized to the eastern corner, delineated to bedrock) • PCBs (localized to three areas: eastern area, western area, and south-central area, delineated to bedrock in all areas but the eastern area)	6-3 through 6-~~11~~12

Exhibit 3-1. Phase Two Conceptual Site Model Summary

Phase Two CSM Element	Summary	Figure Reference (Appendix D3)
Contaminants in Groundwater	• Metals (in overburden and bedrock contact zone and Eramosa Formation) • BTEX (in overburden and bedrock contact zone and Eramosa Formation) • PHCs ((in overburden and bedrock contact zone); LNAPL measured in three monitoring wells in the eastern portion of the Site. • PAHs (in overburden and bedrock contact zone) • VOCs (in overburden and bedrock contact zone, Eramosa Formation, and Goat Island Formation)	6-~~12~~ 13 through 6-~~20~~21
Climatic Conditions	• Temporal flucations in groundwater levels. No atypical weather events that would be expected to significantly influence COC transport are known to have occurred during the Phase Two ESA	NA
Vapour Intrusion	• Details regarding the location or construction details of future buildings, or where subsurface utilities will be installed are not known at this time. RMMs for future buildings are required, as discussed in Section 7.	NA
Human Health Conceptual Site Model	• Residents, site visitors, outdoor workers, construction workers, and utility workers in contact with soil and groundwater, via direct contact, dust inhalation, and inhalation of outdoor air	4-1 (main text)
Ecological Conceptual Site Model	• Soil organisms, terrestrial plants, birds, and mammals in contact with soil (groundwater for terrestrial plants only) via direct contact, root uptake (plants), and ingestion (of biota and prey)	5-1 (main text)

Notes:
cm/y = centimeters per year
COC = contaminant of concern
m/m = metres per metre
m/s = metres per second
m/y = metres per year
mbgs = metres below ground surface
NA = not applicable
LNAPL = light nonaqueous phase liquid
SCS = site condition standard

3.2.1 Presence of Light Non-Aqueous Phase Liguid

LNAPL was measured in the eastern portion of the Site, at OW23S, MW17-108S, and MW18-135S, with apparent thicknesses measurements within the wells of up to 0.970 m. These LNAPL measurements within the wells have shown significant variation (that is, reported thicknesses as low as <0.005 m in the same well after a measurement with a greater measured thickness). The variability in the LNAPL measurements are subject to the Site conditions and field methods at the time of the measurement and to water table fluctuations and LNAPL accumulations that occur in the monitoring wells during periods of water table decline. Generally, the apparent LNAPL thickness measured in a monitoring well can be between 2 to 10 times greater than that in the formation (USEPA, 1995). The measured apparent LNAPL thicknesses at the three monitoring wells are provided below:

Well ID	LNAPL Thickness (m)							
	12/1/2017	8/20/2018	12/18/2018	3/26/2019	7/3/2019	10/1/2019	12/3/2019	2/21/2020
OW23S	0.010	0.390	<0.005	--	0.020	0.500	0.970	<0.005
MW17-108S	0.000	0.130	<0.001	0.130	0.040	0.180	0.070	<0.001
MW18-135S	--	--	--	0.010	0.930	0.560	0.750	0.020

The source of the LNAPL is likely related to the historical contamination in the northeastern area of the Site which was remediated (soils excavated to bedrock) in 1998. In the central eastern portion and southeast corner of the Site, the concrete building slabs from the former machine shop and warehouse/storage buildings remain intact, further suggesting the source is from a release to the north. Historical LNAPL has been consistently measured in OW23 since monitoring began after the remediation. Groundwater montoring programs, completed as part of the 2004 Provincial Officer's Order (Order Number 7616-5LA:3S), had been conducted by AECOM since 1998 which included the collection of groundwater samples, recording of water level measurements, and the removal of LNAPL at OW23S (AECOM, 2015). The quantities of LNAPL removed were only specified in the 2015 and 2016 reports which indicated only recoveries ranging from 100 millilitres (mL) to 350 mL from each event (AECOM, 2016, 2017). LNAPL thickness measurements at OW23S stayed relatively stable over those years and indication from City representatives confirmed very little LNAPL was recovered in these efforts.~~, in 2004, with a~~Apparent thicknesses were reported between 0.02 to 0.15 m in 2004 (Gartner Lee Limited, 2004) and~~;~~ between 0.02 to 0.15 m from 2010 to 2016 (AECOM, 2012-2017)[1]; measurements collected from 2017 to present are shown above. MW17-108S and MW18-135S were installed in 2017 and 2018 for delineation purposes, and LNAPL has been measured in these additional wells from this time onward. The limits of the LNAPL are inferred based on surrounding wells to the north, east, south and west, with screens straddling the water table, and no measured LNAPL: OW22S, OW13-39S, MW19-137S, OW09-I, and MW17-101S.

Based on the monitoring network, the LNAPL appears to remain within the property boundaries, and prior to advancing additional wells in the area, LNAPL had historically been measured only in the one monitoring well (OW23). The release of contaminants would have occurred sometime prior to the 1998 excavation, indicating that in over 20 years, potential migration has been limited. The LNAPL/water levels measured from 2010 to 2020 show levels fluctuating around the bedrock contact zone in the northern end, and consistently below the bedrock surface in the southern portion of the inferred plume. Stratigraphic logs for the monitoring wells advanced in the area have indicated black staining, sheen, and hydrocarbon odours in the highly fractured bedrock (that is, up to 4.6 mbgs at MW17-108S). Based on this information, active LNAPL extraction was determined ~~is~~to not be feasible as the process would be slow and inefficient within the bedrock, and would involve very costly measures.

The dissolved concentrations of PHCs in the groundwater where LNAPL is present are mainly comprised of F3 fractions, with concentrations of up to 580,000 µg/L (F3), 13,000 µg/L (F2), and 24,000 µg/L (F4) reported at the north end of the inferred plume. The most recent sampling of monitoring wells wth LNAPL had groundwater samples collected immediately below the LNAPL (using special sampling techniques) with reported dissolved concentrations of up to 7,360 µg/L (F3) and 550 µg/L (F4).

The NAPL locations (along with the PHC results in groundwater) are discussed in Appendix D3 as part of the Phase Two ESA Conceptual Site Model (CSM), and shown on Figure 6-15 (plan view) and in cross-section view on Figures 6-15a and 6-15b.

3.2.2 Non-Standard Delineation

Under the assumption that the RA will be accepted by the MECP, non-standard delineation per O. Reg. 153/04 Schedule E, Section 7.1 was conducted for the following contaminants of concern (COCs):

- cis-1,2-dichloroethylene (cis-1,2-DCE) in groundwater at OW31 (refer to Figures 6-17, 6-17c and 6-17d in Appendix D3).

[1] Reports made available as part of the background review for the Phase One Environmental Site Assessment.

Delineation was conducted to the requirements of O. Reg. 153/04 Schedule E, Section 7 for all other COCs identified at the RA Property in soil and groundwater.

There is confidence that the maximum concentration of cis-1,2-DCE onsite has been located (OW24D) given its proximity to the known offsite source of chloroethenes and the consistently lower concentrations found across the remainder of the Site, decreasing both horizontally and vertically. Low levels of cis-1,2-DCE are present at depths on Site greater than the depth of OW24D, however the low level cis-1,2-DCE is present across the entire Site in the Goat Island and the Vinemount Member, interpreted to be from an upgradient offsite source based on regional data. Additional vertical or lateral delineation of cis-1,2-DCE at the Site would not materially change Phase Two ESA Conceptual Site Model (CSM), or the Risk Management measures (RMM) to be developed as part of the RA based on the existing dataset. We understand that the MECP concurs with this interpretation, as well as agrees on the importance to avoid drilling deeper into the City's municipal drinking water aquifer, the Gasport Formation. Based on this information, the QP is satisfied that the current dataset provides adequate information to support the RA and additional vertical delineation is not required.

3.3 Contaminants of Concern

The list of COCs for initial consideration in both the human health risk assessment (HHRA) and ecological risk assessment (ERA) was determined according to the screening process described in the following subsections. The major tasks involved for COC selection are as follows:

- Identification of sampling data available for the RA Property
- Review of the suitability of the data in terms of reliability and representativeness of current Site conditions (consistent with the Phase Two ESA)
- Identification of maximum contaminant concentrations and comparison to the applicable SCS (or other appropriate screening criteria for chemicals not regulated under O. Reg. 153/04).

3.3.1 Identification of Data Sources

The RA Property has been the subject of several soil and groundwater investigations and studies since 1991. Appendix D1 (Table D1-2) provides the list of historical reports and investigations. Jacobs reviewed the analytical data results from past investigations to provide a summary of the known soil and groundwater quality within the RA Property as part of the Phase One ESA (CH2M, 2017). COCs for the RA Property were identified based on analytical results obtained from the current Phase Two ESA in addition to staged sampling programs that have been implemented by a variety of consultants.

3.3.2 Reliability of Historical Data

Jacobs evaluated historical data collected by others as part of the data gap assessment and sampling and analysis plan development, to determine whether they could be applied during the Phase Two ESA (in development by Jacobs).

In general, Jacobs made the following observations during this evaluation:

- Parameters, such as oil and grease, total petroleum hydrocarbons (TPHs), and volatile organic compounds (VOCs) were characterized more adequately by current standards, using appropriate sample collection and laboratory analysis methods. Oil and grease and TPH analyses were replaced by petroleum hydrocarbon (PHC) fraction (F)1 through F4 analysis. TPH and VOC analyses from before 2004 are considered unreliable due to changes in analytical methods

- Groundwater concentrations older than 10 years from the commencement of the Phase Two ESA activities were considered not representative of current conditions
- Some results (specifically those prior to 1999) were provided in some reports without supporting laboratory certificates of analysis (COAs)

Where these observations were noted, a portion of the historical data could not be fully relied upon to reflect current environmental conditions at the RA Property. Therefore, Jacobs used the data for screening purposes only during the Phase Two ESA to reflect the possible presence of contaminants in certain areas. The data was not used to confirm concentrations meeting the applicable standards in APECs, nor were they used to confirm maximum concentrations on the RA Property.

The following historical data in soil were determined to be adequate for identifying contaminant concentrations:

- Metals, including hydride forming and ORP hexavalent chromium and mercury
- Polycyclic aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- VOCs and BTEX after 2004

PAHs and PCBs are less likely to degrade in the field. However, current analytical methods for these parameters have lower detection limits, and therefore, they are better used for defining limits and extents of contamination relative to current standards. Where older method detection limits (MDLs) may have been exceeded, additional analysis may be required to confirm maximum concentrations, or to confirm concentrations are less than applied standards. Jacobs considered this requirement while developing the various sampling and analysis plans for the Phase Two ESA (in development by Jacobs). Minimal degradation of metals in soil is expected over time; therefore, data are inferred to reasonably reflect RA Property conditions, except in areas inferred to have been further contaminated since initially sampled which has not known to occur at the Site.

Note that where historical data were used for the parameters, results should be interpreted with caution. Over time, regulations, analytical best practices, and methods have evolved. Many hold times and preservatives changed as a result of O. Reg. 153/04 (MECP, 2011c). Changes in analytical methods, hold times, and sample preservation do not necessarily invalidate previous data, but they keep the analytical procedures in step with current science. Most preservatives and hold times are designed to retain analytes of interest in solution for the period of the stated hold time. It is reasonable to state that as hold times and preservatives are changed with the use of new analytical best practices, older data could be biased low; however, this is not necessarily always the case. Moreover, changes in current rules affecting sample preservatives and hold times do not invalidate the usability of historical data.

Despite these considerations, the historical soil and groundwater data deemed adequate for identifying contaminant concentrations were considered valid for ESA, remedial planning, and RA purposes for the following reasons:

- Changes in current rules affecting sample preservatives and hold times do not invalidate the usability of historical data. Over time, regulations, analytical best practices, and methods have evolved.
- Samples were analyzed at commercial laboratories, using standardized methods for environmental sampling. Commercial laboratories have the ultimate goal of producing valid and reproducible data by performing analysis using current reference methods, often issued by the United States (U.S.) Environmental Protection Agency (EPA) or MECP.

- More recent data have lesser detection limits; however, this is accounted for in the data evaluation. The testing at commercial laboratories has, for the most part, been conducted for years, and the evolution of the testing methods has improved the performance of the method but has not invalidated previous data.
- In general, changes to MDLs will not change the absolute values determined; however, there will be more detections as the detection limits are reduced.

3.3.3 Additional Phase Two Environmental Site Assessment Data Screening Summary

A review of the database as part of the Phase Two ESA (Jacobs, 2020) indicated that select nondetected soil and groundwater results for specific parameters based on laboratory MDLs greater than the Table 6 SCS may not be representative of site conditions. Additionally, parameters that were run as part of older ABN laboratory scans alongside VOCs and PAHs, that were not targeted COCs may not be representative of Site conditions, At the discretion of the QP_{ESA} for the RA Property, these data points, with some exceptions, have been excluded from the analytical database following a rigorous data review process. In general, removal of the select elevated MDL data had a negligible impact on the identification of COCs. The MDL data points removed represent a small proportion of the total data set for soil or groundwater. The rationale for the removal of each of the data points is presented in Appendix D2, Tables 6-7b (soil) and 6-10b (groundwater).

At the discretion of the QP_{ESA} for the RA Property, parameters with exceedances that were not reproduced in subsequent sampling events were not considered groundwater COCs. The rationale for the removal of each of the data points is presented in Appendix D3, Table 6-10c.

3.3.4 Contaminant of Concern Screening Process

Follwing the steps previously described, Jacobs conducted the screening for COCs as follows:

1. A maximum concentration was identified for each parameter. The maximum concentration in soil and groundwater was determined as either the maximum measured value or the greatest detection limit (if greater than the maximum measured value) if an MDL was retained based on the additional data screening per Section 3.3.3.
2. Parameters were retained as a COC under the screening process if they were detected in soil, groundwater, or both as follows:
    a. Parameters were retained for further consideration under the screening process for soil and groundwater if the identified maximum concentration exceeded the Table 6 SCS. Tables F1-1 and F1-2 in Appendix F show the detailed screening process, including the measured concentrations, the number of samples, and the number of detects greater than the Table 6 SCS in soil and groundwater, respectively, at the RA Property.
    b. Parameters that did not have a Table 6 SCS for the media sampled, and where 100 percent of the samples were nondetect, were not retained as COCs (Tables F1-1 and F1-2). There is high confidence that these parameters are not present onsite. However, parameters with laboratory analysis of onsite sampling that reported detectable results were further considered per Section 3.3.3.

    A number of additional screening considerations were built into Step 2 of the screening process on a parameter-specific basis. Of note are the following considerations:

i. Analytical results for the following parameters were reviewed to confirm that the sum of maximum reported individual isomers or the reported summed total was selected as the overall maximum value for comparison to the applicable SCS:

- Methylnaphthalene 2-(1-), 1-methylnaphthalene, and 2-methylnaphthalene
- Benzo(b&j)fluoranthene, benzo(b)fluoranthene, and benzo(j)fluoranthene
- Total xylenes, o-xylene, and m,p-xylene
- 1,3-Dichloropropene, cis-1,3-dichloropropene, and trans-1,3-dichloropropene
- 2,4- and 2,6-Dinitrotoluene, 2,4-dinitrotoluene, and 2,6-dinitrotoluene
- PHC F1, PHC F1 [minus BTEX]
- PHC F2, PHC F2 [minus naphthalene]
- PHC F3, PHC F3 [minus PAHs]
- PHC F4, F4 gravimetric (F4G)-silica gel (SG) (gravimetric-heavy hydrocarbon-silica)

3.3.5 Contaminant of Concern Screening Results

3.3.5.1 Soil

As Table 4-1 indicates, ~~38~~ 42 COCs were retained in soil following the screening process outlined in Section 3.3.4 (Screening Step 2). These chemicals were carried through to the HHRA and ERA. Appendix F presents the detailed screening tables.

3.3.5.2 Groundwater

As Table 4-2 indicates, 30 COCs were retained in groundwater after screening process outlined in Section 3.3.4 (Screening Step 2). These chemicals were carried through to the HHRA and ERA. Appendix F presents the detailed screening tables.

3.3.5.3 Sampling Programs

The Phase Two ESA investigation (summarized in Appendix D2) was conducted to:

- Support and update previous studies
- Meet current O. Reg. 153/04 (as amended) (MECP, 2011a) regulatory requirements
- Investigate or further investigate APECs identified during the Phase One ESA (summarized in Appendix D1)
- Provide data to support future remedial activities or an RA that would need to be conducted to support the eventual filing of an RSC

The sampling program which consisted of a comprehensive soil and groundwater sampling program is considered sufficient to meet the objectives of the RA (refer to Section 1.1). The Site characterization, which describes the stratigraphy and hydrogeological characteristics of the Site, informed the selection of potential human and ecological receptors both on and off the RA Property. The horizontal and vertical extent of impacts in both soil and groundater have been sufficiently defined for the Site, providing confidence that the maximum concentrations of COCs have been identified. The maximum concentrations were used to derive exposure point concentrations for the evaluation of human and ecological health risks and to derive a property-specific standards for each COC. Since the intent is to manage the potential risk associated with soil and groundwater contamination in place by using engineering controls as necessary (Section 7), the data collected by Jacobs was considered to be adequate.

3.4 References

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4. Human Health Risk Assessment

This section of the risk assessment (RA) primarily evaluates risk to human health at the RA Property by addressing the elements required in the RA process. Jacobs completed a quantitative and qualitative Human Health Risk Assessment (HHRA) and deemed the level of risk to be appropriate based on the RA Property's existing conditions and anticipated future use, and the implementation of a risk management plan (RMP). HHRAs assess the potential for human health risks resulting from contamination and the presence of contaminants of concern (COCs) at a site.

This HHRA adheres to the prescribed Ontario Regulation (O. Reg.) 153/04 (as amended) (MECP, 2011a) reporting format and includes the following four major elements:

1) Problem Formulation
2) Exposure Assessment
3) Hazard Assessment
4) Risk Characterization

4.1 Problem Formulation

4.1.1 Human Health Conceptual Site Model

The previously identified risk components, namely chemicals detected, site-specific soil characteristics, pathways, and receptors, as well as proposed redevelopment conditions, are combined to synthesize the conceptual site model (CSM) for the HHRA. The CSM is used to direct the quantitative and qualitative assessments to complete the RA. This section describes elements considered in the development of the CSM.

Receptors have been identified under pre- and post-redevelopment situations, independent of the screening of COCs. This is so that the most conservative scenarios for the RA Property are considered and modelled quantitatively, if necessary. Jacobs understands the RA Property will be redeveloped into mixed residential, parkland, and commercial use. Consequently, Jacobs considered residential and commercial development scenarios while identifying receptors and potentially complete exposure pathways. Residential exposures are protective of parkland exposures.

The following onsite receptor types have been identified for the CSM:

- Residents
- Site Visitors
- Indoor Workers
- Construction Workers
- Utility Workers
- Outdoor Workers

Offsite potential receptors include the following:

- Surface Receptors[1]
- Construction Workers
- Utility Workers

[1] Surface Receptors incorporate offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as Residents, Visitors, Outdoor Workers, or Patrons of nearby properties who may be exposed to dust (soil particulates) migrating offsite during the redevelopment of the RA Property in the absence of risk management measure (RMMs).

Onsite Outdoor Worker, Indoor Worker, Site Visitor, and Resident receptors could be exposed to surface soil. Onsite Construction and Utility Workers receptors could be exposed to surface and subsurface soil. Offsite receptors could be exposed to COCs migrating offsite through soil particulate or groundwater migration. Groundwater is not typically accessible to receptors other than Construction and Utility Workers. Section 4.2.1 provides additional details on potential receptors.

Figure 4-1 presents the Human Health CSM that was developed for the RA Property under current and proposed future conditions. It was based on, and is consistent with, information gathered during site investigation activities and visits described in Section 3 and Appendix D. Section 4.2 describes in more detail how the Human Health CSM was developed and used in the HHRA. Figure 4-2 illustrates the Human Health CSM that is relevant after the RMP in Section 7 of this document is implemented.

4.1.2 Contaminant of Concern Screening for Human Health

Chemical screening incorporates elements of toxicity analysis and exposure assessment by selecting screening criteria that have previously been developed through an RA approach. Risk-based screening criteria use toxicity reference values (TRVs) derived by regulatory agencies in Canada and the United States (U.S.). Regulatory agencies use TRVs to back-calculate standards considered protective of various land uses. The risk-based standards also incorporate assumptions regarding the most sensitive receptor characteristic, such as body weight (BW), ingestion rate, and exposure duration (ED) (based on land use). Chemical screening was conducted to focus the number of retained COCs for the quantitative HHRA.

As presented in Section 3.3, Contaminants of Concern, parameters in soil and groundwater were screened against the Ministry of the Environment, Conservation and Parks (MECP's) *Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* for Residential/ Parkland/ Institutional/ Industrial/ Commercial/Community property use (Table 6 SCS) (MECP, 2011c) based on detected concentrations and method detection limits (MDLs) (refer to Tables F1-1 and F1-2 in Appendix F). This screening process identified the set of COCs requiring evaluation in both the HHRA and ecological risk assessment (ERA).

The following subsections outline the secondary screening process for human health and identify which COCs were assessed quantitatively or qualitatively.

Estimated Site Maximums. Jacobs used estimated Site maximums to complete the secondary human health screening and risk calculations; the approach was inferred from information provided in the Modified Generic Risk Assessment (MGRA) model spreadsheet (MECP, 2016a; 2016b). The MGRA model spreadsheet accepts an estimated maximum concentration up to 20 percent greater than the measured maximum. The estimated Site maximums were, therefore, derived by applying the greater of the maximum detected concentration, multiplying it by 1.2 and then rounding it down to two significant digits, as appropriate, or by applying the MDL. Jacobs did not apply this calculation to COCs with observed maximum concentrations based on an MDL.

Chemical Fate and Transport. The potential fate and transport of a chemical is characterized, in part, by its physical and chemical properties. Water solubility predicts the amount of a chemical that will dissolve in water. The soil sorption coefficient predicts the ratio of the chemical mass that will adsorb to soil versus the mass that will dissolve in soil pore water. The vapour pressure of a chemical can indicate the likelihood that a chemical will volatilize from its pure compound state; chemicals with high vapour pressures are expected to readily volatilize. The Henry's Law Constant (H) for a chemical indicates the theoretical amount of a chemical that will volatilize from the dissolved water phase to the vapour phase; chemicals with high H (that is, greater than 1×10^{-5} [atmospheres per cubic metre per mol [atm-m^3/mol]) or a high vapour pressure (that is, greater

than 1.0 Torricelli [Torr] [Blok, 2019, pers comm.]) are expected to volatilize. Inorganics were not considered volatile; therefore, they were not retained for the vapour inhalation (VI) pathway. The heavier petroleum hydrocarbons (PHCs) (that is, PHC F3 and PHC F4) were also not considered volatile, and were not retained for the VI pathway. Additional details on the volatility designation of parameters are presented in Appendix F2.

As part of the exposure assessment, these values are examined for each COC to evaluate the potential for migration and to model the movement of COCs from the subsurface to a receptor along a potentially complete exposure pathway. Chemical properties provided in the Rationale Document (MECP, 2011a) were used in this assessment unless otherwise indicated. Jacobs used the chemical properties provided in the Rationale Document (MECP, 2011b) in this assessment, unless otherwise indicated.

Tables 4-1 and 4-2 present the estimated maximum concentrations for soil and groundwater. Section 4.1.2.1 describes the secondary screening process for soil.

4.1.2.1 Soil Screening

Parameters were retained for *quantitative* analysis related to direct contact exposure to soil if the parameter was selected as a COC through the screening process in Section 3.3 and its estimated site maximum concentration is greater than the S1 (direct contact) component values used to derive the Table 2 *Full Depth Generic Site Condition Standards in a Potable Ground Water Condition* for coarse-grained soils and residential/parkland/institutional land use (Table 2 Standard) (Appendix F1, Table F1-3).

Parameters were retained for *quantitative* analysis related to inhalation of dust particulate if the parameter was selected as a COC through the screening process in Section 3.3, and the parameter was retained for direct contact exposure to soil (that is, the estimated maximum concentration is greater than the Table 2 S1 component value) (Appendix F1, Table F1-3).

Jacobs employed a two-step screening process for the selection of parameters to be retained for *quantitative* analysis related to inhalation of volatiles through the soil-to-indoor-air (S-IA) pathway and the soil-to-outdoor-air pathway[2] (including inhalation in a trench). Appendix F2 provides additional details on the volatility designation of the COCs (Appendix F2, Table F2-1) and the screening process applied to soil COCs determined to be volatile (Appendix F2, Table F2-2).

COCs and pathways that were not retained for quantitative assessment were, therefore, retained for qualitative assessment. Refer to Section 4.4.3. Table 4-1 summarizes the pathways to be retained for each COC resulting from the secondary screening. Appendix F1, Table F1-3 and Appendix F2, Table F2-2 provide the detailed screening for non-volatile COCs and volatile COCs, respectively.

4.1.2.2 Groundwater Screening

Parameters were retained for *quantitative* analysis related to direct contact exposure to groundwater (for Construction and Utility Workers) and potable water use for Residents if the parameter was selected as a COC through the screening process in Section 3.3, and its estimated site maximum concentration is greater than the GW1 (direct contact) component value used in the derivation of the Table 2 Standard (MECP, 2011a) (Appendix F1, Table F1-4).

Jacobs employed a two-step screening process for the selection of parameters to be retained for quantitative analysis related to inhalation of volatiles through the groundwater- to-indoor-air (GW) pathway and the groundwater-to-outdoor-air pathway (including inhalation in a trench). Appendix F2 provides additional

[2] Appendix G2 provides the rationale for why the MECP outdoor air (OA) component values were not specifically used in the RA.

details on the volatility designation of the COCs (Appendix F2, Table F2-1) and the screening process applied to groundwater COCs determined to be volatile (Appendix F2, Table F2-2).

COCs and pathways that were not retained for quantitative assessment were, therefore, retained for qualitative assessment. Refer to Section 4.4.3. Table 4-2 summarizes the results of the secondary screening. Appendix F1, Table F1-4 and Appendix F2, Table F2-2 provide the detailed screening for non-volatile COCs and volatile COCs, respectively.

4.1.2.3 Additional Considerations Applicable to the Human Health Risk Assessment

Approach for Polycyclic Aromatic Hydrocarbons

The MECP uses a toxicity equivalence factor (TEF) approach to assess risks related to environmental mixtures of carcinogenic polycyclic aromatic hydrocarbons (PAHs). Jacobs reviewed Canadian Council of Ministers of the Environment (CCME) guidance on PAHs when selecting an approach to assess risks related to environmental mixtures of carcinogenic PAHs (CCME, 2010).The MECP guidance indicates that when it is possible for exposure to a PAH mixture to occur at a site, the combined carcinogenic risk from all PAHs with the same mode of action must be assessed, even if an individual PAH is present at a concentration less than its individual SCS.

The TEF approach to assessing potential carcinogenic risks related to environmental mixtures of PAHs is based on evaluating the relative toxicity of carcinogenic PAHs to benzo(a)pyrene (B(a)P). Table 4-3 presents the TEFs applied in this assessment.

To assess the combined carcinogenic risk from all PAHs at the RA Property, a total toxicity equivalence concentration (Washington Department of Ecology, 2008) or benzo(a)pyrene equivalent (B(a)PE) (Law et al., 2002) must be developed as follows:

$$B(a)PE = \sum(Cn \times TEFn) \qquad (1)$$

Where:

Cn = Concentration of the individual carcinogenic PAH in the mixture (micrograms per gram [µg/g] for soil and micrograms per litre [µg/L] for groundwater)

TEFn = Toxic equivalency factor of the individual carcinogenic PAH in the mixture

For each sample (soil or groundwater) analyzed for PAHs, a B(a)PE value was calculated per Equation (1). Half detection limits were used in the calculation for concentrations that were reported as nondetect. The calculated B(a)PE values were evaluated, and the maximum B(a)PE concentration was retained for use in the RA (Table 4-4). The estimated maximum concentration was applied (maximum result multiplied by 1.2), to produce a B(a)PE for soil of 282 µg/g and a B(a)PE for groundwater of 10.3 µg/L.

As contact with PAHs may occur through the dermal, ingestion, and dust-inhalation pathways, these pathways were evaluated using the B(a)PE. Results for these parameters appear as B(a)PE within the tables and text in Section 4.

Approach for Canadian Council of Ministers of the Environment Petroleum Hydrocarbons

The MECP has adopted the CCME Tier 1 standards for petroleum hydrocarbons (PHCs) in soil (CCME, 2008), and included them in the O. Reg. 153/04 Standards (as amended). Assumptions are available to

estimate appropriate concentrations of CCME subfractions, based on the available gross PHC measurements. For PHCs in soil, the CCME determined proportions for the 14 subfractions considered in the Total PHC Criteria Working Group (TPHCWG) (1997a,b; 1998a,b; 1999) approach within the four CCME fractions, based on published data. Table 4-5 summarizes these proportions, which were applied to the PHC fraction soil sampling results and used to evaluate the associated risk.

For PHC in groundwater, Health Canada has identified proportions for the 14 subfractions within the four CCME fractions in the *Preliminary Quantitative Risk Assessment (PQRA) Guidance Part IV* (Health Canada, 2008). Table 4-6 summarizes these proportions, which were applied to the PHC fraction groundwater sampling results and used to evaluate the associated risk.

Approach for Parameters without Toxicity Data

Human health toxicity data may not be available for all parameters evaluated in the HHRA. Refer to Section 4.4.3.5 for the qualitative assessment of electrical conductivity (EC) and lead, which do not have human health toxicity data.

Approach for Vinyl Chloride in Groundwater

In accordance with the *Rationale Document* (MECP, 2011b), the RA evaluated the potential for chlorinated ethylene concentrations in groundwater to degrade to vinyl chloride (VC). As the MECP guidance document discusses, the anaerobic biodegradation of chlorinated compounds to VC involves a reductive dechlorination step, which is influenced by chemical-specific parameters (that is, solubility) and site-specific geochemical parameters (that is, oxidation-reduction [redox] potential). The following chlorinated parent compounds are known to degrade to VC through reductive dechlorination (MECP, 2011b):

- Trichloroethylene (TCE)
- Tetrachloroethylene (PCE)
- 1,1-Dichloroethylene (1,1-DCE)
- cis-1,2-Dichloroethylene (cis-1,2-DCE)
- trans-1,2-Dichloroethylene (trans-1,2-DCE)

To account for the potential degradation of parent compounds to VC at the RA Property, the maximum concentrations of the parent compounds were summed, and 10 percent of the sum was added to the maximum VC concentration (identified as the greater of the detected concentration and MDL) to produce a potential VC concentration. An estimated maximum VC concentration was also derived by either multiplying the maximum detected VC concentration by 1.2 (if the maximum detected concentration exceeded the MDL), or applying the maximum VC detection limit. The greater of the potential VC concentration and estimated maximum VC concentration was applied as the input value in the risk calculations. Using the greatest VC concentration from these two methods provides a conservative estimate of potential future site-related risks by accounting for the potential degradation of VC parent compounds.

Table 4-7 summarizes concentrations of VC and its parent compounds in groundwater as well as the development of the potential VC concentration and compares this value to the estimated maximum VC concentration. The input value for modelling and risk calculations for the RA Property groundwater used a VC concentration of 990 µg/L, based on the estimated maximum concentration.

Approach for the Presence of Nonaqueous Phase Liquid

Over the course of the Phase Two investigation activities, nonaqueous phase liquid (NAPL) was measured in three locations: OW23S, MW17-108S, and MW18-135S. NAPL has been measured at OW23S (screened from 2.52 and 5.26 metres below ground surface [mbgs]) at thicknesses of 0.005 to 0.97 m in 21

monitoring events between 2010 and 2020. At MW17-108S (screened from 1.93 and 4.98 mbgs), NAPL has been measured at thicknesses of 0.002 and 0.18 m in six monitoring events between 2017 and 2020. At MW18-108S (screened from 4.27 to 5.79 mbgs), NAPL has been measured at thicknesses of 0.02 and 0.93 m in five monitoring events between 2019 and 2020.

The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor and outdoor air). Direct contact exposure to NAPL itself would also be possible if NAPL was present. The MECP SCS and component values considered in the evaluation of soil and groundwater COCs, and the equations applied in the calculations of risk and hazard, assume that NAPL-associated contaminants (such as PHCs; benzene, toluene, ethylbenzene, and xylenes (BTEX); and PAHs) are distributed between the dissolved, vapour, and sorbed phases (that is, three phases are considered). If NAPL is present, an additional fourth phase must be considered. Section 4.4.3.6 qualitatively evaluates the potential risks to human health from NAPL.

4.1.3 Risk Assessment Objectives

The objective of the HHRA is to estimate the potential health risks to human receptors from the COCs identified in RA Property soil and groundwater in the absence of RMMs. The RA Property is currently proposed to be redeveloped into mixed residential, parkland, and commercial use. As such, the HHRA assessed the following receptors:

- Residents
- Site Visitors
- Construction Workers
- Utility Workers
- Outdoor Workers
- Indoor Workers

As detailed in the CSM, the assessment included exposure pathways related to the ingestion of, dermal contact with, and the inhalation of COCs originating from impacts in soil or groundwater.

Risk is assessed both quantitatively and qualitatively. Quantitative risk characterization is conducted to evaluate the noncancer hazard and cancer risk posed by Site COCs to each receptor for identified potentially complete pathways. In some cases, the risk was assessed qualitatively, based on the exposure of certain receptors being protected by quantitative evaluation of a more sensitive receptor, and based on select pathways being demonstrated to be incomplete. The quantified levels of risk were used to determine whether RMMs are required at the Site. Property-specific Standards (PSSs) were also determined as required.

Human health risks and hazards were calculated for the RA Property following a standard RA approach under O. Reg. 153/04. Section 1.1.1 describes the general framework for carrying out the RA.

4.1.3.1 Jacobs Quality Control and Data Quality Objectives

Soil and groundwater sampling was either performed or supervised by Jacobs staff with experience in intrusive field investigation techniques and with the COCs encountered at the Site, under the supervision of a MECP Qualified Person for ESAs (QPESA). Soil and groundwater sampled by Jacobs between 2017 and 2020 were collected according to our standard operating procedures (SOPs), which were developed in accordance with O. Reg 153/04 (MECP, 2011a). The selected analytical laboratories performed the chemical analysis in compliance with the MECP's Laboratory Services Branch *Protocol for Analytical Methods Used in the Assessment of Properties under Past XV.1 of the Environmental Protection Act,* as amended (MECP, 2011d).

In combination with the field QA/QC program, a Jacobs project chemist has completed an evaluation of the laboratory QA/QC program to verify the accuracy, precision, and validity of the data reported by the laboratory. Various elements of the laboratory QA/QC program are used to evaluate the data: blanks are analyzed to detect laboratory contaminations that can cause data to be biased high; laboratory control samples are used to evaluate the laboratory performance; laboratory duplicates are used to measure precision in the laboratory; matrix spikes are used to identify high or low bias caused by matrix interference; and surrogate spikes are used to evaluate the method performance that can cause high or low bias in the data. Evaluation of the laboratory QA/QC program was performed by examining blanks, laboratory control samples, matrix spikes, and surrogate spike samples.

The groundwater and soil analytical data evaluated herein is considered valid. All results can be used to support the project decision making process. Appendix D2 provides additional details on the QA/QC program.

The current database includes soil and groundwater data from past investigations completed by other consultants. As discussed in Section 3.3.2, Jacobs determined that some historical soil data are useful for inclusion in the RA report. Appendix D2 lists the historical reports which were included as part of the Phase Two ESA.

Since the intent is to manage the potential risk associated with soil and groundwater contamination in place by using engineering controls as necessary, Jacobs considers the data collected to be adequate. Uncertainties associated with data quality are not likely to affect the objectives of the RA or the ability of current and future land owners to manage potential risks at the RA Property. Overall, the quality of data used in the RA were considered sufficient to meet the objectives of the HHRA and to be usable for RA decision making.

4.2 Exposure Assessment

The exposure assessment quantifies or estimates the potential exposure to environmental media (for example, groundwater or air) in which humans could possibly have contact with COCs at the RA Property under current and future scenarios. This section also presents the methodology used to estimate exposure concentrations, the equations and models, as well as the exposure assumptions used for the retained exposure pathways.

4.2.1 Receptor Characteristics

For this RA, receptor assumptions have been compiled for human characteristics for use in quantitatively or qualitatively determining the various exposure doses or exposure concentrations. MECP (2011b) or Canadian-specific values were used where available. Other sources of human factor parameters included information generated by the U.S. Environmental Protection Agency (EPA), which Jacobs adopted and used here based on an understanding of similarities between U.S. and Canadian populations. If a piece of information could not be obtained from a credible source, Jacobs assumed a conservative estimate based on professional and scientific judgment. Section 4.2.3, Exposure Estimates, describes the characteristics of each retained receptor by pathway.

The proposed future use of the RA Property is mixed residential, parkland, and commercial. Based on this proposed future use, the receptors included in the HHRA for quantitative and qualitative assessment are presented in Table 4-8.

Where appropriate, Jacobs used a composite human receptor. This means a lifetime of exposure and risk was evaluated based on adjusted age characteristics calculated using a weighted average for each parameter from each of the five life stages summed to derive a composite value.

Individual descriptions for each receptor considered in the HHRA are as follows:

- **Resident** – The Resident is assumed to be an infant, toddler, child, teen, adult, or composite receptor residing within a proposed residential building. The Resident is anticipated to spend the majority of his or her time indoors but would also spend a limited amount of time outdoors within the RA Property. The Resident could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation), to potable groundwater via direct contact (ingestion of drinking water and dermal contact), via the inhalation of indoor air (that is, the migration of volatile COC vapours from soil and groundwater to indoor air), and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air). The Resident is anticipated to be present onsite 24 hours a day, 7 days a week, 50 weeks per year, for 76 years.
- **Site Visitor** – The Site Visitor is assumed to be an infant, toddler, child, teen, adult, or composite receptor visiting the RA Property for residential, parkland, or commercial purposes. The Site Visitor could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation), to potable groundwater via direct contact (ingestion of drinking water and dermal contact), and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air). Site Visitor exposure to Site media is expected to be less than that of the Resident; therefore, exposure and risk to Site Visitors was qualitatively assessed in terms of the results for Residents. Site Visitors are conservatively assumed to be present onsite for a portion of each day, 7 days a week.
- **Construction Worker** – A Construction Worker is considered to be an adult worker conducting excavation activities extending to the water table, such as those that would occur during construction or redevelopment activities. The Construction Worker could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation); to groundwater via direct contact (incidental ingestion and dermal contact[3]); and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater). The Construction Worker is anticipated to be onsite full-time, 5 days a week, for a limited number of years, and would represent a subchronic subsurface worker exposure scenario.
- **Utility Worker** – The Utility Worker is considered to be an adult worker conducting ground-intrusive activities that extend to the water table, such as those that would occur during the maintenance, installation, or repair of subsurface utilities. The Utility Worker could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation); to groundwater via direct contact (incidental ingestion and dermal contact[3]); and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater). The Utility Worker is anticipated to be onsite full-time for a limited number of days per year, but for a significant number of years (that is, 56 years), thus represents an intermittent subsurface worker exposure scenario. This assumption is consistent with Health Canada (2004) which indicates 2 weeks per year for a construction worker, with the understanding that this receptor represents a utility worker, despite differences in naming convention.

[3] For the subsurface worker scenarios, it is expected that typical construction worker attire will be worn during these construction activities (for example, per O. Reg. 213/91, as amended [MOL, 1991]). With regards to groundwater contact, it is expected that typical construction activities, such as dewatering, will be performed (for example, per O. Reg. 213/91, as amended [MOL, 1991] which states that, "every excavation that a worker may be required to enter shall be kept reasonably free of water"). Given the use of dewatering techniques at construction sites (regardless of whether they are brownfields or not), which limits the presence of groundwater in construction areas, typical construction worker activities do not lead to extensive skin wetting. These typical construction activities are not considered risk management measures, as they are required by the Province of Ontario on every construction site, regardless of whether contamination is present or not.

- **Outdoor Worker** – The Outdoor Worker is considered to be an adult working primarily outdoors at the RA property to maintain landscaped areas. The Outdoor Worker could be exposed to soil by direct contact (incidental ingestion, dermal contact, and dust inhalation) and via the inhalation of vapours (COC vapour emissions from soil and groundwater) in outdoor air. As the average depth to groundwater (2.70 mbgs) is deeper than 1 mbgs, it is not expected that the Outdoor Worker would come into contact with groundwater during planting activities. The Outdoor Worker is conservatively anticipated to be onsite full-time (9.8 hours per day), 5 days a week, 39 weeks per year, for 56 years to tend to ornamental gardens and perform periodic landscape installations and grounds maintenance.
- **Indoor Worker** - The Indoor Worker is considered to be an adult working indoors within a future generic commercial building, with a limited amount of time spent outdoors. The Indoor Worker could be exposed to Site COCs via the inhalation of indoor air (migration of volatile COC vapours from soil and groundwater to indoor air). Exposures also considered include the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air) and direct contact with Site soil (incidental ingestion and dermal contact). However, Jacobs notes that an Outdoor Worker would have greater exposure than the Indoor Worker to inhalation of vapours in outdoor air and direct contact with soil. Therefore, the risk to the Indoor Worker will be qualitatively assessed for these latter two pathways in the context of the Outdoor Worker. The Indoor Worker is anticipated to be onsite full-time (9.8 hours indoors per day), 5 days a week, 50 weeks per year, for 56 years.
- **Offsite Surface Receptors** – This receptor group incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as Indoor Workers, Outdoor Workers, Site Visitors, Residents, patrons of nearby properties, or a combination thereof. Properties adjacent to the RA Property are generally used for industrial and commercial purposes. Approximately four residential properties are located to the west of the RA Property (cross-gradient), across Stevenson Street South. The Offsite Surface Receptors may be exposed to dust (soil particulates) migrating offsite during potential construction activities at the Site in the absence of RMMs. The movement of COCs offsite with groundwater flow may also contribute to a complete VI pathway (both indoors and outdoors) for offsite receptors. Offsite Outdoor Workers, Indoor Workers, Residents, or patrons of nearby properties are anticipated to be present offsite for the same amount of time as the corresponding onsite receptors. Therefore, exposure and risk to these offsite receptors are expected to be less than that of similar onsite receptors. These receptors were qualitatively assessed in terms of onsite Outdoor Workers, Indoor Workers, and Residents. These receptors were qualitatively assessed for the potential for risk from offsite migration of COCs.
- **Offsite Construction and Utility Worker** – This receptor group incorporates Construction and Utility Workers engaged in excavation activities downgradient of the RA Property that may be exposed to groundwater that has migrated offsite from the RA Property. Exposure and risk to these offsite receptors is anticipated to be less than that of similar onsite receptors; therefore, these receptors were qualitatively assessed in terms of the onsite results for Construction and Utility Workers.

Tables 4-9, 4-10, 4-11, and 4-12 present specific receptor assumptions (for example, BW, skin surface area, and ED) for receptors requiring quantitative assessment.

A Pregnant Female receptor was also included in the RA for quantitative assessment of risk related to COCs with developmental effects. For the direct contact pathways, this receptor is used in each quantitatively assessed exposure scenario that does not include a toddler (for example, Indoor Worker, Outdoor Worker, Construction Worker, and Utility Worker). The calculations for pregnant female receptors assume continuous exposure without prorating for exposure frequency (EF) or ED because an exposure limit may be exceeded during any one of many critical developmental periods during pregnancy. The exposure estimates for the Pregnant Female Worker or Pregnant Female Resident for each scenario were

then appropriately carried through for risk evaluation for COCs where Section 4.3.2.1 identifies potential developmental effects.

4.2.2 Pathway Analysis

A complete exposure pathway must exist for risk to be present at a site. An exposure pathway is the means by which a receptor may make contact with a COC from a site. A complete exposure pathway has the following five elements:

1) A source of chemical released to the environment (for example, PHC to soil)
2) A mechanism for release of the source (for example, volatilization of vapours)
3) An environmental transport medium (for example, air)
4) An exposure point (for example, a workplace)
5) A feasible route of exposure (for example, inhalation)

Exposure may occur when environmental media containing chemicals migrate or are physically moved from the site to an exposure point, such as a location where receptors can make contact with chemicals in environmental media. It may also take place when a receptor makes direct contact with the source material containing the COCs. An exposure pathway is complete (that is, there is exposure) if a receptor takes in chemical constituents through ingestion, inhalation, or dermal absorption (contact with the skin).

Direct contact with contaminants occurs when receptors make direct contact with the medium that contains the contaminants (for example, placing hands in water or touching soil with hands). Indirect contact with the contaminants occurs when the contaminants are transported from their presently identified location to a receptor through a variety of mechanisms (for example, the inhalation of indoor vapours originating from soil or groundwater).

This section discusses possible pathways of exposure to COCs by receptors on and off the RA Property. Incomplete or implausible pathways where there can be no exposure are not retained for the RA. Table 4-13 and Section 4.2.2.1 present the rationale for retaining or eliminating these pathways.

The potential soil and groundwater exposure pathways have been evaluated based on current Site conditions and considering future Site conditions following redevelopment.

4.2.2.1 Site-specific Pathway Analysis Summary

Table 4-13 presents the pathway analysis for the HHRA. Based on the Site characterization and chemistry, the current and proposed land use, and the anticipated receptors on the RA Property, Jacobs quantitively assessed the following exposure pathways and receptors:

- Ingestion and dermal contact with soil and groundwater
- Inhalation of volatiles in indoor air (derived from soil and groundwater)
- Inhalation of volatiles in outdoor air (derived from soil and groundwater)
- Inhalation of particulates (dust derived from soil) in outdoor air

Jacobs performed risk calculations for the maximally exposed receptor and pathway scenarios, as indicated in the Rationale column of Table 4-13. Jacobs qualitatively evaluated potential risks to receptors and pathways not specifically modelled from the maximally exposed quantitative results.

The following paragraphs discuss the pathways that are complete but were not quantitatively assessed.

Direct Contact Exposure—Vapour Skin Contact

Dermal exposure to vapours may be a significant pathway of exposure to chemicals in some cases; however, this pathway was not assessed in the HHRA because of the uncertainties associated with the numerous assumptions required to quantify the exposure. For example, the equations available for quantifying dermal absorption of chemical vapours are typically simplistic (and often inaccurate), as they do not account for variability of skin penetration, variability of skin exposure, temperature and humidity, and evaporation from skin following deposition onto skin. As such, while dermal exposure to vapours is a potentially complete pathway at the RA Property, given the uncertainty associated with the quantification of this pathway and the general belief that it does not contribute greatly to a receptor's overall exposure and body burden unless he or she is wearing a respirator (which is not anticipated at the RA Property), this pathway is not quantitatively evaluated. A qualitative assessment of the dermal exposure to vapours pathway is presented in Section 4.4.3.3.

Non-Aqueous Phase Liquid Exposure

As discussed in Section 4.1.2.3, NAPL has been identified at the RA Property, and there is potential for it to remain following redevelopment. The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor and outdoor air). Direct contact exposure to NAPL itself would also be possible where NAPL is present. Section 4.4.3.6, discusses the qualitative assessment of NAPL at the RA Property.

Ingestion Exposure— Home Grown Garden Produce

The ingestion of home-grown garden produce may be a significant pathway of exposure to chemicals in some cases; however, this pathway was not quantitatively assessed in the HHRA because of the uncertainties associated with the numerous assumptions required to quantify the exposure. For example, there is a significant amount of uncertainty associated with the uptake of certain soil COCs into the edible portions of plants. In addition, factors such as the potential yield of an urban garden, the amount and type of produce consumed, and the effects of various methods of food preparation are difficult to quantify. While it is not anticipated that a significant portion of a Resident's normal diet would be derived from home garden produce, potential risks can be mitigated by implementing the use of RMMs that limit or prohibit gardens that produce fruits and vegetables for consumption, or by requiring that home gardens only be grown in containerized plots or aboveground containers. Therefore, this pathway is not quantitatively evaluated. A qualitative assessment of this pathway is presented in Section 4.4.3.7.

Qualitative Assessment of Inhalation of Soil Particulates that are Ingested

Exposure from COCs in soil can occur from inhalation via two primary routes of exposure. Smaller particulates (less than or equal to PM_{10}) may be inhaled into the lungs and larger particulates (greater than PM_{10} and less than PM_{30}) may be trapped in the upper respiratory tract and subsequently swallowed and ingested (MassDEP, 2008). The portion of this pathway where particulates reach the lungs has been quantitatively assessed in Section 4.4.3.8. However, the particulate ingestion portion is considered negligible relative to the ingestion exposure experienced by a receptor via the conventional incidental ingestion of soil pathway (refer to Section 4.4.2.4). Exposure from particulate ingestion may be a significant pathway of exposure to chemicals in some cases; however, for typical construction projects using MECP default assumptions (as is the case for this RA), the exposure and risk from this pathway is negligible. Therefore, this pathway was not quantitatively assessed. A qualitative assessment of this pathway is presented in Section 4.4.3.8.

4.2.3 Exposure Estimates

This section summarizes the methodology and exposure factors used to estimate dose concentration. Exposure estimates were calculated for the human health exposure pathways that were retained through the screening process. Daily intake (DI) and daily uptake (DU) are defined as the product of chemical concentration in the source material, multiplied by the amount of intake or uptake (or source material the body contacts or adsorbs), respectively.

$$Dose = Chemical\ Concentration \bullet Intake\ (or\ uptake) \quad (2)$$

Intake is generally used to describe administered doses (ingestion and inhalation), while uptake refers to absorbed doses (dermal).

Eight basic factors are used to estimate intake (or uptake):

1) C = Chemical concentration (milligrams per kilogram [mg/kg], µg/g, milligrams per litre [mg/L], milligrams per cubic metre [mg/m^3], or micrograms per cubic metre [µg/m^3])
2) CR = Contact rate; the amount of contaminated medium contacted (milligrams [mg], litres [L], or cubic centimetres [cm^3] per hour or day)
3) ET = Exposure time (hours per day) for *continuous* exposures (that is, inhalation)
4) EF = Exposure frequency (days per week, weeks per year)
5) ED = Exposure duration (total years)
6) BW = Body weight
7) AT = Averaging time (associated with the period of exposure and effects)
8) RAF = Relative absorption factor

Daily absorbed or administered dose (DAD) can be described by the following general equation:

$$DAD = \frac{C * CR * ET * EF1 * EF2 * ED * RAF}{BW * AT} \quad (3)$$

In this assessment, intake (or uptake) is normalized for time and BW, and is expressed in milligrams of chemical per kilogram of BW per day (mg/kg/d). This calculation has been completed for all exposure routes except inhalation, according to the MECP (2011b) (after [EPA, 2009]).

The chemical concentration (C) used for each exposure route was determined and discussed in previous sections. The CR for each exposure point is discussed in Sections 4.2.3.2 through 4.2.3.6.

Appendix G1 provides sample calculations for the exposure estimates referenced in this section. Calculations were performed using Microsoft Excel.

4.2.3.1 Dose Estimation for Carcinogens and Noncarcinogenic Effects

The intake of a chemical evaluated for carcinogenic health effects is averaged over an entire lifespan (that is, lifetime average chemical intake) of 56 years for workers. For carcinogens, the lifespan in years is referred to as the AT. The selection of an AT that spans a lifetime is based on EPA guidance (1989): *"The approach for carcinogens is based on the assumption that a high dose received over a short period of time is equivalent to a corresponding low dose spread over a lifetime."*

Typically, EPA recommends 70 years for residents as the AT for carcinogens; however, Health Canada recommends 75 years (Health Canada, 2010). The MECP has used 76 years to account for ages 0 to 75, inclusive, for lifetime exposure of residents (MECP, 2011b); as such this value was applied in this RA for Recreational Users. The MECP has used 56 years to account for ages 20 to 75, inclusive, for lifetime exposure of adult workers (MECP, 2011b); this value was applied in this RA for those receptors. For carcinogens:

$$AT = 56 \text{ years} \times 365 \text{ days/year} \quad (4)$$

The intake of chemicals evaluated for noncarcinogenic health effects uses an AT based on the estimated period of exposure for any given exposure setting.

For noncarcinogens:

$$AT = ED \times 365 \text{ days/year} \quad (5)$$

The noncarcinogenic risk is evaluated for a target receptor (the group within a potentially exposed population with the greatest potential exposure; that is, the group that receives the greatest intake).

Table 4-9 presents general receptor characteristics, such as BW, ED, and ATs. These inputs are also used in the specific equations that estimate dose for dermal, ingestion, and inhalation pathways, which are described in the following sections.

4.2.3.2 Dermal Uptake

Soil

A receptor's average uptake of COCs through dermal contact with soil, or DAD, is estimated using the following equation (based on MECP, 2011b):

$$DAD = \frac{C * DAF * SAF * ESSA * CF * EF1 * EF2 * ED}{BW * AT} \quad (6)$$

Where:

DAD = Daily absorbed or administered dose via dermal contact (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

SAF = Soil adherence factor (mg per square centimetre [cm^2] per day)

DAF = Dermal absorption factor (unitless)

ESSA = Exposed skin surface area (cm^2)

CF = Conversion factor (10^{-6} kilograms per milligram [kg/mg])

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kilograms [kg])

AT = Averaging time (days)

This calculation of DAD via dermal contact assumes one soil contact event per day. Table 4-10 summarizes the values used to estimate the daily dermal uptake from soil.

Groundwater

A receptor's average uptake of COCs through dermal contact with groundwater is estimated using the following equation (based on EPA, 2004):

$$DAD = \frac{DA_{event} * FE * ESSA * EF1 * EF2 * ED}{BW * AT} \quad (7)$$

Where:

DAD = Daily absorbed or administered dose (mg/kg/d)

DA_{event} = Absorbed dose per event (mg/cm^2/event); the equations applied in the derivation of DA_{event} are presented in Appendix G1

FE = Frequency of events (event per day)

ESSA = Exposed skin surface area (cm^2)

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency (weeks per year)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

The value of DA_{event} depends on the physical and chemical properties of the chemical being assessed (for example, dermal permeability factors, organic or inorganic chemical), event duration, concentration of the chemical in groundwater, and other factors. A discussion of the details for modelling exposure from this route can be found in the EPA's final *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* (RAGS E) (EPA, 2004). This model estimates the rate of migration of a chemical through a receptor's skin during contact with impacted groundwater. Dermal permeability values (K_p), derived from either experimentally measured or predicted values, are used together with Site-specific receptor exposure characteristics to estimate exposure.

The potential for Construction or Utility Workers to make contact with contaminated groundwater is low, since typical construction methods (that is, dewatering) restrict prolonged contact with groundwater that may be present onsite. Exposure assumptions for Construction and Utility Worker contact with groundwater are included in Table 4-10.

Relative Absorption Factors

Relative absorption factors (RAFs) were used in this assessment. The terms dermal absorption factor (DAF) and gastrointestinal absorption factor (GIAF) are used in this assessment for dermal and ingestion exposures, respectively. The values are consistent with the values used by the MECP in the development of the 2011 Standards (MECP, 2011b) or in EPA RAGS E (2004), if a MECP value was not available. If a suitable RAF value for a COC could not be determined, absorption was assumed to be the same as that in the TRVs critical study (that is, 100 percent or an RAF of 1.0). Table 4-14 presents the RAFs used in the assessment.

Dermal Exposure Estimates

Tables 4-15 and 4-16a/b show the predicted dermal exposures to soil and groundwater (potable and subsurface contact), respectively.

4.2.3.3 Ingestion

Soil

A receptor's average uptake of COCs through incidental ingestion of soil is estimated using the following equation (MECP, 2011b; EPA, 1989):

$$DAD = \frac{C * IR_S * GIAF * CF * EF1 * EF2 * ED}{BW * AT} \quad (8)$$

Where:

DAD = Daily absorbed or administered dose via incidental ingestion (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

IR_S = Quantity of soil ingested daily (milligrams per day [mg/d])

GIAF = Gastrointestinal absorption factor (unitless)

CF = Conversion factor (10^{-6} kg/mg)

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Table 4-14 summarizes the GIAFs used to estimate the ingestion intake from soil.

Groundwater

A receptor's average uptake of COCs through incidental ingestion of groundwater is estimated using the following equation (MECP, 2011b; EPA, 1989):

$$DAD = \frac{C * IR_W * GIAF * FE * CF * EF1 * EF2 * ED}{BW * AT} \quad (9)$$

Where:

DAD = Daily absorbed or administered dose (mg/kg/d)

C = Chemical concentration in groundwater (µg/L)

IRW = Quantity of groundwater ingested daily (L per event)

GIAF = Gastrointestinal absorption factor (unitless)

FE = Frequency of events (events per day)

CF = Conversion factor (0.001 milligram per microgram [mg/µg])

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Table 4-14 summarizes the GIAFs used to estimate the ingestion intake from groundwater (Construction and Utility Workers only). Table 4-11 shows the exposure assumptions for ingestion exposure.

Ingestion Exposure Estimates

Tables 4-17 and 4-18a/b present the predicted exposure from ingestion for soil and groundwater (potable and subsurface contact), respectively.

4.2.3.4 Inhalation

Particulate

The exposure pathway related to the inhalation of fugitive dust derived from soil was evaluated to determine the need, if any, for dust control measures during future construction activities. This evaluation is also protective of exposure during current conditions in the absence of RMMs (that is, no paving or grass covers). The following equation was used to estimate exposure from dust inhalation (MECP, 2011b; Health Canada, 2010a):

$$DAD = \frac{C * PM_{10} * CF * IR_A * FPM_{inh} * EF1 * EF2 * EF3 * ED}{BW * AT} \quad (10)$$

Where:
DAD = Daily adsorbed or administered dose (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

PM_{10} = Particulate concentration in air (µg-soil/m^3)

CF = Conversion factor, 1 kg/10^9 µg

IR_A = Inhalation rate (cubic metres per hour [m^3/hr])

FPM_{inh} = Fraction of particulate matter smaller than 10 microns in diameter (PM10) (unitless); MECP default value of 0.6 is applied herein

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency (weeks per year)

*EF*3 = Exposure frequency (hours per day)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (lifetime or ED in years × 365 days per year)

As discussed in Section 4.1.2.1, the COCs in soil identified for quantitative assessment (that is, estimated maximum concentrations were greater than the MECP S1 component value) have been considered COCs for dust modelling in the HHRA.

Table 4-12 summarizes the receptors, receptor characteristics, and exposure assumptions used to model the dust inhalation pathway. Table 4-19 presents the predicted exposure from dust inhalation for the retained receptors.

Volatiles

For inhalation exposures, the amount of the chemical that reaches the target site is not a simple function of the inhalation rate and BW; therefore, intake equations developed based on these parameters are not recommended for estimating exposures to inhaled contaminants. Instead, an exposure concentration is calculated. The following equation was used to estimate exposure from inhalation of volatiles (MECP, 2011b; EPA, 2009):

$$EC = \frac{(C_{air} * EF1 * EF2 * EF3 * ED)}{AT} \quad (11)$$

Where:

EC = Exposure concentration (mg/m^3)

C_{air} = Volatile contaminant concentration in indoor or outdoor air (mg/m^3); this concentration is obtained through modelling, as described in Section 4.2.3.5 (indoor air) and Section 4.2.3.6 (outdoor air), and Appendixes G2 and G3

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency to indoor or outdoor air (weeks per year)

*EF*3 = Exposure frequency (hours per day)

ED = Exposure duration (years)

AT = Averaging time (hours)

The exposure concentration is then compared with the appropriate TRV to determine the level of risk.

Table 4-9 presents general receptor characteristics, such as exposure frequencies, EDs, and ATs, applied to the estimate of volatile COCs dose through the inhalation of indoor or outdoor air for all relevant receptors.

4.2.3.5 Soil and Groundwater to Indoor Air

The RA Property is anticipated to be redeveloped as mixed residential, parkland, and commercial. The Site currently consists of vacant land and all onsite buildings have been razed, with concrete floor slabs still in place. Future building plans for the property are unknown. Based on this information, indoor air exposure was modelled for generic residential and commercial building scenarios. For the residential building scenario, Residents are the maximally exposed receptors and for the residential building scenario, Indoor Workers represent the maximally exposed receptor to indoor air for the commercial building scenario. If exposure is determined to be acceptable, then all other receptors listed in Table 4-13 are considered protected. The onsite Site Visitor, Construction and Utility Workers were not retained for quantitative evaluation in this exposure assessment as it is not expected they would be exposed for any extended period within finished buildings.

Modelled Conditions

In September 1998, EPA developed a series of models to estimate indoor air concentrations and associated health risks from subsurface VI into buildings. These models were based on the analytical solutions of Johnson and Ettinger (J&E) (1991) for contaminant partitioning and subsurface vapour transport into buildings, and were updated in 2004.

For groundwater to indoor air evaluations, the depth to groundwater is used to determine whether the J&E model will be applied to calculate the Site-specific attenuation factor. The presence of contaminated groundwater less than 1.0 m away from a building's foundation precludes the use of the J&E Model for modelling VI from COCs in groundwater. In these cases, estimated indoor air concentrations are developed by applying the MECP's empirically derived attenuation values of 0.02 for a residential scenario and 0.004 for a commercial scenario (MECP, 2011b). Because groundwater elevations can fluctuate from spring to winter, the minimum depth to groundwater was used to account for seasonal variations in the water table to determine whether the MECP default attenuation factor or the J&E Model would be used for concentration calculations.

The calculated separation distance (refer to Table G2-2 in Appendix G2) between the foundation and the minimum depth to groundwater indicates the foundation is less than 1 m above the minimum depth to the water table for slab-on-grade foundations. Based on this, estimated indoor air concentrations for the groundwater-to-indoor-air pathway were derived using the MECP default residential and commercial attenuation factors for the generic residential and commercial building scenarios. J&E-modelled attenuation factors were used for the soil-to-indoor-air pathway for the identified building scenarios.

Appendix G2 presents the J&E input parameter table, as well as DATENTER and INTERCALCS worksheets from this assessment.

Indoor Air Vapour Estimates

Table 4-20 presents the predicted indoor air vapour concentrations from soil and groundwater for the generic residential and generic commercial scenarios.

Soil and groundwater–indoor air modelling was completed for the following scenarios:

- Generic Residential building
- Generic Commercial building

Estimated indoor air concentrations were developed through a two-step process. First, volatile partitioning relationships were applied to soil and groundwater data to produce estimated soil gas concentrations at the source. Second, MECP default and J&E-derived attenuation factors were applied to the soil gas concentrations to estimate indoor air concentrations.

These concentrations were used to derive an exposure concentration for each applicable receptor to be compared with the reference concentration (RfC) or unit risk (UR) (if the parameter was a carcinogen, see Section 4.3, Toxicity Assessment).

Spreadsheets indicating the development of the indoor air concentrations for the generic residential and commercial building scenarios are presented in Appendix G2. Calculations were performed using Microsoft Excel.

Tables 4-21a and 4-21b present the predicted exposure of receptors to COCs through the soil-to-indoor-air pathway for the generic commercial and residential building scenarios, respectively. Tables 4-22a and 4-22b

present the predicted exposure of receptors to COCs through the groundwater-to-indoor-air pathway for the commercial and residential building scenarios, respectively.

4.2.3.6 Soil and Groundwater to Outdoor Air Pathway (All Receptors)

Estimating exposure via this pathway involves calculating the predicted concentration of COCs in outdoor air because of the migration of vapours from subsurface soil layers and from groundwater through unsaturated soil into receptors' breathing spaces. The model described by Sanders and Stern (1994) was used to calculate the flux or emission rate of each individual COC at the boundary between the surface of the soil and ambient air. A box model (EPA, 1989) was then employed as a conservative dispersion model to calculate air concentrations of each predicted COC emission from the soil surface. Appendix G3 presents the model specifics, equations, and calculations used to estimate outdoor air concentrations.

For Construction and Utility Workers, it was assumed that the "box" could also be an excavated trench located within the subsurface. The enclosed nature of an excavated trench leads to decreased air exchange and increased soil surface area for fluxing; thus, results in increased potential exposure to subsurface volatiles via inhalation.

The RA Property is expected to undergo redevelopment in the future. The planned presence of paving and other surface materials will restrict the flow of soil gases and the migration of vapours, as concrete materials are much less porous than soil. However, for this exposure modelling, the presence of surface covers was conservatively ignored.

This assessment also employed the following conservative assumptions:

1) The degradation of COCs in the soil vadose zone was not considered if half-lives were not available.
2) The bulk water flow and infiltration of precipitation were ignored, as both of these would tend to retard the migration of vapours upward; therefore, would predict lesser concentrations.

Using the phase partitioning methods described in *Rationale for the Development and Application of Generic Soil, Groundwater and Sediment Criteria for Use at Contaminated Sites in Ontario* (MECP, 1996), COCs in groundwater were used to derive a "total" concentration, including:

- Concentration of a substance in soil gas phase (air)
- Soil water phase (dissolved)
- Soil particle phase (absorbed)

For this assessment, the predicted total concentration in soil based on the groundwater concentration was compared to the estimated maximum concentration in soil, and the greater of these two concentrations was applied to model volatilization to outdoor air. Tables 4-1 and 4-2 summarize the estimated maximum concentrations of volatile COCs in soil and groundwater, respectively.

Table 4-23 shows the predicted outdoor air concentrations (at ground surface and in a trench) determined as a result of the outdoor air calculations.

The receptors identified may be exposed to COCs volatilizing from soil and groundwater into outdoor air. Residents and Outdoor Workers are only exposed at the surface, whereas Construction Workers and Utility Workers would be maximally exposed in an excavation. The estimated dose for each receptor was calculated based on receptor characteristics and was compared with the RfC or UR (if the parameter was a carcinogen, see Section 4.3, Toxicity Assessment), which implies exposure at that concentration would be continuous over the receptors' lifetime (that is, 24 hours a day, 7 days a week, 52 weeks a year for a lifetime).

Table 4-24 presents the predicted exposure to subsurface volatiles in outdoor air for Residents and Workers above ground surface. Table 4-25 presents the predicted exposure to subsurface volatiles in outdoor air for Construction Workers and Utility Workers during time spent in a trench.

4.2.3.7 Exposure Estimates for Pregnant Adult Female Receptor

To assess the potential risk of exposure to developmental toxicants, an adult female receptor was assumed to be exposed continuously, to estimate exposure during Resident, Construction, Outdoor, and Utility[4]; and Indoor Worker scenarios.

The RA identified the following COCs as developmental toxicants:

- Lead
- B[a]P
- TCE
- Vanadium

4.2.4 Uncertainties—Exposure Assessment

Uncertainty exists in the RA's exposure assessment. Onsite receptors were hypothesized and activities assumed to result in exposures. Taken together, Jacobs developed the assumptions to be conservative and likely overestimate the potential exposure and risk:

- The screening process for volatility (Appendix F2) assumes that a chemical is volatile if the H is greater than 1×10^{-5} atm-m^3/mol or the vapour pressure is greater than 1.0 Torricelli (MECP, 2019). Slightly differing definitions of what constitutes a volatile chemical are available. Even if alternate screening criteria were applied and additional parameters identified as volatile, it is not expected to alter the conclusions of the RA.
- Exposure duration and frequencies for workers were assumed to occur on a regular and long-term basis, despite the reasonable potential that receptors may relocate, may change employment and job descriptions, and are unlikely to contact chemicals on a routine basis. The conservative way receptors have been identified and activities evaluated indicates uncertainties in the exposure assessment most likely allow for an overestimate of exposure, which will lead to an overestimation of risk.
- Exposure duration and frequency of exposure for Residents were assumed to occur on a regular and long-term basis (assumed the person would reside on the RA Property approximately 24 hours per day, 7 days per week, 50 weeks per year for a lifetime), despite the reasonable potential that receptors may move during their lifetime. The conservative way receptors have been identified and activities evaluated indicates uncertainties in the exposure assessment most likely allow for an overestimate of exposure, which will lead to an overestimation of risk.
- The exposure assessment section also defines the concentrations to which potential receptors may be exposed. Within the RA Property boundaries, vapour concentrations have been estimated using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which exposures might occur. This conservative approach likely results in an overestimate of exposure and associated risk to certain receptors. These assumptions impart uncertainty to the RA but are purposely developed to verify that the RA conclusions are, indeed, conservative and protective of human health. Though the use of some assumptions may result

[4] The exposure assumptions for the Pregnant Female Construction, Outdoor, and Utility Worker are identical for all scenarios except dust inhalation; and the TRVs do not differ for the developmental toxicants identified in this RA (that is, the identified chronic and subchronic TRVs are the same). Therefore, these three receptors have been combined into one column in the exposure and risk tables as "Female Construction, Outdoor, or Utility Worker", where appropriate.

in lowering exposure and risk, the net effect of these uncertainties is that risk to potential receptors has likely been overestimated.

- In the assessment of indoor air, the use of soil concentrations and partitioning calculations to determine soil gas concentrations is not generally accepted for use in evaluating VI because there is a great degree of uncertainty associated with the soil partitioning results (EPA, 2002b), which could lead to over- or underestimating risk.
- Potential vapour concentrations in outdoor air were modelled assuming that receptors were chronically occupying the area of the RA property with the estimated maximum soil and groundwater concentrations. This assumption is conservative; therefore, the predicted exposure to COCs through outdoor air inhalation has likely been overestimated, which will lead to an overestimation of risk.
- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas onsite and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their ED; therefore, the predicted exposure and risks have likely been overestimated.
- Potential vapour concentrations inside future RA Property buildings were modelled assuming the buildings are occupied and lie directly over the estimated maximum soil and groundwater concentrations detected at the RA Property (only for volatile COCs). This assumption is conservative; therefore, the predicted exposure to COCs through indoor air inhalation has likely been overestimated, which will lead to an overestimation of risk.
- The selected incidental ingestion rates for soil and groundwater may be different than the experimental basis used to develop them (for example, Construction and Utility Worker incidental ingestion of groundwater is based on exposure while swimming and nonincidental contact while working). Changes in ingestion rate would increase or decrease the predicted exposure and risk.
- The daily dermal events and ingestion exposures were hypothesized to have occurred on the RA Property. Some receptors may spend more time in a day not at the RA Property; therefore, these exposures from soil and groundwater have likely been overestimated. This will lead to an overestimation of risk.
- The assessment of exposure to PHC fraction (F)1, F2, F3, and F4 in soil and groundwater was conducted through application of subfraction proportions outlined in *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* (CCME, 2008) and *Federal Contaminated Site Risk Assessment in Canada, Part IV* (Health Canada, 2008). These proportions were specifically developed for soil and groundwater; however, Site-specific subfractions proportions may be different. The application of these proportions in the assessment of exposure to PHC in soil and groundwater adds uncertainty to the assessment and could lead to an overestimation or underestimation of exposure and risk to any subfraction grouping.
- The toxicity, mobility, and bioavailability of metals and metalloids in soil generally depend on several soil factors, including the following: pH, redox potential, iron and manganese content, and calcium carbonate content. Interactions between these soil factors can increase or decrease the toxicity, mobility, and bioavailability of these chemicals; however, the extent of the effects is unknown.
- The biodegradation of parent compounds to VC in groundwater is affected by site-specific geochemical parameters (redox potential, pH, and such), microbial activity, and chemical-specific parameters. These parameters can increase or decrease the biodegradation of chlorinated ethylenes to VC. Therefore, adding 10 percent of the parent compounds' maximum concentrations to the maximum VC concentrations may over- or underestimate the exposure to, and risks from, VC at the RA Property.

- The calculation of B(a)PE did not include contributions from methylnaphthalene 2- (1-), naphthalene, or others. Although some evidence of carcinogenicity has been identified for these parameters, it has not been confirmed in all cases, or for all routes of exposure. Accepted TEFs have not been established for these parameters. The exclusion of these parameters from the B(a)PE calculation could lead to an underestimation of exposure to B(a)PE.
- The uptake of vapours through skin was not assessed quantitatively and was considered negligible, compared with exposure of vapours through inhalation. The exclusion of this pathway could lead to an underestimation of exposure and risk.
- Lead was identified as a developmental toxicant for direct contact exposures, but was not assessed quantitatively via the Pregnant Female receptor. The exclusion of this toxicant-receptor scenario could lead to an underestimation of exposure and risk for developmental effects.
- The exposure assessment assumes worker exposure to groundwater would be limited to the hands, since dewatering is a typical construction practice that limits the presence of groundwater in construction areas. Additional body parts, such as forearms, may occasionally be exposed to groundwater, if accidental splashing were to occur. This scenario would increase the potential exposure area; however, an increase in the exposure area is unlikely.
- The Utility Worker receptor represents a worker who would be involved in the maintenance, installation, or repair of subsurface utilities or tunnels at the RA Property. As such, the Utility Worker is anticipated to be onsite full-time for only a limited number of days per year (assumed to be 2 weeks), but could return to the RA Property each year for additional work. The assumption of 2 weeks per year could over- or underestimate exposure in the short-term, but is unlikely to significantly underestimate risk in the long-term.
- The J&E modelling assumes an infinite source and does not account for the degradation of or removal processes for constituents, potentially significantly overestimating indoor air concentrations for soil.

4.3 Toxicity Assessment

This section describes the types of adverse effects a substance can cause following different routes of exposure (for example, ingestion, inhalation, or dermal), and the nature and severity of such effects associated with various levels of exposure, where increased exposure leads to increased risk of adverse effect (that is, dose-response relationship).

4.3.1 Nature of Toxicity (Hazard Assessment)

Two broad categories of adverse effects are considered: (1) threshold effects and (2) nonthreshold effects. For the threshold effect category, a substance is not expected to cause risk of an adverse effect at less than a certain dose (that is, the threshold dose). For nonthreshold effects, it is assumed that a substance may cause an adverse effect at any dose greater than zero. The former category is usually associated with noncancer effects, and the latter category is generally associated with cancer effects.

Chemicals assumed to exhibit threshold-type dose-response relationships exhibit a no-observed-adverse-effect level (NOAEL). At less than this threshold of exposure, the risk of adverse effect is essentially zero. This threshold is the basis for a TRV called a reference dose (RfD), which incorporates the use of safety factors, uncertainty factors (UFs), modifying factors, or a combination thereof. The magnitude of a factor depends on the confidence in the data and study used to derive the NOAEL and to account for inter- and intraspecies differences, EDs, and overall data quality of available data and information. The factors can easily span several orders of magnitude. The analogous exposure limit for airborne chemicals is called an RfC.

Chemicals that exhibit a nonthreshold-type dose-response are assumed to have no adverse effect only when the exposure or dose is zero. This dose-response model is generally applied to genotoxics (affects genetic material in biological cells) and carcinogens (causes cancer). Mathematical modelling is usually required to extrapolate cancer risk from animal studies to hypothetical human exposures. For chemicals that exhibit nonthreshold-type hazards, slope factors (SFs) and URs are used to determine the incremental lifetime cancer risk (ILCR) from exposure.

Many chemicals exhibit both types of dose-response relationships, exhibiting different adverse-effect end-points. Some COCs that are the subject of this assessment are assumed to have shown both threshold and nonthreshold adverse effects.

The following definitions have been extracted from the EPA's Integrated Risk Information System (IRIS) documentation (EPA, 2016a,b):

- **Reference Concentration (RfC):** An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, lowest-observed-adverse-effect level (LOAEL), or benchmark concentration, with UFs generally applied to reflect limitations of the data used. This estimate is generally used in EPA's noncancer health assessments.
- **Reference Dose (RfD):** An estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, LOAEL, or benchmark dose, with UFs generally applied to reflect limitations of the data used. This estimate is generally used in the EPA's noncancer health assessments.
- **Slope Factor (SF):** An upper bound, approximating a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg/d, is generally reserved for use in the low-dose region of the dose-response relationship (that is, for exposures corresponding to risks less than 1 in 100).
- **Unit Risk (UR):** The upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 µg/L in water or 1 µg/m^3 in air. The interpretation of UR would be as follows: if UR = 1.5 × 10^{-6} µg/L, 1.5 excess tumours are expected to develop per 1,000,000 people if exposed daily for a lifetime to 1 µg of the chemical in 1 L of drinking water.

Chemical-specific toxicity profiles in Appendix H include a description of the hazard assessment indicating the potential adverse health effects from exposure to the COCs in this assessment.

4.3.2 Dose Response Assessment

The TRVs were obtained from regulatory agencies, including the MECP and EPA (IRIS). Other TRVs cited in the Rationale Document (MECP, 2011b), such as those developed by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, the Agency for Toxic Substances and Disease Registry, the Netherlands National Institute of Public Health and Environmental Protection, or the World Health Organization, were also considered. TRVs were obtained from published toxicity databases. If a database did not have a published value, an alternate source was reviewed. The TRVs used from other credible jurisdictions (as listed) meet the requirements as set out in Section 4.3.2 of *Procedures for the Use of Risk Assessment under Part XV.1 of the Environmental Protection Act* (MECP, 2005).

Noncarcinogenic TRVs (that is, RfDs and RfCs) can be based on several different toxicological end-points, including systemic effects, developmental toxicity, neurotoxicity, and reproductive effects. Typically, the

most sensitive end-point is selected for the derivation of the TRV (that is, the end-point associated with the least of the available LOAELs). Thus, the noncarcinogenic TRVs can generally be considered protective of all toxicological end-points. Furthermore, because a UF is typically applied during the TRV derivation process to account for intraspecies differences, the noncarcinogenic TRVs can generally be considered protective of all receptors (that is, including sensitive subgroups within the human population). Taken together, the noncarcinogenic TRVs can be viewed as protective of all toxicological end-points and all receptors, including, for example, developmental toxicity and pregnant women.

Table 4-26 lists the TRVs used in this RA and also briefly describes the potential health effects on human receptors associated with their exposure to those contaminants. There is great confidence that the TRVs selected for this assessment are relevant and protective of human health. RfDs and RfCs used in this assessment are considered protective of the human population (including sensitive subgroups) at continuous exposure levels (that is, 24 hours per day, 7 days per week). The human receptors identified in the problem formulation are likely to have exposure that is less continuous (that is, 40-hour work week); therefore, the RA provides another layer of conservatism. Similarly, URs and SFs used herein were derived by their respective agencies to account for continuous exposure.

Where more than one TRV is presented in Table 4-26 for the same route and effect (that is, threshold or nonthreshold) the available TRVs were applied as follows:

- **Sub-chronic TRVs** - Where available, sub-chronic TRVs (RfD and RfC) were applied only to the Construction Worker receptor.
- **Vinyl Chloride** - Two sets of carcinogenic TRVs (SF and URF) were selected for vinyl chloride. The TRVs specific to "continuous lifetime exposure from birth" were applied to the Composite Resident receptor for residential exposures, while the TRVs specific to "continuous lifetime exposure during adulthood" were applied to the Indoor Worker, Construction Worker, and Utility Worker receptors for job-related exposures (as these receptors are assumed to be adults per Section 4.2.1).

Chemicals with RfD and RfC TRVs are considered to have "threshold-acting" characteristics, while those with SFs and URs are considered to exhibit carcinogenic or nonthreshold characteristics. Contaminants with both RfD and RfC and SF and UR TRVs have been identified by the reporting regulatory agency as a chemical that can exhibit both types of health effects.

Appendix H presents toxicity profiles, which include a description of the chemical, health effects, assessment of carcinogenicity, and basis of the selected TRV for the chemicals and TRVs not presented in the Rationale Document (MECP, 2011b) or in the updated TRVs provided by the MECP (Pagliarulo, 2017, pers. comm.; Blok, 2018, pers. comm).

For the assessment of Pregnant Female Workers, the following COCs were identified as developmental toxicants:

- Lead
- B[a]P
- TCE
- Vanadium

There are uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at blood lead levels (BLLs) less than the current Canadian BLL intervention level of 10 micrograms per decilitre (µg/dL). As a result, the RA has not quantitatively assessed exposure and risk to lead via the direct contact route. Lead has also been identified as a developmental toxicant, but risk was

not assessed quantitatively for the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus are available.

4.3.3 Uncertainties—Toxicity Assessment

Without exception, the toxicity indices employed in this RA have been developed in a conservative fashion to facilitate the protection of human health, as follows:

- Indices, such as cancer SFs and noncancer RfDs, are intentionally developed to be protective of human health. Cancer SFs are developed assuming that a threshold for effects does not exist. RfDs are frequently derived using several UFs (ranging from 1 to 10) and modifying factors (ranging from 10 to 10,000) that, in effect, lessen the dose responsible for the toxic effects. Furthermore, additional modifying factors are applied, depending on the confidence level of the database used to derive a toxicity limit. If confidence is low (that is, because of limited information, variations within the test species populations, or differences between the test species and humans), the factor applied is relatively high and accounts for the lack of knowledge.
- Jacobs built in an additional consideration of uncertainty into this RA by including a separate developmental toxicity-based TRV evaluation for a Pregnant Female receptor exposure scenario.
- Jacobs evaluated PAHs for nonthreshold (carcinogenic) effects if they were identified to have carcinogenicity or genotoxicity, or both, as described by EPA, and International Programme on Chemical Safety (WHO, 1998) classifications for this group of chemicals. The aromatic PAHs were not identified as genotoxic or carcinogenic chemicals, do not have common mechanisms of action to cause toxicity as the carcinogenic PAHs, or do not have a well-established TEF. Therefore, Jacobs did not include them in its TEF approach for B(a)PE estimations; however, the uncertainty associated with the risk estimation for the B(a)PE is likely to be minimal.
- The evaluation of B(a)PE assumes that the toxicological endpoint for all identified carcinogenic PAHs are the same as B(a)P. This may result in an under or over estimation of potential risks associated with exposure to carcinogenic PAHs.
- The MECP uses route-to-route extrapolation to derive an RfC value, typically from RfD values for chemicals without readily published RfC values. Additionally, Jacobs conducted a literature search for RA Property COCs to identify published RfC values from other agency guidance documents. Table 4-26 lists the identified selected TRVs. However, some chemicals did not have RfC values because such chemicals are not an inhalation exposure concern, most likely due to low volatility or lack of toxicity through inhalation route of exposure. Thus, uncertainty associated with the absence of RfC or URF values for such chemicals is considered minimal.
- Over time, as more information from studies and research become available, toxicological information for constituents is updated. As a result, TRVs are expected to change over time. If TRVs are updated, changed, or added, they could inherently change the estimated risk.
- Due to uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at BLLs less than the current Canadian BLL intervention level of 10 µg/dL, Jacobs has not quantitatively assessed exposure and risk to lead via the direct contact or inhalation exposure routes in this RA. Lead has also been identified as a developmental toxicant but was not assessed quantitatively via the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus is available.
- In the absence of TRVs developed specifically for intermittent exposures, Jacobs adopted chronic TRVs to assess risks to the Utility Worker. This may result in an under or over estimation of potential risks to this receptor.

4.4 Risk Characterization

4.4.1 Interpretation of Health Risks

The risk characterization stage integrates the results of the exposure assessment with the information obtained during the toxicity analysis. Jacobs derived risk estimates for noncarcinogens (threshold toxicity response) by comparing the exposure intake results to the TRVs.

A comparison of the estimated exposure and estimated air concentration for each chosen substance to the appropriate RfD and RfC, respectively, will provide an estimate of the potential health risk associated with each. If the modelled exposure or air concentrations are less than the appropriate RfD or RfC, adverse health impacts are not expected. The comparison estimates are as described by the following ratios:

$$Exposure\ Ratio = \frac{Predicted\ Exposure\ Rate}{Reference\ Dose\ (RfD)} \quad (12)$$

or

$$Exposure\ Ratio = \frac{Predicted\ Air\ Concentration}{Reference\ Concentration\ (RfC)} \quad (13)$$

Exposure ratios (ERs) are also referred to as hazard quotients (HQs). The MECP considers an ER or HQ of 0.2 to be acceptable for any one environmental medium, if multimedia exposure is possible (MECP, 2011b). The target HQ used in this assessment for all COCs except PHC and TCE (for inhalation only) was 0.2. The target HQ for PHC fractions and TCE (inhalation only) was 0.5 (CCME, 2008; MECP 2016b). MECP (2016b) guidance states that an HQ of 0.5 is acceptable for "TCE exposure inhalation of indoor air (and possibly also outdoor air)" because intake of TCE from other pathways (that is, ingestion in food, groundwater, and soil; and dermal contact with soil) is negligible in comparison (for non-potable sites). It is the QPRA's opinion that the HQ of 0.5 for TCE is also appropriate to apply to the outdoor air inhalation pathway because inhalation (in general terms) is the primary route of exposure to TCE where a potable groundwater use is not present. It is noted that the RA Property has a potable groundwater condition, and therefore, the use of the HQ of 0.5 would typically not be acceptable. However, while groundwater is considered potable in general, impacted groundwater at the Site is not used as a potable resource. RMMs are included in Section 7 to prevent potable water use from RA Property groundwater. As such, the use of the HQ of 0.5 for TCE (for inhalation pathways only) is considered appropriate for the assessment.

The MECP (2011b) HQ of 0.2 is equal to one-fifth of the applicable noncancer TRV. The RfD and RfC define either the exposure rate or concentration of chemical in air that humans, including sensitive individuals, may be exposed to over a lifetime without an appreciable risk of experiencing an adverse effect (which is equivalent to an HQ of 1.0 [EPA, 2000]). If HQs are shown to be greater than 1.0, this does not imply that an adverse effect will result, only that there is a potential for an adverse effect. Because of the conservative nature of the assumptions underlying the calculation of exposure and air concentrations, there is an inherent tendency to overpredict exposure. Furthermore, the scientific principles employed to derive RfD and RfC values are based on selecting the most sensitive end-point observed in the most sensitive gender of the most sensitive species and consider uncertainties in the toxicology assessment database. Overall, these TRVs are expected to be protective of human health.

UFs that span several orders of magnitude (for example, often 1,000-fold or greater) are placed on dose-response models in animal toxicity studies to protect human health. Often, the TRV is developed from the NOAEL in animal studies, which is a dose that does not cause harm to an animal. The greater the uncertainty

in the toxicological study, the larger the UF that is employed. Taken together, the overprediction of exposure and the minimization of the toxicity value provide a comprehensive approach to the protection of human health and the environment.

Estimates of risk for carcinogens (nonthreshold response) are derived by the following relationship, where the ILCR is calculated:

$$ILCR = Exposure\ Estimate \times Cancer\ SF \quad (14)$$

or

$$ILCR = Exposure\ Concentration \times UR \quad (15)$$

For the ILCR, values between 1×10^{-6} and 1×10^{-4} are typically considered to be a negligible increase of risk. The MECP has selected a target ILCR of 1×10^{-6} (1 in 1 million) as the acceptable level of risk, which was used in this assessment.

Based on the hazard assessment, some COCs may act toxicologically the same or in a similar manner on biological systems (that is, carcinogenic PAHs or chlorinated volatile organic compounds [cVOCs]). For this RA, Jacobs calculated the cumulative risk for PAHs in soil and groundwater and cVOCs in groundwater to conservatively address the potential for exposure to these groups of substances.

4.4.2 Quantitative Interpretation of Health Risks

4.4.2.1 Dermal Contact with Soil

Table 4-27 shows the predicted risks from dermal contact with soil. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents and Outdoor Workers, respectively (refer to Section 4.4.3.1). Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• B(a)P • Copper • Iron • Zinc • PHC F3	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-Cd)Pyrene • B(a)PE
Outdoor Worker	• B(a)P	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-Cd)Pyrene • B(a)PE
Construction Worker	• None	• B(a)P • B(a)PE

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Utility Worker	• None	• Arsenic • B(a)P • B(a)PE
Pregnant Female Resident	• B(a)P	• Not applicable
Pregnant Female Worker (Outdoor, Construction, or Utility)	• None	• Not applicable

Based on the assessment of risks from dermal contact with soil, risks greater than the target cancer risk are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in soil; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.2 Dermal Contact with Groundwater

Table 4-28a shows the predicted risks from Resident dermal contact with groundwater as potable drinking water. Table 4-28b shows the predicted risk from Construction and Utility Worker dermal contact with groundwater while working in the subsurface. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents (refer to Section 4.4.3.1). Risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers (refer to Section 4.4.3.2).

For potable groundwater, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• 2-(1-)Methylnaphthalene • Benzene • B(a)P • Cis-1,2-dichloroethene • Fluoranthene • Phenanthrene • Pyrene • TCE • VC • PHC F2 • PHC F3	• Acenaphthene • Arsenic • Benzene • Benzo(a)anthracene • B(a)P • Benzo(b+j)fluoranthene • Benzo(k)fluoranthene • Chrysene • Fluoranthene • Pyrene • TCE • VC • B(a)PE
Pregnant Female Resident	• B(a)P • TCE	• Not applicable

For incidental contact with groundwater, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• TCE • PHC F2 • PHC F3	• B(a)P • TCE VC • B(a)PE
Utility Worker	• PHC F2 • PHC F3	• B(a)P

		• TCE VC • B(a)PE
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

Based on the assessment of risks from dermal contact with groundwater (drinking water and incidental), risks greater than the target cancer risk are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in groundwater; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.3 Uncertainties—Dermal Contact

Uncertainties related to the estimation of dermal exposure and risk are as follows:

- The relative DAF and SAFs may be different than the experimental basis used to develop them. This may over- or underestimate the risk.
- The model does not account for the removal of soil contaminants from the receptors' hands by brushing off or washing them off. This may overestimate the risk from exposure.
- Concentrations of contaminants are not distributed uniformly across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations may appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- Site users were assumed to have access to the maximum detected concentrations of chemicals (regardless of depth) on an ongoing and constant basis. Under normal circumstances, only a Construction or Utility Worker would have access to soil located at depths impacted with COCs at maximum detected concentrations.
- The exposure assessment assumes worker exposure to groundwater would be limited to the hands. Additional body parts, such as forearms, may occasionally be exposed to groundwater, increasing potential exposure area; however, a significant increase in the exposure area is unlikely.
- The likelihood is low that Construction or Utility Workers would have their hands submerged continuously in groundwater even for one 5-minute event per day for the duration of the construction period. Typical construction activities include the dewatering of excavations. Therefore, it is unlikely that these receptors would have significant exposure to groundwater when using typical construction practices.
- The K_p used in this RA has uncertainty and could overestimate exposure for highly lipophilic compounds and underestimate exposure from other organic compounds, such as chlorinated compounds. The risk estimates could be higher or lower. Peer-reviewed estimates of chemical physical properties were used where available.

4.4.2.4 Incidental Ingestion of Soil

Table 4-29 shows the predicted risks from incidental ingestion of soil. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents and Outdoor Workers, respectively (refer to Section 4.4.3.1). Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Arsenic • B(a)P • Cadmium • Cobalt • Copper • Iron • PCB, Total • Thallium • TCE • Vanadium • Zinc • PHC F3	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Chrysene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-cd)pyrene • TCE • B(a)PE
Outdoor Worker	• B(a)P • Cadmium • Cobalt • Thallium	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Chrysene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-cd)pyrene • B(a)PE
Construction Worker	• Cadmium	• Arsenic • B(a)P • B(a)PE
Utility Worker	• None	• Arsenic • B(a)P • B(a)PE
Pregnant Female Resident	• B(a)P •	• Not applicable
Pregnant Female Worker (Outdoor, Construction, or Utility)	• None	• Not applicable

Based on the assessment of risks from incidental ingestion of soil, risks greater than the target cancer and noncancer risks are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in soil; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.5 Ingestion of Groundwater

Table 4-30a shows the predicted risks from Resident ingestion of RA Property groundwater as potable drinking water. Table 4-30b shows the predicted risks from Construction and Utility Worker incidental ingestion of groundwater while working in the subsurface. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents (refer to Section 4.4.3.1). Risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers (Section 4.4.3.2).

For potable water, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• 2-(1-)Methylnaphthalene • Arsenic • Benzene • B(a)P • Cis-1,2-dichloroethene • Phenanthrene • Trans-1,2-dichloroethene • TCE • Zinc • VC • PHC F2 • PHC F3 • PHC F4	• 1,1-dichloroethane • Acenaphthene • Arsenic • Benzene • Benzo(a)anthracene • B(a)P • Benzo(b+j)fluoranthene • Benzo(k)fluoranthene • Chrysene • Fluoranthene • Pyrene • TCE • VC • B(a)PE
Pregnant Female Resident	• B(a)P • TCE •	• Not applicable

For incidental ingestion, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• TCE • PHC F2 • PHC F3	• Arsenic • TCE • VC
Utility Worker	• TCE • PHC F3	• Arsenic • TCE • VC
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

Based on the assessment of risks from ingestion of groundwater (drinking water and incidental), risks greater than the target cancer and noncancer risks are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in groundwater; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.6 Uncertainties—Ingestion

Uncertainties related to the estimation of ingestion exposure and risk are as follows:

- The amount of water assumed to be ingested by Construction and Utility Workers in this assessment is equivalent to the amount considered to be ingested during swimming activities (50 millilitres [mL], based on EPA [1989]). The actual ingestion of groundwater is likely to be insignificant. The assumption will likely overestimate the risk to Construction and Utility Workers.

- Typical construction activities include dewatering excavations; therefore, it is unlikely that Construction or Utility Workers will be exposed to groundwater. Less exposure will result in lesser risk estimates.
- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- Site users were assumed to have access to the maximum detected concentrations of chemicals (regardless of depth) on an ongoing and constant basis. Under normal circumstances, only a Construction or Utility Worker may have access to soil or groundwater deep enough to be impacted with COCs at maximum detected concentrations.
- The incidental ingestion rates may be different than the experimental basis used to develop them. Changes in ingestion rate would increase or decrease the predicted risk.

4.4.2.7 Summary of Direct Contact (Dermal and Ingestion) with Soil

Table 4-31 shows the calculated combined risk from dermal contact and ingestion with soil. Adding the two exposure pathways resulted in the addition of the following COCs and receptors with risks greater than MECP target levels:

- Phenanthrene, PHC F2, and PHC F4 exceed the target noncancer risk for the Toddler Resident
- TCE exceeds the target cancer risk and copper and iron exceed~~ing~~ the noncancer risk for the Outdoor Worker.
- Benzo(b)fluoranthene and dibenzo(a,h)anthracene exceed the target cancer risk for the Utility Worker.
- Copper, iron, and zinc exceed the target noncancer risk for the Construction Worker.

Risks associated with dust were not included in Table 4-31. This is because the risks associated with dust inhalation are minor compared to the dermal or ingestion pathways. While there is uncertainty associated with excluding dust from these tables, its inclusion does not affect the conclusions of the assessment or the RMMs required for the RA Property. Section 4.4.3.8 provides a qualitative assessment of inhaled soil particulates that are ingested.

4.4.2.8 Summary of Direct Contact (Dermal and Ingestion) with Groundwater

Tables 4-32a and 4-32b show the calculated combined risk from dermal contact and ingestion with groundwater for the RA Property for potable water by Residents and subsurface contact by Workers, respectively. Adding the two exposure pathways resulted in the addition of the following COCs and receptors with risks greater than MECP target levels:

- Fluoranthene exceeds the target noncancer risk for the Infant Resident
- Trans-1,2-dichloroethene exceeds the target noncancer risk for the Child Resident.
- Phenanthrene and pyrene exceed the target noncancer risk for the Adult Resident.

4.4.2.9 Inhalation of Fugitive Dust

Table 4-33 shows the predicted risks from inhalation of particulates (dust) originating from RA Property soil both during construction activities and following redevelopment. Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• None	• None
Outdoor Worker	• None	• None
Construction Worker	• B(a)P • Cobalt • Zinc	• None
Utility Worker	• None	• None
Pregnant Female Resident	• None	• Not applicable
Pregnant Female Worker (Outdoor)	• None	• Not applicable
Pregnant Female Worker (Construction or Utility)	• B(a)P	• Not applicable

Based on the assessment of risks from inhalation of particulates (dust), risks greater than the target noncancer risks are possible for pregnant subsurface workers during construction activities. RMMs are, therefore, required during construction activities to reduce the potential risks to acceptable levels.

It was not possible to quantitatively assess lead or iron for the dust inhalation pathway due to a lack of toxicity criteria for ~~this~~ these parameters. For ~~lead~~these COCs, the background soil values are considered appropriate to determine whether concentrations at the RA Property may pose a greater risk to human health than that expected at an Ontario property that has not been impacted by anthropogenic activities (refer to Section 4.4.3.5 for a qualitative analysis). Based on the qualitative analysis of lead and iron, RMMs are also required to reduce the potential risks from ~~lead~~ exposure to these COCs to acceptable levels.

4.4.2.10 Uncertainties—Dust Inhalation

Uncertainties related to the estimation of dust inhalation exposure and risk are as follows:

- Inhalation RfDs and URs were derived from RfCs and URFs using a default inhalation rate of 20 cubic metres per day (m^3/d) and a BW of 70 kg to assess risks from dust inhalation as a dose. This conversion is specific to adults; therefore, risks from dust inhalation may be underestimated for nonadult receptors. However, since an elevated risk is already estimated for the pathway, the conclusion that RMMs are required is not affected by this uncertainty.
- Risk to offsite receptors would likely be less than experienced by Site users, since the concentration of COC-impacted fugitive dusts diminishes rapidly with dispersion and dilution in air and with distance (EPA, 2002a).
- The total dust in the air is highly variable; as a result of the uncertainty in the dust concentrations, Jacobs used a conservative value, likely resulting in an overestimate of exposure and risk.
- A suitable noncancer TRV for inhalation of lead and iron are~~is~~ not currently available; therefore, Jacobs could not estimate the noncancer inhalation risks from lead and iron in dust. As RMMs are required for this pathway for other COCs, the potential for noncancer risks greater than MECP targets from lead in dust will be managed as part of the RMP.

4.4.2.11 Inhalation of Indoor Air

Tables 4-34a and 4-34b show the predicted risks from inhalation of vapours migrating from soil to indoor air for all retained receptors under commercial building and residential building scenarios, respectively.

For the generic commercial building soil to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Indoor Worker	• Benzene • Naphthalene • TCE • PHC F2	• Benzene • TCE
Pregnant Female Indoor Worker	• TCE	• Not applicable

For the generic residential building soil to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Benzene • Mercury • Naphthalene • PHC F2 • TCE • Xylenes, total	• Acenaphthene • Benzene • TCE
Pregnant Female Resident	• TCE	• Not applicable

Tables 4-35a and 4-35b show the predicted risks from inhalation of vapours migrating from groundwater to indoor air for all retained receptors under commercial building and residential building scenarios, respectively.

For the generic commercial building groundwater to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Indoor Worker	• Benzene • 1,1-dichloroethene • Cis-1,2-dichloroethene • Trans-1,2-dichlorothene • n-hexane • TCE • VC • PHC F1 • PHC F2	• Benzene • 1,1-dichloroethane • TCE • VC

Pregnant Female Indoor Worker	• TCE	• Not applicable

For the generic residential building groundwater to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Benzene • 1,1-dichloroethane • 1,1-dichloroethene • Cis-1,2-dichloroethene • Trans-1,2-dichlorothene • n-hexane • (2-)1-Methylnaphthalene • Naphthalene • Tetrachloroethylene • 1,1,1-trichloroethane • TCE • VC • PHC F1 • PHC F2	• Acenaphthene • Benzene • 1,1-Dichloroethane • Tetrachloroethylene • TCE • VC
Pregnant Female Resident	• TCE	• Not applicable

Based on the assessment of risks from inhalation of vapours in indoor air originating from soil and groundwater for the modelled building scenarios, unacceptable risks are possible for the generic commercial and residential building scenarios. RMMs are, therefore, required to reduce the potential risks to acceptable levels for the generic commercial and residential building scenarios.

4.4.2.12 Uncertainties—Indoor Air

Uncertainties related to the estimation of inhalation exposure and risk are as follows:

- The degradation of organic compounds along the transport path was ignored. If degradation was included, the chemical concentration would decrease, which would decrease the estimated risks.
- For indoor air assessments, it is not generally acceptable to use soil concentrations and partitioning calculations to determine soil gas concentrations while evaluating VI because there is a great degree of uncertainty associated with the soil-partitioning results (EPA, 2002b), which could lead to over- or underestimating risk.
- The exposure assessment section also defines the concentrations of COCs to which potential receptors may be exposed. Within the RA Property boundaries, Jacobs estimated potential indoor air vapour concentrations by using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which a receptor might be exposed. The selection of conservative assumptions regarding Site-specific inputs may result in an overestimate of exposure and associated risk to certain receptors. These assumptions all impart uncertainty to the

RA but are purposely developed to yield RA conclusions that are, indeed, conservative and protective of human health.

- Vapour concentrations inside future RA Property buildings were modelled assuming the buildings are occupied, and the VI pathway is complete, meaning soil vapours can enter the structure. This assumption is conservative because the exposure pathway may not actually be complete or significant; therefore, there may be no or little associated risk.
- Exposure modelling for indoor air conservatively assumes the structure lies directly over the estimated maximum soil and groundwater concentrations for volatile COCs detected at the RA Property. It is also assumed that the source is infinite, and the modelling does not account for degradation of constituents. These factors may significantly overestimate indoor air concentrations and risk.
- A source of uncertainty in indoor air vapour concentration model results is the use of partitioning coefficients from other media into soil vapour to predict subslab soil vapour concentrations of COCs and, in turn, to assess potential indoor air concentrations. Modelling results based on ideal chemical properties of the COCs may not appropriately represent true portioning between media that occurs on a site-specific basis. This results in uncertainty in the model results that could over- or underestimate risk.

4.4.2.13 Inhalation of Outdoor Air Volatiles

Table 4-36 shows the predicted risk for Residents and Workers from inhalation of subsurface volatiles migrating to outdoor air above the ground surface at the RA Property. Risks to each receptor were estimated to be less than the MECP target noncancer and cancer risks for the retained COCs. RMMs are, therefore, not required at the RA Property to reduce the potential risks to acceptable levels. Risks to onsite Indoor Workers and offsite receptors (that is, offsite Surface Receptors, and Construction and Utility Workers) were indirectly assessed through the modelling for onsite Residents and Workers (Sections 4.4.3.1 and 4.4.3.2).

Table 4-37 shows the predicted risk for Utility and Construction Workers from inhalation of subsurface volatiles migrating to outdoor air in an excavated trench for the RA Property. Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• Naphthalene • TCE • PHC F2	• None
Utility Worker	• None	• None
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

RMMs are required during excavation activities at the RA Property to reduce the potential risks to acceptable levels.

Table 4-38 shows the combined predicted risk for Utility and Construction Workers from the inhalation of subsurface volatiles migrating to outdoor air above ground surface and in an excavated trench. Adding the two pathways did not result in any COCs exceeding the MECP target risk levels for any receptor.

4.4.2.14 Uncertainties—Outdoor Air Volatiles Inhalation

Uncertainties related to the estimation of outdoor air inhalation exposure and risk are as follows:

- The comparators used to predict risk (that is, RfC and UR) are values considered protective of lifetime exposure to chemicals—24 hours per day, 7 days per week, 52 weeks per year, for 70 years—and include adjustments for sensitive individuals in the human population. Therefore, for any human receptor, risks are overestimated for short-term exposure to volatile chemicals that may be present in air, since no person will occupy the RA Property for a duration consistent with the duration used to develop the comparators. Adjustment of the comparator for shortened duration would likely result in a decreased risk for receptors.
- Risk to offsite receptors, included Residents, would likely be less than experienced by Site users, since the concentration of volatile COCs in air diminishes with dispersion and dilution in air rapidly with distance (EPA, 2002a).
- As outline in Appendix G3, outdoor air concentrations in a trench have been modelled based on an assumed wind speed and the assumed presence of a worker in a trench. Actual concentrations may be under- or overestimated. However, typical practices for trench excavation prohibit entry because the trench is considered a confined space. Therefore, exposure estimates are likely to overestimate risks in this case.

4.4.3 Qualitative Interpretation of Health Risks

This section discusses parameters and exposure scenarios that were qualitatively assessed in the HHRA.

4.4.3.1 Qualitative Assessment of Additional Onsite Receptors

Site Visitors of all ages may also be present at the RA Property under future conditions. These receptors may also be exposed to RA Property impacts; however, their exposure will be less than that of the receptors included for quantitative assessment. Similarly, Indoor Workers were not included for quantitative assessment for pathways other than indoor air inhalation, because they have less exposure to outdoor air and direct contact with Site soils relative to a full-time Outdoor Worker. It is understood that if risks to the quantitatively evaluated receptors are identified, risks to these onsite receptors are also possible through relevant exposure pathways.

The following risk conclusions have been made for quantitatively evaluated receptors and are understood to possibly exist for the qualitatively evaluated onsite receptors:

- Unacceptable risks from direct contact with soil are possible for Indoor Workers, Site Visitors, and for non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from incidental ingestion of soil are possible for Indoor Workers, Site Visitors, and non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from ingestion of groundwater as potable water are possible for Indoor Workers and ingestion of drinking water for Site Visitors and non-Toddler Residents (infant, child, teen, and adult) and Indoor Workers.
- Unacceptable risks from inhalation of volatiles in outdoor air above ground are not expected for Indoor Workers, Site Visitors, and non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from dust inhalation are possible for non-Toddler Residents, Site Visitors, and Indoor Workers from lead and iron.

4.4.3.2 Qualitative Assessment of Offsite Receptors

Offsite receptors may also be exposed to Site media if impacted soil particulates, vapours, or groundwater migrates beyond the RA Property boundaries; however, their exposure will be less than that of the onsite receptors included for quantitative assessment. If risks to the quantitatively evaluated onsite receptors are identified, then risks to these offsite receptors are also possible through relevant exposure pathways.

The following risk conclusions have been made for quantitatively evaluated onsite receptors (Section 4.4.2) and are understood to possibly exist for the qualitatively evaluated offsite receptors should offsite migration of dust (from onsite soils) or groundwater occur:

- Unacceptable risks from dust inhalation are possible for offsite Surface Receptors from lead and iron, offsite Construction and Utility Workers from B(a)P, cobalt, zinc, B(a)P, and lead and iron; and offsite Female Construction and Utility Workers from B(a)P.
- Unacceptable risks from dermal contact or incidental ingestion of groundwater are possible for offsite Construction and Utility Workers.
- Unacceptable risks from dermal contact or ingestion of groundwater as potable drinking water are possible for offsite Surface Receptors.
- Unacceptable risks from inhalation of volatiles from soil or groundwater to indoor air are possible for offsite Surface Receptors in residential or industrial/commercial buildings. The following bullets provide additional interpretation:
  - Residential receptors are not present directly to the south or east, closest to where the highest concentrations of volatile COCs in soil have been detected.
  - Per the updated draft MECP document entitled *Technical Guidance for Soil Vapour Intrusion Assessment* (MECP 2021) "soil vapour migration tends to be insignificant at distances of approximately 30 m from the edge of the subsurface contamination" for recalcitrant chemicals, and approximately 10 m for readily-biodegradable chemicals such as PHCs and BTEX. ~~These detected concentrations are approximately 20 m from the property boundary~~.
  - Considering the distances cited by the MECP (2021) and using the generic S-IA components for an offsite ICC land use, the Site soil data was further evaluated for potential issues to offsite commercial buildings (no residences are located within 30 m of a location with a volatiles exceedance). Per Table 3-34a, onsite risks to occupants of commercial buildings were predicted to be greater than MECP target risk values only for benzene, naphthalene, TCE, and PHC F2 in soil. Therefore, these COCs were examined further, as follows:
    - All concentrations of benzene in soil onsite are less than the Table 2 ICC S-IA component value. Risk from lateral gas movement offsite of benzene from onsite soil sources is unlikely.
    - One soil location has concentrations of naphthalene greater than the Table 2 ICC S-IA component (OW07-34D), located approximately 26 m from the southern property boundary. Risk from lateral gas movement offsite of naphthalene from onsite soil sources is unlikely to low based on a single exceedance of the S-IA component and distance of this location to the property boundary.
    - Twelve locations have TCE concentrations in soil greater than the generic Table 6 SCS[5], all locations are within the northeast corner of the Site within 16 m of the property boundary, co-located with highest TCE impacts in groundwater. Risk from lateral gas movement offsite of TCE from onsite soil sources is possible, based on the proximity to the property boundary.

[5] The Table 2 ICC S-IA component is less than background; therefore, the generic Table 6 SCS was used.

However, considering the associated groundwater concentrations in this area, the primary source of potential TCE vapours in this corner are associated with groundwater. RMMs are proposed to mitigate risks to receptors in offsite buildings from offsite groundwater migration.

- One soil location has concentrations of PHC F2 greater than the Table 2 S-IA component (BH07-40), located approximately 25 m from the eastern property boundary. Risk from lateral gas movement offsite of PHC F2 from onsite soil sources is unlikely to low based on a single exceedance of the S-IA component and the distance of this location to the property boundary.

– Based on this evaluation, the potential for risk from lateral soil gas movement offsite of benzene, naphthalene, and PHC F2 from onsite soil sources is considered unlikely to low.

– Soil gas concentrations typically decrease rapidly with distance from the source due to various processes (such as degradation and adsorption); therefore, soil gas generated from impacted soil onsite is less likely to pose a risk to offsite receptors than soil gas generated from impacted groundwater that has migrated offsite (as the "source" would be moving closer to the receptor).

– Considering the existing and future Site conditions and current lack of identified preferential pathways in the vadose zone, the primary migration mechanism for soil gas would be expected to be diffusion and as a result the potential for risks to offsite receptors via the lateral migration of soil gas from soil sources is considered low. Utility corridors can provide a preferential path for contaminated groundwater or volatile transport. Based on the depth of groundwater, the typical depth of underground utilities (1.5 mbgs or deeper), and the presence of permeable materials onsite to the shallow onsite bedrock, COCs are most likely to be transported (that is, to migrate) via groundwater. RMMs are proposed to mitigate risks to receptors in offsite buildings from offsite groundwater migration.

- No unacceptable risks from inhalation of volatiles in outdoor air are expected for offsite Surface Receptors but unacceptable risks are possible for offsite Construction and Utility Workers working in trenches if impacted groundwater migrates offsite.

4.4.3.3 Qualitative Assessment of Direct Contact Exposure – Vapour Skin Contact

Dermal exposure to vapours can be an important pathway in HHRAs—particularly for occupational settings where receptors are wearing a respirator because most of the body burden would likely be derived from dermal exposure. However, with few exceptions, dermal exposure to vapours is generally not considered in HHRAs, as supported by the following documents:

- EPA, 1989 — *Risk Assessment Guidance for Superfund* (RAGS): "Dermal absorption of vapour phase chemicals is considered to be lower than inhalation intakes in many instances and generally is not considered in Superfund exposure assessments."
- EPA, 1992 — *Dermal Exposure Assessment: Principles and Applications*: "Current studies suggest that dermal exposure may be expected to contribute no more than 10% to the total body burden of those compounds present in the vapour phase."
- McDougal and Boeniger, 2002 — "Methods for assessing risks of dermal exposures in the workplace": "In most cases, vapour absorption through the skin would not be of concern unless a respirator is worn because the majority of the body burden would come from inhalation."
- EPA, 2007 — *Dermal Exposure Assessment: A Summary of EPA Approaches*: "Dermal exposures to chemicals present in air are considered unlikely, in most cases, to provide more than 10% of aggregate exposure."

Numerous regulatory documents and scientific journals provide methodologies and equations that can be used to estimate the dermal absorption of chemical vapours (for example, EPA, 1992; McDougal and Boeniger, 2002). At least four different methods can be used to predict an internal dose once an external dose has been estimated. The methods differ in the type and quantity of information required for the calculations, in the simplifying assumptions that are made, and in the reliability of the results. Internal dose can be predicted from external dose based on the following:

- The empirical measurement of fraction of applied dose absorbed
- Measured (or estimated by correlations) steady-state flux or permeability
- Steady-state flux or permeability adjusted by the square root of time
- Biologically based mathematical models (McDougal and Boeniger, 2002)

The equations available for quantifying dermal absorption of chemical vapours are typically simplistic (and often inaccurate), as they do not account for many exposure factors, including the following:

- Individual variability of skin penetrability due to age of the individual and skin condition (for example, broken or damaged skin)
- Variances in the penetrability of the skin in different areas of the body
- Individual variability in the amount of skin available for exposure (that is, clothing or gloves worn)
- Temperature and humidity (both have been shown to affect dermal absorption of chemical vapours)
- Evaporation from skin following deposition onto skin

Estimates of internal dose often rely on information gained from animal studies. However, rodents (frequently used as a model for human exposure and risk) have a different, more permeable skin structure than humans; and, in most cases, there is more penetration data for rodents than for humans. This usually necessitates the use of physiologically based pharmacokinetic modelling, which can further increase the uncertainty of internal dose estimates. Therefore, while dermal exposure to vapours is a potentially complete pathway at the RA Property, Jacobs did not quantitatively evaluate this pathway, given the uncertainty associated with its quantification and the general belief that it does not contribute greatly to a receptor's overall exposure and body burden unless the receptor is wearing a respirator (which is not anticipated at the RA Property).

4.4.3.4 Qualitative Assessment of Contaminants of Concern with Concentrations Less than MECP Component Values

As outlined in Section 4.1.2, a secondary screening against MECP-derived human health component values (MECP, 2011b) was completed for the COCs to determine which would be evaluated quantitatively or qualitatively in the HHRA. Tables 4-1 and 4-2 present the results of this screening for soil and groundwater, respectively. Qualitatively assessed COCs include those with maximum concentrations greater than the Table 6 SCS, but estimated maximum concentrations less than the MECP-derived human health component values (direct contact pathways), or maximum theoretical indoor air concentrations less than HBIAC values and maximum concentrations less than the human health component values (for inhalation pathways). For these COCs, risks to receptors (including Pregnant Females) are considered to be less than the MECP target cancer and noncancer risk levels. Therefore, the proposed human health PSSs are based on the estimated maximum concentration of each COC.

4.4.3.5 Qualitative Assessment of Parameters without Toxicity Data

Lead

Lead was retained as a COC in soil and groundwater for quantitative evaluation in the HHRA, since the estimated maximum concentrations in both media were greater than the Table 6 SCS. Recent science suggests any exposure to lead may result in an adverse effect, especially to infants and children. The current Canada BLL "intervention level" is 10 µg/dL; however, there is evidence to suggest adverse impacts at lesser BLLs (as low as 1 to 2 µg/dL) (Health Canada, 2013). Therefore, there are uncertainties associated with TRVs that have not considered the potential adverse health effects associated with lower BLLs, including those used to derive the generic MECP standards.

The Rationale Document (MECP, 2011b) acknowledges that lead was an exception in the development of the generic standards and human health component values:

> *"For some substances, a threshold for non-cancer effects may not exist, or may not be possible to discern. In such instances, establishing a guideline or standard cannot be based on target HQ. Instead, the guideline or standard may be based on a policy decision regarding an acceptable level of adverse effect or uncertainty. Lead is an example of such a substance."*

In response to the changing science, various regulatory agencies, including EPA and Health Canada, are in the process of reassessing their previously published policies, TRVs, and soil and groundwater quality guidelines for lead. As a result, Jacobs did not quantify exposure and risk from oral and dermal contact with lead in soil or groundwater within the HHRA.

A qualitative evaluation of oral, dermal, and inhalation (dust) exposures to lead has been conducted using the MECP *Table 1 Full Depth Background Site Condition Standards* (Table 1 Standard) (MECP 2011c), which represent background conditions in Ontario. The background soil and groundwater values are considered appropriate to determine whether lead concentrations measured at the RA Property may pose a risk to human health greater than that expected at an Ontario property that has not been impacted by anthropogenic activities. The estimated maximum concentration of lead in soil at the RA Property is 12,000 µg/g, which is 100 times greater than the MECP Table 1 Standard for lead of 120 µg/g. Seventy-six soil samples (approximately 33 percent of soil samples analyzed for metals) had concentrations of lead exceeding 120 µg/g. Therefore, this elevated lead concentration in soil may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers.

The estimated maximum concentration of lead in groundwater at the RA Property is 17 µg/L, which is 9 times greater than the MECP Table 1 Standard for lead of 1.9 µg/L. Four groundwater samples (approximately 2 percent of groundwater samples analyzed for metals) had concentrations of lead exceeding 1.9 µg/L. Therefore, this elevated lead concentration in groundwater may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers.

To mitigate the potential risks from direct contact with lead in soil and groundwater, and inhalation of lead in soil, RMMs to prevent or reduce contact with lead-impacted soils and groundwater are recommended as part of the RMP (Section 7). As RMMs will be implemented, the proposed human health PSSs for lead are based on the estimated maximum concentration of lead currently remaining onsite.

Bismuth

A literature search was performed to identify one of more of: Ontario or Canadian background concentrations for bismuth, human health soil screening values, or agency-approved TRVs for bismuth. As a result of this search, only one human health specific soil screening value was identified. The Texas Commission on Environmental Quality (TCEQ), as part of their Texas Risk Reduction Program, has derived a Protective Concentration Level (PCL) (TCEQ 2021) for bismuth for residential receptors. The PCLs consider direct contact (ingestion and dermal) with soil and ingestion of vegetables grown in impacted soil. The PCL derived by TCEQ for bismuth is 37,000 µg/g for residents based on the direct contact pathways only. The value is based on non-carcinogenic risk using an RfD (oral) of 5.0E+01 mg/kg/day. The source of the TRV is listed as being derived directly by TCEQ; the supporting documentation for the derivation of this TRV was not readily available online. Due to the lack of information available for bismuth and the known low toxicity to humans via the intake of medicinal products (Wang et al.), the TCEQ value was determined to be adequate for use in the qualitative assessment. The TCEQ PCLs are based on a HQ of 1.0 (TCEQ 2008); therefore, the PCL was divided by 5 to adjust to a target HQ of 0.2 for use in this RA. Therefore, the adjusted soil screening level used for the qualitative assessment of bismuth is 7,400 µg/g.

The estimated maximum concentration of bismuth in soil at the RA Property is 180 µg/g, which is approximately 40 times lower than the adjusted soil screening value of 7,400 µg/g. Of the 103 soil samples analyzed for bismuth (12 samples as part of historical investigations and 91 samples as part of recent investigations), only 12 samples had detected concentrations, ranging from 1.7 µg/g to 150 µg/g. Therefore, the bismuth concentrations in soil are unlikely to pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers from oral, dermal, and inhalation (dust) exposures.

As RMMs will be implemented across the property for other COCs and no adverse impacts from bismuth are anticipated, the proposed human health PSS for bismuth is based on the estimated maximum concentration of bismuth currently remaining onsite.

Iron (Dust Only)

A qualitative evaluation of inhalation (dust) exposures to iron has been conducted using the MECP *Ontario Typical Range* (OTR) values (MECP 2011c), which represent background conditions in Ontario. The background soil values are considered appropriate to determine whether iron concentrations measured at the RA Property may pose a risk to human health greater than that expected at an Ontario property that has not been impacted by anthropogenic activities. The estimated maximum concentration of iron in soil at the RA Property is 150,000 µg/g, which approximately 4 times greater than the OTR for iron of 38,000 µg/g. Twenty-five of 135 soil samples (approximately 19 percent of soil samples analyzed for iron) had concentrations of iron exceeding 38,000 µg/g. Therefore, elevated iron concentrations in soil may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers via the inhalation of dust.

To mitigate the potential risks from inhalation of iron in soil, RMMs to prevent or reduce dust generation are recommended as part of the RMP (Section 7). As RMMs will be implemented, the proposed human health PSS for iron is based on the estimated maximum concentration of iron currently remaining onsite.

Ecological Contaminants of Concern

One parameter that was not applicable to human health was retained as soil a COC via the screening process outlined in Section 3: EC. This parameter is included in the ERA presented in Section 5 of this RA. As human health toxicity data have not been developed for this parameter, Jacobs based the proposed human health PSS on the estimated maximum concentration.

Essential Nutrients

Essential nutrients are needed to maintain basic life functions. Because these chemicals are essential nutrients and they have relatively low toxicity to human health, TRVs may not have been developed for them. The physiologically essential levels for these nutrients are recommended for daily intakes from various health agencies worldwide. Values adopted by Health Canada (2010b) were used in the current assessment. Values used to determine the intake of essential nutrients at the Site include:

- Tolerable Upper Intake Level (UL) – The UL is the highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals in a given life-stage and gender group.

- Adequate Intake (AI) – The AI is the average recommended daily allowance (RDA) of a nutrient based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people who are assumed to be maintaining an adequate nutritional state.

Using the UL and AI values described, the intake of essential nutrients detected at the RA Property (specifically, calcium and magnesium in soil) were calculated (Table 4-39) for a Toddler based on the soil ingestion rates used in the RA to determine if the intake from Site soil represents a significant proportion of the UL or AI values. The following subsections describe the results.

Calcium

Calcium occurs abundantly in nature as least soluble calcium compounds. Several foods are rich in calcium such as milk, cheese, green leafy vegetables, soybean products, fortified flour, and various nuts. The concentration of calcium in natural drinking water varies from less than 100 mg/L in soft water to 300 mg/L in hard water areas. Calcium intake is required for healthy bone formation, and the reference nutritional intake of calcium is 350 mg/day to 1,000 mg/day. Calcium is beneficial to health in reducing cell proliferation that is a precursor to certain forms of cancers and in reducing hypertension among adults. It is essential for skeletal structure and also is a cofactor in various enzyme metabolisms. TRVs were not developed for calcium as it is a nutritionally essential element and has relatively low toxicity (NIH 2021a)

- Calcium in Soil: The UL for calcium is 2,500 mg/day, and RDA/AI is 750 mg/day (based on a child 1-3 years old). Assuming a soil ingestion rate of 200 mg/day (based on the toddler soil ingestion exposure), with the estimated maximum concentration of calcium in soil of 260,000 mg/kg, receptor intake is estimated to be 52 mg/day, which is less than both the UL and the RDA/AI values. The proportion of the UL and RDA/AI, are approximately 2% and 7%, respectively. Therefore, detected concentrations of calcium in RA Property soil are unlikely to result in an adverse effect to human receptors at the Site.

Magnesium

Magnesium is the eighth most abundant element in the earth's crust and is ubiquitous in foods such as: leafy vegetables, grains, nuts, meats, and dairy. Magnesium is also used in antacids and as a food additive or supplement. It is essential for normal cell functioning as a cofactor for many enzyme systems and is required for "protein synthesis, muscle and nerve function, blood glucose control, and blood pressure regulation". Magnesium regulates the movement "of potassium and calcium ion across cell membranes". Magnesium is an important element in the metabolism and action of vitamin D and is essential for the synthesis and secretion of parathyroid hormone (NIH 2021b). Thus, TRVs have not been developed for magnesium.

- Magnesium in Soil: The UL for magnesium is 65 mg/day, and RDA/AI is 80 mg/day (based on a child 1-3 years old). The UL for magnesium does not account for food of water intake; therefore, the value appears to be biased low as it is less than the RDA/AI. Assuming a soil ingestion rate of 200 mg/day (based on toddler soil ingestion exposure), with the estimated maximum concentration of magnesium in soil of 140,000 mg/kg, receptor intake is estimated to be 28 mg/day, which is less than the UL and RDA/AI values. The proportion of the UL and RDA/AI, are approximately 35% and 43%, respectively. These proportions are higher than the analogous 20% of the TRV (HQ) used for evaluating noncancer risks. However, as magnesium is not volatile, daily exposures may be sourced from soil, water, food, and consumer products; therefore, assuming that a slightly higher proportion from soil would not result in an adverse effect may be appropriate. In addition, U.S. dietary surveys indicate that approximately 48% of people consume less than the RDA/AI of magnesium from food and beverages, with adolescents of both ages "most likely to have low intakes" (NIH 2021b). Considering this information, the detected concentrations of magnesium in RA Property soil are unlikely to result in an adverse effect to human receptors at the Site.

4.4.3.6 Qualitative Assessment of NAPL

The presence of NAPL has been confirmed at the RA Property in a limited area. Three monitoring wells (all screened within the overburden and bedrock contact zone aquifer unit) in the eastern portion of the Site have measured NAPL floating on the water table located right at or below the overburden and bedrock contact (refer to Figures 6-15, 6-15a, and 6-15b in Appendix D3). Therefore, additional consideration of potential risks related to NAPL, and the potential need for additional RMMs due to the presence of NAPL, is warranted. The MECP SCS and component values considered in the evaluation of COCs for the RA Property, and the equations applied in the calculations of risk and hazard, are based on the assumption that the petroleum hydrocarbons are distributed between the dissolved, vapour, and sorbed phases (that is, three phases are considered). With the limited area of NAPL present at the RA Property, nonaqueous-phase hydrocarbon could be present in addition to the dissolved, vapour, and sorbed phases (that is, four phases are present).

The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor air and outdoor air). Direct contact exposure to NAPL itself would also be possible in areas where NAPL is present. The quantitative assessment of risks due to impacts in soil and groundwater (Section 4.4.2) has already indicated unacceptable risks are present along the following pathways for PHCs:

- Human direct contact with soil (dermal and ingestion)
- Human direct contact with groundwater (dermal and ingestion)
- Inhalation of indoor air

The exposure pathways for which the estimated exposure and risk could be affected by the presence of NAPL include direct contact with soil and groundwater (dermal and ingestion) and inhalation (indoor and outdoor). The inhalation of dust pathway is believed to be insignificant in the context of NAPL, as saturated soils would not become airborne. Each of these pathways is discussed below:

- Direct contact with Soil - As the MECP direct contact component values do not rely on partitioning equations (which may be invalidated by the presence of NAPL), the exposure and risk estimates previously presented (Section 4.4.2.1 and 4.4.2.4) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.

- Direct contact with Groundwater – As the MECP direct contact component values do not rely on partitioning equations (which may be invalidated by the presence of NAPL), the exposure and risk estimates previously presented for Workers in contact with groundwater(Section 4.4.2.2 and 4.4.2.5) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.
- Inhalation of Indoor Air – Risks to receptors in existing and future buildings were predicted from PHCs from both soil and groundwater sources. The exposure and risk estimates previously presented (Section 4.4.2.11) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective where localized NAPL is present.
- Inhalation of Outdoor Air –The highest estimated outdoor air risk from PHC F2 was an HQ of 0.1 (for the Construction and Outdoor Worker, at the ground surface). This HQ is five times less than HQ for PHCs of 0.5. Considering the conservative assumptions that were assumed for the outdoor air modelling (for example, Jacobs selected the lowest average windspeed at the surface, ignored degradation and infiltration, and assumed receptors are exposed to the maximum soil or groundwater contraction for all exposures) and the limited extent of NAPL onsite, risks from outdoor air with respect to NAPL is considered low. Therefore, no RMMs are recommended for the outdoor air pathway for receptors at the surface even where NAPL is present. For Workers in a trench, the highest estimated outdoor air risk from PHC F2 for the Construction Worker was an HQ of 3.0, which greater than the acceptable HQ of 0.5 for PHCs. Therefore, it is possible that risks could be even greater for Workers in a trench in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.

In summary, the RMMs proposed in Section 7 for the protection of the direct contact with soil, groundwater, and vapour intrusion pathways are also adequate to protect receptors where NAPL is managed in place. Based on the qualitative evaluation of the localized presence of NAPL, additional RMMs are proposed to protect subsurface workers in contact with groundwater and working within trenches (outdoor air inhalation).

4.4.3.7 Qualitative Assessment of Ingestion Exposure - Home Garden Produce

As discussed in Section 4.2.2.1, there are significant uncertainties associated with quantifying exposure to home garden produce. As concentrations of COCs are present at levels greater than the Ontario background concentrations (that is, the Table 1 Standard [MECP, 2011c]), there is assumed risk from ingestion of produce grown on the RA Property. Therefore, RMMs will be proposed that prohibit the planting of fruit or vegetable gardens at the RA Property except in containerized plots or aboveground containers.

4.4.3.8 Qualitative Assessment of Inhalation of Soil Particulates that are Ingested

MassDEP (2008) provides guidance on assessing the ingested portion of soil (dust) particulates (greater than PM_{10} and less than PM_{30}). The fraction of inhaled particulate matter that is ultimately swallowed is assumed to be 1.4, which represents the fraction of all particles in air greater than PM_{10} and less than PM_{30} that are ingested (assumed to be 100% or a fraction of 1) plus the fraction of PM_{10} that is not deposited into the lungs (100% minus 60% [using the MECP assumption of 0.6] = 40% or a fraction of 0.4). Considering a sensitive receptor (pregnant female construction worker) and using other MECP defaults for the particulate concentration in air, body weight, inhalation rate, and exposure duration combined with an assumed contaminant concentration in soil of 1 µg/g, the particulate ingestion dose is approximately

3.E-09 mg/kg/day. Incidental ingestion exposure based on Site-specific COC concentrations in soil for this receptor are several orders-of-magnitude higher, ranging from 3.E-06 to 1.E-01 mg/kg/day. Adding the estimated exposure for the two ingestion pathways results in an insignificant change to the overall ingestion exposure. These results indicate that the particulate (dust) ingestion pathway does not contribute significantly to the overall risk for ingestion when default MECP assumptions are applied. This conclusion may differ under certain scenarios where PM_{10} concentrations could be generated at levels greater than the typical MECP default. For the current RA, the risk estimates based on the conventional incidental soil ingestion pathway are sufficient to base risk management decisions on. Since the contribution of soil ingestion to the overall exposure is considered negligible for this sensitive receptor/COC combination, it is assumed to be negligible for all other less sensitive receptor/COC combinations.

4.4.3.9 Qualitative Assessment of Soil Odour Pathway

The Rationale Document (MECP, 2011b) contains aesthetic criteria for soil odour (S-Nose component) which contemplates a receptor smelling soil while gardening. A qualitative assessment was completed to determine the potential for aesthetic effects associated with onsite soils. The following COC had an estimated maximum concentration in soil greater than the S-Nose component[6]:

- Methylnaphthalene 1,2- (9 samples with concentrations greater than the S-Nose component)

Based on this comparison to the S-Nose values, the potential for elevated soil odour cannot be ruled out; however, it is noted again that the S-Nose values were evolved to be protective of a scenario where a receptor may smell a handful of soil at close range while gardening. Given that RMMs (specifically, capping and administrative controls) have been determined to be required to prevent direct contact with existing Site soils based on the quantitative evaluation, and gardening of home produce has been prohibited in Site soils, the potential for soil odour to cause an adverse effect at the Site is limited. With the implementation of these RMMs, Site soils with concentrations exceeding the S-Nose component values are expected to be located beneath a cap. Additionally, to address the potential for odour issues in soil used for fill caps, an olfactory screening step has been included in the soil management process for the construction of fill caps (Sections 7.2.2 and 7.2.3.2).

4.4.3.10 Qualitative Assessment of Potable Groundwater Odour Pathway

The Rationale Document (MECP, 2011b) contains aesthetic criteria for potable groundwater odour (GW1-Odour component). A qualitative assessment was completed to determine the potential for aesthetic effects associated with the use of onsite groundwater as a potable water source. The following COCs have an estimated maximum concentration in groundwater greater than the GW1-Odour component (Appendix F, Table F1-6):

- Methylnaphthalene 1,2-
- Naphthalene
- Trichloroethylene

Based on this comparison to the GW1-Odour values, the potential for groundwater odour cannot be ruled out if groundwater at the Site is used as a potable resource. Given that RMMs (specifically, a restriction on the installation of potable and commercial wells) have been determined to be required to prevent potable water use of the existing Site groundwater based on the quantitative evaluation, the potential for groundwater odour to cause an adverse aesthetic effect at the Site is limited. As the groundwater odour

[6] In the absence of a soil component table for Table 6 (MECP, 2011b), the S-Nose components from the table entitled *Soil Components for Table 2 – Full Depth, Potable Water Scenario* (Coarse Textured Soil, Residential/Parkland Land Use) was used.

pathway is considered minor in comparison to the health-based direct contact pathway (quantitatively assessed in Section 4.4.2), no specific RMMs have been proposed to address the potential for groundwater odour. Section 7.2.3.6 describes the proposed potable and commercial well restriction RMM for the Site based on the results of the quantitative assessment.

4.4.3.11 Qualitative Assessment of Soil Leaching to Potable Groundwater

The MECP (2011b) has published soil values that are protective of human receptors from COCs in soil leaching to groundwater with subsequent use as potable water (S-GW1). Table F1-7 in Appendix F1 presents the S-GW1 component values (Table 2 values were used in the absence of Table 6-specific values); note, the MECP did not develop S-GW1 values for metals and inorganics (except for mercury), as these analytes are not considered mobile or are not significantly mobile under normal soil conditions (for example, if soil pH is within the acceptable range).

Based on the comparison to the S-GW1, 14 soil COCs were identified with estimated maximum concentrations in soil greater than the S-GW1 component value within the RA Property:

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Ethylbenzene
- Fluoranthene
- Naphthalene
- PHC F3
- Phenanthrene
- Pyrene
- Trichloroethylene

The S-GW1 values are calculated using GW1 values, combined with partitioning and transport models. As an intermediate step in the MECP's calculation of the S-GW1 soil values, concentrations of COCs in groundwater that have leached from soil are estimated. However, site-specific groundwater data are available to directly consider groundwater concentrations, as data from 94 monitoring well locations across the RA Property are included in the RA dataset (refer to Appendix D2). These measured groundwater concentrations provide a more direct and site-specific reflection of actual groundwater conditions, including potential leaching from soil. Of the 14 COCs with soil concentrations greater than the site-specific S-GW1, all but one parameter (dibenzo[a,h]anthracene) were retained for further assessment in groundwater based on their maximum observed groundwater concentrations exceeding the generic Table 6 SCS (refer to Table F1-2 in Appendix F1). The maximum measured concentration of dibenzo[a,h]anthracene in groundwater was half the Table 6 SCS value based on 189 samples from 55 monitoring wells; therefore, this analyte was not retained as a groundwater COC. Leaching of this analyte from soil does not appear to be of concern at the Site.

Contamination at the RA Property resulted from historical sources. The RA considers groundwater data from 2007 to 2020; therefore, the past and present potential for contaminant leaching to groundwater is reflected by the currently measured groundwater concentrations. Based on this information, potential risks to human receptors from RA Property potable groundwater use were evaluated primarily by comparing measured groundwater concentrations to the GW1 values. Table F1-4 in Appendix F1 presents the GW1 component values. As the quantitative assessment of the direct contact with potable groundwater pathway considers all the soil COCs[7] which had concentrations greater than the S-GW1, the risk to human health has been appropriately assessed. No specific RMMs have been proposed for this

[7] Apart from dibenzo(a,h)anthracene, which is not a COC in groundwater.

pathway. Section 7.2.3.6 describes the proposed potable and commercial well restriction RMM for the Site based on the results of the quantitative assessment.

4.4.4 Human Health Standards Based on Quantitative and Qualitative Interpretation of Health Risks

The quantitative and qualitative assessment of exposure pathways indicate health risks are possible to current and future receptors for the exposure scenarios discussed. The rationales for the development of the PSSs that are protective of human health are discussed in this section. Risk management is proposed where the assessment indicated a potential risk at the PSS.

4.4.4.1 Development of Property-specific Standards

Jacobs selected the estimated maximum concentration, defined as the maximum plus 20 percent (of detected values) or the maximum reported detection limit (RDL), for each COC to be representative of a reasonable upper-estimate of actual soil and groundwater concentrations remaining on the RA Property. COCs were selected based on the Table 6 SCS and the shallow bedrock conditions have been considered in setting the PSS for the Site. Proposed PSSs for soil and groundwater applicable to human health were selected as described in the following subsections.

4.4.4.2 Soil

PSSs for COCs identified in soil were based on the following:

- The estimated maximum if no unacceptable risks were predicted in the quantitative or qualitative assessment
- The estimated maximum if unacceptable risks were predicted in the quantitative or qualitative assessments, and exposure pathways with risk exceeding target levels are eliminated using RMMs

Table 4-~~39~~ 40 presents the PSS values selected for soil to be protective of human health.

4.4.4.3 Groundwater

PSSs for COCs identified in groundwater were based on the following:

- The estimated maximum if no unacceptable risks were predicted in the quantitative or qualitative assessment
- The estimated maximum if unacceptable risks were predicted in the quantitative or qualitative assessment, and exposure pathways with risk exceeding target levels are eliminated using RMMs

Table 4-~~39~~ 40 presents the PSS values selected for groundwater to be protective of human health.

4.4.5 Special Considerations

The special conditions for environmentally sensitive areas, shallow soil properties, and water bodies cited under Sections 41 and 43.1 of O. Reg. 153/04 apply to the RA Property. Specifically, due to shallow bedrock conditions on a portion of the property, the RA Property is considered a shallow soil property under Section 43.1. This condition was considered in the initial screening of chemicals by using the Table 6 SCS to determine the COCs to be assessed for the RA Property (Section 3.3). As such, the proposed PSSs for human health have accounted for the conditions cited under Section 43.1 of O. Reg. 153/04. Section 41 (for environmentally sensitive areas) and Section 43.1 (specifically with respect to water bodies) do not apply to the RA Property.

4.4.6 Interpretation of Off-Site Health Risks

The proposed PSSs for soil COCs (presented in Table 4-~~39~~40) are not anticipated to result in a concentration exceeding the applicable generic MECP standard (inferred to be the Table 6 SCS) at the nearest offsite property. Soil has the potential to migrate offsite via dust originating from soils at the RA Property; however, this mechanism is unlikely to result in a material change to offsite soil concentrations. In addition, elevated risks from dust inhalation were identified only for the Pregnant Female Workers (Construction or Utility) for B(a)P and for the Construction Worker for B(a)P, cobalt, and zinc during construction activities. Elevated risks from lead and iron in dust were identified for all receptors, based on the qualitative assessment. The RMMs required during construction activities to reduce the potential risk to acceptable levels onsite would prohibit transmission of PAH- and metals-containing dust offsite.

The proposed PSSs for groundwater COCs (presented in Table 4-~~39~~40) could result in concentrations exceeding the applicable generic MECP standards (Table 6 SCS) at the nearest downgradient offsite property if groundwater containing COCs at PSS concentrations greater than the applicable SCS migrates offsite. Table 4-~~40~~ 41 lists the groundwater COCs for the RA Property and assesses whether the proposed PSSs are likely to result in an offsite exceedance of the Table 6 SCS (inferred to apply to the nearest downgradient offsite properties), and whether the parameter is mobile[8]. If the potential for an offsite exceedance could not be ruled out, the nearest offsite human receptor was identified.

Groundwater flow direction was considered in this assessment. As discussed in Section 3.2, the predominant groundwater flow direction in the Overburden and Bedrock Contact Zone is from the northeast to the southwest, with ~~generally flows~~localized flow from west to east on western portion of the Site and localized flow~~s~~ from east to west on the eastern portion of the Site. Groundwater in the Eramosa Formation (Potentiometric surface), appears to flow predominantly to the ~~south~~east.

As indicated in Table 4-~~40~~41, the potential for an offsite exceedance of the applicable generic MECP standard for several parameters cannot be ruled out. As these parameters have a PSS greater than the Table 6 SCS and can potentially be mobile in groundwater, they have the potential to pose a risk to a downgradient offsite property. Groundwater monitoring is proposed on Site for these parameters (Section 7).

Offsite groundwater quality can be addressed onsite by monitoring groundwater movement, allowing natural attenuation, and notifying appropriate stakeholders in the event of offsite migration.

4.4.7 Discussion of Uncertainty

By its very nature, RA is an uncertain endeavour. Assumptions must be made regarding receptors that are potentially exposed. Often, exposure point concentrations must be estimated via modelling or other estimation methods. Without exception, toxicity indices are developed by credible government agencies and are purposefully calculated in a conservative fashion to monitor that benchmarks for estimating toxicity effects have a sufficient margin of safety to protect human health.

[8] The potential for contaminant of concern (COC) mobility in groundwater was assessed using professional judgement considering the Site history, distribution of COCs in soil and groundwater, as well as the individual COC's physical and chemical properties. Guidance from the New Jersey Department of Environmental Protection (NJDEP, 2008) related to the mobility of chemicals based on the organic carbon partition coefficient was also considered. In general, volatile organic compounds (VOCs), "light" polycyclic aromatic hydrocarbons (PAHs), and "light" petroleum hydrocarbons (PHCs) were considered potentially mobile, while "heavy" PAHs and "heavy" PHCs are unlikely to be mobile.

4.4.7.1 Hazard Analyses and Problem Formulation

Hazard analyses and problem formulation are conservative in nature and are developed so potential elevated risks are identified at the RA Property. This section qualitatively evaluates the extent to which chemicals at the RA Property may cause adverse health effects on receptors of concern.

COCs have been detected in soil and groundwater at the RA Property, indicating a potential risk exists. The screening process is conservative and could lead to the identification of COCs (and their inclusion in the RA) that do not actually indicate a potential risk at the RA Property. The inclusion of these COCs in the RA has little effect on the conclusions of the evaluation.

4.4.7.2 Exposure Assessment

Uncertainty exists in the exposure assessment of the RA. Onsite receptors were hypothesized, and activities assumed to result in exposures, as follows:

- EDs and EFs were assumed to occur on a regular and long-term basis, despite the reasonable potential that receptors may relocate residences; therefore, may change recreational places, may change employment or job descriptions, and are unlikely to contact chemicals on a routine basis. The conservative way receptors have been identified and activities evaluated indicates that uncertainties in the exposure assessment most likely allow for an overestimation of risk.
- The exposure assessment section also defines the concentrations to which potential receptors may be exposed. Within the RA Property boundaries, vapour concentrations have been estimated using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which exposures might occur. This approach results in an overestimate of exposure and associated risk to certain receptors. These conservative assumptions likely overestimate exposures to the COCs and, correspondingly, overestimate risk. These assumptions impart uncertainty to the RA but are developed to confirm the RA conclusions are conservative and protective of human health. The net effect of these uncertainties is that risk to potential receptors has likely been overestimated.
- Estimated maximum concentrations of chemicals in soil and groundwater were used in the modelling. Concentrations of contaminants are not uniformly distributed across the RA Property. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentrations present at the Site over their lifetime; therefore, the predicted risks have likely been overestimated.
- The selected incidental ingestion rates for soil and groundwater may be different from the experimental basis used to develop them (for example, Construction and Utility Worker incidental ingestion of groundwater is based on exposure while swimming and not incidental contact while working). Changes in ingestion rate would increase or decrease the predicted exposures and risk.
- The conditions at a site may not match the conditions during the study upon which the dermal adherence factor is based. For example, studies have found finer particles adhere preferentially to the hands unless soils are greater than 10 percent moisture. Some studies have found soil particles greater than 250 micrometres (µ) do not adhere readily to skin (EPA, 2004). Thus, the soil type, including moisture content, can affect the adherence of soil. In addition, the specific activity that occurs in the site-specific exposure scenario may not directly match the activities on which adherence factors were based. These factors can introduce uncertainties into the exposure assessment.

4.4.7.3 Toxicological Information

There is a limited amount of toxicological information on the effects associated with human exposures to low levels of chemicals in the environment. What human information is available is generally based on epidemiological studies of occupationally exposed workers. These studies are generally limited in scope and provide results that may not apply to chronic or continuous exposures to low levels of chemicals. Because human toxicological information is limited, RfDs and cancer potency estimates for many compounds are based on the results of dose-response assessment studies using animals.

The use of experimental animal data to estimate potential biological effects in humans introduces uncertainties into the evaluation of potential human health effects. These estimations require that several assumptions be made, including:

- The toxicological effect reported in animals is relevant and could occur in humans.
- The extrapolation from high-dose studies to low-dose environmental exposures adequately represents the shape of the dose-response curve in the low-dose exposure range.
- Short-term exposures used in animal studies can be extrapolated to chronic or long-term exposures in humans.
- The uptake of a compound from a test vehicle (including drinking water and food) in animals will be the same as the uptake of the chemical from environmental media (soil, sediment, airborne particulate matter) in humans.
- The pharmacokinetic processes that occur in the test animals also occur in humans.

There are clearly a number of uncertainties associated with extrapolating from experimental animal data to humans. To address these weaknesses, regulatory agencies, such as Health Canada and EPA, incorporate several conservative assumptions to try and account for the uncertainties associated with this process. The uncertainties are accounted for by using UFs that serve to reduce the RfD to far less than the level at which adverse health effects have been reported in the test species. UFs are generally applied by factors of 10 and are used to account for the following types of uncertainties:

- Variation within the population (protection of sensitive members of the population)
- Differences between humans and the test species
- Differences in using short- or medium-term studies to estimate the health effects associated with long-term or chronic exposures
- Limitations in the available toxicological information

The magnitude of the UFs applied by the various regulatory agencies indicates the level of confidence that should be placed in the reference value. UFs typically range between 100 and 10,000, although some can be less than 10. The latter values are found for a few chemicals where sound and substantial human toxicological information is available to enable setting a toxicological end-point solely on the basis of human epidemiological information.

The application of UFs is intended to address technical uncertainties in toxicological data, and to confirm, as much as possible, that limited exposures that exceed the RfC will not result in adverse human health effects. Because RAs that use these regulatory limits incorporate the conservatism used in the development of the toxicological information, the results can generally be viewed as being extremely conservative.

4.4.7.4 Risk Characterization

The risk characterization phase of the RA integrates toxicity and exposure information to determine the potential for adverse health effects. In large part, the uncertainty resulting at this phase of the RA is a direct result of those uncertainties that have been discussed previously. As such, based on the foregoing evaluation, health risk is largely overestimated. However, it is important to note that benchmarks constituting substantial risk are arbitrarily selected and, as such, become value judgments as to their significance. In all instances, the risks deemed to be significant (that is, one in a million cancer risks for exposures from source related chemicals) are small relative to health risks associated with typical activities in a modern society (that is, approximately one in three cancer risks from all societal exposures). This does not diminish the importance of the excess risk noted in this report. The following summarizes uncertainties relating to the assessment at the RA Property (included in Section 4.4.2):

- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- The incidental ingestion rates may be different than the experimental basis used to develop them. Changes in ingestion rate would increase or decrease the predicted risk.
- The model does not account for the removal of contaminants (from soil) from the receptors' hands by brushing or washing off. This overestimates the risk from exposure.
- The amount of groundwater assumed to be incidentally ingested by Construction and Utility Workers during construction activities in this assessment is equivalent to the amount considered to be ingested during swimming activities (50 mL, as specified by EPA [1989]). The actual ingestion of groundwater is likely to be insignificant.
- Typical construction activities include dewatering excavations; therefore, it is unlikely that Construction and Utility Workers will be exposed to groundwater. Less exposure will result in lesser risk estimates.
- The comparators used to predict risk (that is, RfC and UR) are values considered to be protective of lifetime exposure to chemicals—24 hours per day, 7 days per week, 52 weeks per year, for 70 years—and include adjustments for sensitive individuals in the human population. Therefore, for a human receptor, risks are overestimated for short-term exposure to chemicals that may be present in air from dust, as no person will occupy the RA Property for any duration consistent with the duration used to develop the comparators. Adjustment of the comparator for shortened duration would likely result in a decreased risk for receptors.
- Risks from dust to offsite receptors would likely be less than experienced by RA Property users, since the concentration of COC-impacted fugitive dusts diminishes with dispersion and dilution in air rapidly with distance (EPA, 2002a).
- Vapour concentrations inside a generic commercial or generic residential building were modelled assuming the structure lies directly over the estimated maximum soil or groundwater concentration detected at the RA Property (only for volatile COCs). This assumption is conservative; therefore, the predicted risks from indoor air inhalation have likely been overestimated.
- While developing indoor air and outdoor air volatile concentrations, the degradation of organic compounds was ignored. If degradation was included, the chemical concentration would decrease, resulting in a decrease the estimated risks.

- Due to uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at BLLs less than the current Canadian BLL intervention level of 10 µg/dL, exposure and risk to lead via the direct contact and inhalation routes have not been quantitatively assessed in the RA. Lead has also been identified as a developmental toxicant but was not assessed quantitatively via the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus is available.
- Due to a lack of appropriate TRVs, risks to bismuth have been qualitatively assessed using an adopted soil screening value. The lack of a quantitative assessment for this COC has little effect on the conclusions of the evaluation. Since an elevated risk has already been determined for onsite receptors from other COCs, the recommendation that RMMs should be implemented at the RA Property is not affected by this uncertainty.

4.4.8 Risk-based Concentrations for Fill Caps

The fundamental approach to preventing contact with contaminated soils is to construct a cap or soil barrier where RMMs are required. The cap or barrier must prevent human exposure to COCs and prevent mobilization of the contaminants. The purpose of the barrier is to prevent direct contact without relying on personal protective equipment (PPE) or clothing. Cap risk-based concentrations are developed for the anticipated future land use scenario as mixed residential and commercial.

Risk-based concentrations (RBCs) for fill caps were developed based on dermal contact and incidental ingestion exposure to soil by the Resident, Construction Worker, Utility Worker, Outdoor Worker, Indoor Worker, and Pregnant Female Worker, for a future mixed residential and commercial land use scenario.

Soil RBCs based on inhalation, dermal, and ingestion exposures were developed by applying a target ILCR of 1×10^{-6}, a target HQ of 0.2 for all COCs except PHC, and a target HQ for PHC fractions and TCE (inhalation pathways only) of 0.5. The soil RBCs apply for soil pH ranges of 5 to 9.

Tables 4-~~41a~~ 42a and 4-~~41b~~ 42b present the soil RBCs relevant to human health based on the direct contact pathway (dermal contact and ingestion) for the residential land use scenario for residents and subsurface workers, respectively. MECP generic soil direct contact component values (that is, S1) were adopted as the direct contact RBCs for any COC not retained for quantitative assessment in the HHRA.

Tables 4-43~~2~~a and 4-43~~2~~b present the soil RBCs relevant to human health based on the inhalation of indoor air pathway for residential and commercial building uses, respectively. MECP generic soil-to-indoor-air component values based on building type (that is, the S-IA) were adopted as the inhalation RBCs for volatile COCs not retained for quantitative assessment in the HHRA.

Table 4-~~43~~ 44 shows the selection and basis of the overall soil RBCs protective of human health for a mixed residential, parkland, and commercial land use. If the calculated direct contact or inhalation RBC was less than the Table 6 SCS, the Table 6 SCS was selected as the overall soil RBC. VI RMMs are required for all future buildings at the RA Property (Section 7).

Fill cap target concentrations are presented in Section 6 of this document.

Additional human health RBCs were calculated to support the requirement to report the percentage reduction in COC concentrations associated with the proposed RMMs (Section 7).

Tables 4-~~44a~~ 45a and 4-~~44b~~ 45b present the dermal groundwater contact RBCs for potable water contact and Worker incidental contact in the subsurface, respectively.

Table 4-~~45a~~ 46a and 4-~~45b~~ 46b present the groundwater RBCs for the inhalation of indoor air pathway for the generic commercial and residential scenarios, respectively.

Table 4-4~~6~~7 presents the inhalation of trench air RBCs. Values are derived for the media (soil or groundwater) that was driving the risk for this pathway for each COC.

RBCs were developed based on the TRVs presented in Section 4.3. Uncertainties associated with variations in the TRVs could increase or decrease the RBC estimates. However, the conclusion that these RBCs are protective of Site receptors can be considered valid despite changes to the TRV, since the derivation of TRVs includes modifying factors and UFs that may span several orders of magnitude.

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5. Ecological Risk Assessment (ERA)

This section of the RA primarily evaluates risk to ecological receptors at the RA Property, by addressing the elements required in the RA process. A semi-quantitative and qualitative Ecological Risk Assessment (ERA) was completed and deemed appropriate based on the RA Property's existing conditions and anticipated future use, and the implementation of a risk management plan (RMP). ERAs assess the potential for ecological risks resulting from contamination and the presence of contaminants of concern (COCs) at a site.

This ERA adheres to the prescribed O. Reg. 153/04 (as amended) (MECP 2011a) reporting format and includes the following five major elements:

1) Problem Formulation
2) Receptor Characterization
3) Exposure Assessment
4) Hazard Assessment
5) Risk Characterization

5.1 Problem Formulation

The problem formulation component of this ERA comprises a description of the ecological conceptual site model (EcoCSM) as it relates to ecological receptors, site characteristics, and potential routes of exposure. It defines the objectives of the ERA, and summarizes the data quality control and objectives.

5.1.1 Ecological Conceptual Site Model

An EcoCSM provides a basic description of how contaminants enter and are transported within a system, and where the routes of exposure to organisms potentially occur.

The RA is based on a fundamental understanding of site conditions (as discussed in Section 3, Property Information, Site Plan, and Geological Interpretation) and considers the nature and magnitude of the interaction between COCs in environmental media and valued ecosystem components (VECs).

The RA Property is 5.2 ha in area and consists of vacant land historically used for industrial purposes. All buildings previously onsite have been razed, with concrete floor slabs remaining in place. Since the Site has been vacant, various types of vegetation (including trees, shrubs, grasses, and weeds) have become naturally established along the property boundaries and between the remaining floor slabs (CH2M, 2017). No visual evidence of vegetation inferred to be stressed from contaminant influence was observed during the Site reconnaissance completed as part of the Phase One Environmental Site Assessment (CH2M, 2017).

Over the course of the Phase Two investigation activities, nonaqueous phase liquid NAPL has been measured at thicknesses of 0.002 and 0.97 m in six monitoring events between 2017 and 2020. Therefore, additional consideration of potential risks related to NAPL, and the potential need for additional RMMs due to the presence of NAPL, is warranted. Refer to Section 5.5.3.4.

No surface water or aquatic habitat is located on or within 30 metres (m) of the RA Property. Groundwater at the Site is potable, and generally flows south. Groundwater flow is influenced by groundwater pumping from municipal water supply wells, as well as rivers including the Eramosa River and Speed River.

COCs are contaminants found on, in, or under an RA property at concentrations that exceed the applicable Site Condition Standards (SCS). As a result, they may present risks to ecological receptors. The chemicals chosen for evaluation in this RA were identified, based on the known practices and activities that occurred at the RA Property, through a Phase One and Phase Two Environmental Site Assessment (ESA) process (Appendix D). COCs are present in soil and groundwater at the RA Property because of historical releases of chemicals to soil from former industrial activities with subsequent migration to groundwater, including an iron facility, machine shops, former rail spurs, and the placement of fill of unknown quality (CH2M 2017).

Soil pH was found to range from 6.6 to 10.64 based on 106 soil samples. With the exception of two samples, the soil samples were found to have a pH value within the MECP's acceptable range (that is, a pH value in surface soil between 5 and 9, or a pH value in subsurface soil between 5 and 11) (Jacobs 2020). The soil from one borehole was determined to be "isolated fill" and is not considered to be representative of soil conditions at the Site. At this location, concrete foundations were noted to be present both above and below the sample, essentially isolating this fill from other overburden soils. As such, this pH result was not considered further for the determination of pH at the RA Property. The second sample (MW17-100S, collected between 0.3 to 0.46 metres below ground surface [mbgs]) where a pH concentration of 9.45 was found was further investigated with BH19-100i, where three samples were collected from within 2 m of the original sampling location, at the same sampling depth as the original sample. The sample results reported a pH of 7.71, 7.78, and 7.79, which when averaged with the original sample, confirms pH at the Site is within the MECP's acceptable range with a result of 8.0 (sample averaging as per Section 48(2) of the O. Reg. 153/04; MECP 2011a).

Based on this information, the Table 6 *Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition* for coarse-grained soils and residential/ parkland/ institutional property use (Table 6 SCS) (MECP 2011b) have been applied as the applicable SCS for RA purposes. Tables F1-1 (soil) and F1-2 (groundwater) in Appendix F1 provide detailed lists of COCs and their corresponding concentrations.

The following onsite receptors and pathways were considered in the ERA:

- Soil organisms (ingestion and dermal contact with soil)
- Terrestrial plants (root uptake from soil and groundwater)
- Birds and mammals (ingestion of soil, and ingestion of prey and food)

The ERA considers the following offsite receptors and pathways: pelagic invertebrates, fish, amphibians, and reptiles (dermal contact and ingestion of surface water), as well as aquatic plants (uptake of surface water through roots, leaves, and stems). Sections 5.2 (Receptor Characterization) and 5.3 (Exposure Assessment) provide additional details regarding the selection of ecological receptors and pathways, respectively.

Figure 5-1 presents the EcoCSM that was developed for the RA Property under current conditions. It was based on, and is consistent with, information gathered during site investigation activities and visits described in Section 3 and Appendix D. Section 5.3, Exposure Assessment, describes in more detail how the EcoCSM was developed and used in the ERA. Figure 5-2 illustrates the EcoCSM that is relevant after the RMP in Section 7 of this document is implemented.

5.1.2 Risk Assessment Objectives

The objectives of the ERA are to assess the potential risks to ecological receptors from COCs in soil and groundwater, and develop ecological property-specific standards (EPSSs), assuming COCs will be left in place and managed as required, using the RMP provided in Section 7 of this document. If warranted, soils

from specified areas may be removed from the RA Property; at that time, they will be managed per the RMP, tested, and disposed of as required by applicable legislation.

5.1.2.1 Proposed Land Use

The proposed land use within the RA Property will be mixed residential, parkland, and commercial use.

Constructed ornamental gardens or naturalized areas may be created as part of the redevelopment and could include mowed grass, trees, shrubs, herbaceous vegetation, or a combination thereof. The wildlife community under redevelopment conditions is expected to be dominated by mammals and birds tolerant of habitat disturbances and human activities within an urban setting, as well as species with a greater range, which migrate between habitats and areas.

5.1.2.2 Receptors and Pathways

VECs and exposure pathways to be semi-quantitatively evaluated include:

- Onsite soil organisms (earthworms) – ingestion and dermal contact with soil
- Onsite terrestrial plants (grasses and Manitoba Maple trees) —root uptake from soil and groundwater
- Onsite birds and mammals (American Woodcock, Red-winged Blackbird, and Red-tailed Hawk to represent birds; Meadow Vole, Red Fox, and Short-tailed Shrew to represent mammals) —ingestion of soil and food-chain transfer by the consumption of contaminated prey or forage items

VECs and exposure pathways to be qualitatively evaluated include:

- Offsite aquatic receptors – exposure to surface water influenced by Site groundwater
- Inhalation of volatiles and soil particulates for soil organisms, birds, and mammals
- Dermal contact with soil for birds and mammals
- Stem and foliar uptake of ambient air for terrestrial plants

The following pathways will be demonstrated as incomplete:

- Dermal contact with groundwater (soil organisms, birds, and mammals)
- Ingestion of surface water (birds and mammals)
- Offsite benthic receptors - migration of soil to a water body via erosion followed by direct contact

Section 5.2 describes the VECs selected for the RA Property in greater detail. The growth, reproduction, and survival of populations of the identified VECs are to be protected to a level consistent with that assumed by the MECP in the derivation of the generic SCS (MECP 2011c). The MECP values are set at "levels at or below lowest observable effects levels from controlled dose-response studies for the selected representative species showing the most sensitive response (effect) to a given contaminant dose (exposure)" (MECP 2011c). The selected level of protection is considered appropriate for the RA Property given the existing Site conditions, the proposed land use, and the intent to implement risk management measures (RMMs) to mitigate any risks to ecological health identified by the evaluation.

5.1.2.3 ERA Approach

A semi-quantitative and qualitative ERA was completed that involved comparisons of site media concentrations to established MECP ecological benchmark concentrations (EcoBMCs). Onsite terrestrial VECs were evaluated semi-quantitatively, while offsite aquatic VECs in downgradient waterbodies were evaluated qualitatively.

5.1.2.4 Data Quality Objectives and Uncertainties

Soil and groundwater sampling was either performed or supervised by Jacobs staff with experience in intrusive field investigation techniques and with the COCs encountered at the Site, under the supervision of a MECP Qualified Person for ESAs (QPESA). Soil and groundwater sampled by Jacobs between 2017 and 2020 were collected according to our standard operating procedures (SOPs), which were developed in accordance with O. Reg 153/04 (MECP 2011a). The selected analytical laboratories performed the chemical analysis in compliance with the MECP's Laboratory Services Branch Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act, as amended (MECP 2011d).

In combination with the field QA/QC program, a Jacobs project chemist has completed an evaluation of the laboratory QA/QC program to verify the accuracy, precision, and validity of the data reported by the laboratory. Various elements of the laboratory QA/QC program are used to evaluate the data: blanks are analyzed to detect laboratory contaminations that can cause data to be biased high; laboratory control samples are used to evaluate the laboratory performance; laboratory duplicates are used to measure precision in the laboratory; matrix spikes are used to identify high or low bias caused by matrix interference; and surrogate spikes are used to evaluate the method performance that can cause high or low bias in the data. Evaluation of the laboratory QA/QC program was performed by examining blanks, laboratory control samples, matrix spikes, and surrogate spike samples.

The groundwater and soil analytical data evaluated herein is considered valid. All results can be used to support the project decision making process. Appendix D2 provides additional details on the QA/QC program.

The current database includes soil and groundwater data from past investigations completed by other consultants. As discussed in Section 3.3.2, Jacobs determined that some historical soil data are useful for inclusion in the RA report. Appendix D2 lists the historical reports which were included as part of the Phase Two ESA.

Since the intent is to manage the potential risk associated with soil and groundwater contamination in place by using engineering controls as necessary, Jacobs considers the data collected to be adequate. Uncertainties associated with data quality are not likely to affect the objectives of the RA or the ability of current and future landowners to manage potential risks at the RA Property. Overall, the quality of data used in the RA were considered sufficient to meet the objectives of the HHRA and to be usable for RA decision making.

5.2 Receptor Characterization

Receptor characterization involves the following process:

- Identify terrestrial and aquatic resources, including Species at Risk (SAR).
- Identify VECs.
- Determine the effects against which to protect ecological receptors.

As the EcoCSM discusses, COCs from the RA Property have the potential to adversely affect terrestrial resources on the RA Property, as well as aquatic resources located offsite in downgradient waterbodies via groundwater flow to surface water. Therefore, the receptor characterization describes the terrestrial and aquatic resources and the biota that use the RA Property. Based on the resources and biota present, VECs and assessment and measurement endpoints were selected to facilitate the assessment.

VECs are specific ecological receptors determined to be of ecological importance at a site, considering the current and proposed land use. They are chosen to represent groups of species that are likely to inhabit a site and, as a result, may be affected by exposure to a chemical or other stressor. The representative VECs were selected for this ERA considering:

- Their habitat preferences
- Their potential presence on the RA Property
- Whether the species was indigenous to the area
- The availability of toxicological literature for the species
- Representation of a trophic level or feeding guild

5.2.1 Species at Risk

The *Species at Risk Act* (SARA) provides protection for wildlife species (listed on Schedule 1 of the SARA) and critical habitat. The federal government's responsibilities for listed aquatic species and birds are covered by the *Fisheries Act* and the *Migratory Birds Convention Act*, respectively; prohibitions apply to these species wherever they are found in Canada. For all other species, SARA applies on federal lands only. However, species not protected by SARA may otherwise be protected through provincial legislation. In Ontario, those with provincial designations of Species at Risk are protected under the *Ontario Endangered Species Act*. Both acts use the same designation categories, starting with the greatest concern, and then moving from extirpated, endangered, and threatened, to special concern.

The designation of species of national significance is assigned by the Committee on the Status of Endangered Wildlife in Canada. The designation of species of Provincial significance is assigned by the Ontario Ministry of Natural Resources and Forestry (MNRF) (Ontario General Status), and is based on recommendations made by the Committee on the Status of Species at Risk in Ontario.

Jacobs completed a search using the MNRF (2020) Natural Heritage Information Centre (NHIC), as this database presents actual species observations. The NHIC search revealed observations of 9 species within 1 square kilometre (km^2) of the RA Property. The entire RA Property falls within the 17NJ6222 regional square. The RA Property falls within 1 kilometre (km) of the following regional squares: 17NJ6121 through 17NJ6123, 17NJ6221, 17NJ6223, and 17NJ6321 through 17NJ6323. The observed dates for Species at Risk occurrences range from 1913 to 1978.

Table 5-1 summarizes the Species at Risk that have been identified in the area at some time, along with their species status and their preferred habitat. Given the level of development, amount of disturbance (for example, surrounding industrial and commercial properties around the Site), last recorded dates of observances, and site characteristics compared to Species at Risk habitat preferences, these Species at Risk are unlikely to be present or to be adversely affected by work at the RA Property.

5.2.2 Terrestrial Resources and Selection of Valued Ecosystem Components

Under current conditions, the RA Property is vacant, with the majority of concrete floors, foundations and footings of historical buildings remaining in place. Fill was found across the RA Property from ground surface to a depth of 0.1 to 3.1 mbgs. Low wildlife and plant species diversity is expected on the RA Property because of limited habitat diversity and availability.

Due to the lack of nearby surface water and the Site conditions, there is no habitat suitable for amphibians onsite and habitat for reptiles is considered to limited onsite. However, habitat for amphibians and aquatic reptiles (turtles) is present offsite within the Eramosa River. The data and the methods needed to estimate exposure and evaluate toxicity for these receptors are generally not available (Hopkins 2000, MECP 2011b); therefore, these receptors were not quantitatively assessed in this ERA for the RA Property, but

were assumed to be protected if other wildlife were. Section 5.5.3.2 provides a qualitative discussion of reptiles onsite. Amphibians and reptiles were, however, considered qualitatively for the Eramosa River (offsite).

Based on the terrestrial resources and the presence of COCs in soil and groundwater, the ecological receptors chosen for assessment were soil organisms, terrestrial plants, birds, and mammals consistent with the MECP's Rationale Document (MECP 2011b). A semi-quantitative assessment was completed that involved comparisons of site media concentrations to established MECP EcoBMCs and calculating a risk. Section 5.2.4 of the MECP's Rationale Document (MECP 2011b) provides the receptor characteristics for the birds and mammals considered in the development of those EcoBMCs (provided as Table G4-1 in Appendix G4). Population-level assessments were deemed appropriate for this ERA.

Based on current and future site conditions, ERA objectives, and the exposure pathways to be assessed, the terrestrial VECs evaluated in this RA include:

Soil Organisms

- Earthworms – A soil invertebrate that is ubiquitous with high exposure to soil (via dermal contact and ingestion). A food source for many wildlife species.

Plants

- Grasses and Manitoba Maple trees (*Acer negundo*)— All vegetation is considered sessile with high exposure to soil via root contact and uptake. Root contact and uptake with groundwater may also be possible.

Birds

- American Woodcock (*Scolopax minor*)— A vermivorus or omnivorous bird (MECP 2011b). Exposure to Site COCs may occur via direct contact while foraging onsite or via the diet (primary food source is invertebrates).
- Red-winged Blackbird (*Agelaius phoeniceus*— An herbivorous or granivorous bird (MECP 2011b). Exposure to Site COCs may occur via direct contact while foraging onsite or via the diet (primary food source is plants).
- Red-tailed Hawk (*Buteo jamaicensis*)—A carnivorous bird (MECP 2011b). Exposure to Site COCs may occur via direct contact while hunting onsite or via the diet (primary food source is mammals).

Table G4-1 in Appendix G4 provides the MECP receptor characteristics for birds including body weights, food ingestion rates, soil ingestion rates, inhalation rates, and skin surface areas.

Mammals

- Meadow Vole (*Microtus pennsylvanicus)*—An herbivorous mammal (MECP 2011b). Exposure to Site COCs may occur via direct contact while foraging or residing onsite or via the diet (primary food source is plants).
- Red Fox (*Vulpes vulpes*)—A carnivorous mammal (MECP 2011b). Exposure to Site COCs may occur via direct contact while foraging onsite or via the diet (primary food source is mammals).
- Short-tailed Shrew (*Blarina brevicauda*)—A vermivorous or omnivorous mammal (MECP 2011b). Site COCs may occur via direct contact while foraging or residing onsite or via the diet (primary food source is invertebrates).

Table G4-1 in Appendix G4 provides the MECP receptor characteristics for mammals including body weights, food ingestion rates, soil ingestion rates, inhalation rates, and skin surface areas.

The terrestrial vegetation was observed onsite, in the surrounding area, or both; and the bird and mammal species, while not directly observed, could be located onsite based on Site conditions and habitat requirements.

Table 5-2 lists the species chosen as VECs for this assessment.

5.2.3 Aquatic Resources and Selection of Valued Ecological Components

No aquatic resources (for example, streams or ponds) are currently located on the RA Property. The nearest offsite water body is the Eramosa River, located approximately 0.5 km to the south of the Site, and the Speed River, located approximately 1.1 km west of the Site.

The RA Property is located within the Speed River Subwatershed of the Grand River Watershed. Both the Eramosa River and the Speed River are influenced by groundwater discharge, and groundwater flow within the City of Guelph is influenced by groundwater pumping from municipal water supply wells (Jacobs 2020).

The Grand River Watershed provides habitat for numerous aquatic species common to Southern Ontario (including aquatic Species at Risk). More than 90 species of fish, about half of all species in Canada, are found within the river system part of this watershed (GRCA 2020a).

Common species within the Eramosa River include smallmouth bass (*Micropterus dolomieu*), brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), and northern pike (*Esox lucius*) (GRCA 2020b).

Based on the aquatic resources present within the Eramosa River, which is downgradient of the RA Property, the ecological receptors chosen for assessment were pelagic invertebrates, fish, amphibians, reptiles (that is, turtles), and aquatic plants. A qualitative assessment of the potential for offsite risks was completed, which involved comparing groundwater concentrations against established MECP EcoBMCs (MECP 2011b) for water-mediated exposures. Population-level assessments were deemed appropriate for this ERA.

For aquatic VECs, the species selected include:

Pelagic Invertebrates

- Daphnia—An algivorous and planktivorous waterflea (Elenbaas 2014) with continuous exposure to surface water. A food source for many aquatic species. Exposure to Site COCs may occur via direct contact (dermal and ingestion) of surface water influenced by onsite groundwater via discharge to the water body.

Fish

- Common Shiner (*Luxilus comutus*)—An invertivorous fish (Eakins 2019) with continuous exposure to surface water. Exposure to Site COCs may occur via direct contact (dermal and ingestion) of surface water influenced by onsite groundwater via discharge to the water body or via the diet.
- Northern Pike (*Esox lucius*)— A piscivorous fish (Eakins 2019) with continuous exposure to surface water. Exposure to Site COCs may occur via direct contact (dermal and ingestion) of surface water influenced by onsite groundwater via discharge to the water body or via the diet.

Amphibians

- Green Frog (*Rana clamitans*) to represent amphibians—A carnivorous frog (AmphibiaWeb 2019) with high exposure to surface water and sediment. Exposure to Site COCs may occur via direct contact (dermal and ingestion) of surface water or sediment (influenced by onsite groundwater or soil) or via the diet.

Aquatic Reptiles

- Midland Painted Turtle (*Chrysemys picta marginata*) to represent aquatic reptiles—An omnivorous turtle (Ontario Nature 2019) with high exposure to surface water and sediment. Exposure to Site COCs may occur via direct contact (dermal and ingestion) of surface water or sediment (influenced by onsite groundwater or soil) or via the diet.

Aquatic Plants

- *Carex spp*.— Aquatic vegetation is considered sessile with high exposure to surface water and sediment. Exposure to Site COCs may occur via uptake of surface water or sediment through roots, leaves, and stems.

These aquatic and riparian receptors could be located offsite within the Eramosa River based on site conditions and habitat requirements.

Table 5-2 lists the species chosen as VECs for this assessment.

5.2.4 Assessment Endpoints

Assessment endpoints are explicit expressions of the actual environmental value to be protected. They are developed based on information concerning the chemicals present and site characteristics, and they must represent a property of the system that can be measured. These endpoints can be operationally defined as comprising an entity and an attribute (Suter 1995, EPA 1998). The entity is the specific environmental component of interest (for this assessment, represented by the VECs identified in Table 5-2). The attribute represents characteristics of the entity that may be affected by exposure to COCs.

Explicit in the assessment endpoint definition is the level of ecological organization. Entities and attributes were selected for the population-level ecological organizational level. Based on current conditions, ERA objectives, and VECs selected for protection, entities and attributes evaluated in this assessment included the growth, reproduction, and survival of populations of the identified VECs.

5.2.5 Measurement Endpoints

Measurement endpoints are evaluated to indicate whether adverse effects to assessment endpoints have occurred or are likely to occur. Measurement endpoints are measurable changes in an attribute of an assessment endpoint or its surrogate in response to a stressor (for example, chemical or physical impact) to which it is exposed.

As noted, the Table 6 SCS were used in the identification of soil and groundwater COCs for the RA Property.

5.3 Exposure Assessment

Exposure assessment is the evaluation of the potential exposure of ecological receptors and VECs to COCs. The exposure assessment identified the COCs; pathways by which VECs were potentially exposed to COCs; and the magnitude, frequency, and duration of the actual or potential exposure.

5.3.1 Pathway Analysis

An exposure pathway can be described as the physical course a chemical takes from the point of release to a receptor. An exposure pathway is complete (that is, there is exposure) if there is a way for the receptor to take in chemicals through ingestion, inhalation, or dermal absorption. To be complete, an exposure pathway must have a chemical source, a mechanism for chemical release, an environmental transport medium, an exposure point, and a feasible route of intake. In the absence of any one of these components, an exposure pathway is considered incomplete, and, by definition, there can be no risk associated with that exposure pathway. Exposure can occur when chemicals migrate from their source to an exposure point (that is, a location where receptors can contact the chemicals) or when a receptor moves into direct contact with chemicals or contaminated media.

Table 5-3 presents the pathway analysis for this ERA, which describes and evaluates how COCs from a source are transferred through a contaminated medium to the VECs.

Soil organisms can absorb chemicals from soil through the epidermis or may ingest soil during feeding or burrowing.

Terrestrial plants can absorb and store chemicals from environmental media through roots, leaves, or stems. Section 5.5.3.1 justifies that stem and foliar uptake of ambient air for terrestrial plants is a minor or secondary pathway and was not quantitatively assessed. Terrestrial plant root uptake from groundwater was considered a potentially complete pathway.

Birds and mammals may be exposed to COCs through dermal contact, the inhalation and ingestion of soil, the ingestion of surface water, and through the food chain by the consumption of contaminated prey (for example, earthworms) or foraged items (for example, terrestrial plants). Indirect risks from groundwater to birds and mammals via the consumption of terrestrial plants (in contact with the water table) is possible. This indirect exposure pathway is qualitatively assessed based on the terrestrial plant uptake from groundwater pathway in Section 5.5.3.3. Dermal contact and the inhalation of volatiles and particulates were not quantitatively assessed for birds and mammals and are justified as minor or secondary pathways in Section 5.5.3.1.

Groundwater effects on soil organisms, birds, and mammals were not assessed. This is because dermal contact with groundwater for soil organisms, birds, and mammals was considered a minor exposure route. These receptors avoid saturated ground conditions, there is a lack of data to adequately evaluate these effects, and risks to these ecological receptors are better assessed through the evaluation of other exposure pathways.

No surface water is located on the RA Property; therefore, the ingestion of surface water pathway is considered incomplete for onsite terrestrial receptors.

Offsite pelagic invertebrates, fish, amphibians, and aquatic reptiles may be exposed to chemicals in surface water through ingestion and dermal contact.

For aquatic plants growing within offsite waterbodies the major route of exposure is from surface water through their roots, leaves, and stems.

Dermal contact and ingestion of soil (as sediment) for benthic invertebrates was not assessed. This is because no water bodies are located onsite or within 30 m of the RA Property, and the migration of soil via erosion to a water body is not a complete pathway.

In summary, the primary routes of exposure that were semi-quantitatively evaluated are:

- Soil organisms – ingestion and dermal contact with soil
- Terrestrial plants—root uptake from soil and groundwater
- Birds and mammals—ingestion of soil and food-chain transfer by the consumption of contaminated prey or forage items

Section 5.5.3.1 contains the qualitative evaluation of the minor or secondary pathways identified in Table 5-3 for onsite receptors, including:

- Inhalation of volatiles and soil particulates for soil organisms, birds, and mammals
- Stem and foliar uptake of ambient air for terrestrial plants
- Dermal contact with soil for birds and mammals

Section 5.5.3.4 contains the qualitative assessment of offsite aquatic receptors exposed to surface water influenced by Site groundwater.

Pathways considered incomplete include:

- Dermal contact with groundwater (soil organisms, birds, and mammals) because soil organisms and burrowing birds and mammals would avoid saturated soils
- Ingestion of surface water (birds and mammals) because no surface water is present onsite
- Dermal contact and ingestion of soil (as sediment) for benthic invertebrates because no surface water is present onsite or within 30 m of the RA Property.

5.3.2 Exposure Estimates

The exposure assessment describes and quantifies the nature and magnitude of the interaction between COCs in environmental media and VECs. The frequency and duration of exposure to contaminated media is assumed as follows:

- Terrestrial Plants – Continuous, as plants are sessile.
- Soil invertebrates, Birds, and Mammals – Continuous, per MECP (2011b) assumption that all of the RA Property is considered suitable habitat for each VEC and that all incidental soil ingestion and food ingestion exposures occur within the RA Property.

Exposure can be represented in various ways (Government of Canada 2012), including:

- A measured concentration in an environmental medium (for example, micrograms [µg] per gram [µg/g] of a chemical in soil or µg per litre [µg/L] of a chemical in water)
- An estimated concentration in a tissue via modelling (for example, the chemical concentration in a plant via uptake of soil)

- An estimated dose to an organism via modelling (for example, milligrams per kilogram per day [mg/kg/d] from the food chain)

For this ERA, measured chemical concentrations in soil and groundwater are used to represent exposure. COCs are contaminants found on, in, or under a property at concentrations that exceed its applicable SCS. As a result, they may present risks to ecological receptors. The chemicals chosen for evaluation in this RA were identified based on the known practices and activities that have occurred at the RA Property (refer to the ESA summaries in Appendix D). Appendix F1 (Tables F1-1 and F1-2) provides detailed lists of RA Property COCs and the maximum observed concentration of each COC in soil and groundwater, respectively.

5.3.2.1 Soil

The pathway analysis for soil organisms (earthworms), terrestrial plants (grasses and Manitoba Maple trees), birds (Red-tailed Hawk, American Woodcock, and Red-winged Black Bird), and mammals (Red Fox, Meadow Vole, and Short-tailed Shrew) indicated they can be exposed to, and are at risk from, COCs in soil. Consideration must be given to COCs that can biomagnify, resulting in increased exposure and risk to higher trophic organisms. The uptake of COCs by soil organisms and plants and the consumption of these VECs by higher trophic bird and mammal species have the potential to impact the growth, reproduction, and survival of these species through dietary exposure. The generic MECP SCS (2011c) considers biomagnification, food-chain effects, and dietary exposure. Therefore, the food chain and diet pathway, including biomagnification potential, has been evaluated for the VECs identified as part of this ERA. The frequency and duration of exposure of VECs to COCs in soil are assumed to be similar to those assumed by the MECP in the derivation of the generic SCS.

To assess potential risks to terrestrial VECs from COCs in soil and diet, the maximum observed concentrations in soil were compared to the Table 6 SCS. Based on this comparison, ~~38~~ 42 COCs were retained for soil at the RA Property (Appendix F1, Table F1-1).

The estimated maximum concentrations of these ~~38~~ 42 chemicals (calculated based on the observed maximum plus 20 percent) represent terrestrial receptor exposure to soil (Table 5-4). If the observed maximum concentration of a chemical was based on a method detection limit (MDL), the observed maximum was selected as the estimated maximum concentration.

5.3.2.2 Groundwater

The pathway analysis for terrestrial plants (grasses and Manitoba maple trees) indicated they can be exposed to and at risk from COCs in groundwater because the minimum depth of groundwater (0.93 mbgs) is less than 1.5 mbgs. Contaminants in groundwater within the rooting zone (generally 1.5 mbgs[1] or shallower) have the potential to affect terrestrial vegetation.

The pathway analysis for aquatic receptors indicated they could be exposed to groundwater migrating from the RA Property to the nearest downgradient surface water body (that is, the Eramosa River). Pelagic invertebrates, fish, amphibians, aquatic reptiles, and aquatic plants experience water-mediated exposures, which are measured as a function of the concentration of contaminants in surface water (for example, micrograms of chemical per litre of water). These ecological receptors within the downgradient waterbodies could be exposed to groundwater COCs from the RA Property. The frequency and duration of

[1] Root zone inferred from MECP (2011c) which indicates that plant protection in subsurface soil (that is, below the root zone) is not a significant concern. MECP (2011a) defines subsurface soil as "more than 1.5 m below the soil surface".

exposure of VECs to COCs in groundwater are assumed to be similar to those assumed by the MECP in the derivation of the generic SCS.

To assess potential risks to offsite aquatic VECs in downgradient waterbodies and terrestrial plants from COCs in groundwater, the maximum observed concentrations in groundwater were compared to the Table 6 SCS. Based on this comparison, 30 COCs were retained in groundwater for the RA Property (Appendix F1, Table F1-2).

The estimated maximum concentrations of the 30 COCs in groundwater (calculated based on the observed maximum, plus 20 percent) represent terrestrial plants and offsite aquatic receptor exposure to groundwater (Table 5-5).

5.3.3 Discussion of Uncertainty

As is typical for most site investigations and RAs, it is possible that greater or lesser concentrations of chemicals exist onsite compared to those currently measured. This ERA employed a conservative approach to address the potential underestimation of risks by using the maximum and estimated maximum concentrations of COCs in soil and groundwater.

The bioavailability of all COCs in all environmental media was assumed to be 100 percent. The bioavailability of each COC was assumed to be equivalent to that observed or assumed within the study upon which the applied EcoBMC was based. These assumptions tend to overestimate exposure, but would not be expected to affect the conclusions of the ERA.

The assumption that all exposures related to food and soil ingestion occur on the RA Property is conservative. The home or foraging range of mobile VECs is unlikely to be confined to the RA Property; therefore, these assumptions have likely overestimated VEC exposure.

This assessment assumed the food and soil ingestion rates, body weights, and diet composition proportioning employed by the MECP (refer to Table G4-1 in Appendix G4) to evaluate exposure applied to the receptors at the RA Property. There is uncertainty with these uptake factors and the regression equations used by the MECP to estimate concentrations of chemicals in plants, earthworms, and mammals from exposure to soil and ingestion of food (diet). However, these approaches have been developed by the scientific community to provide an alternate method of assessing the potential for ecological risks in the absence of site-specific data (for example, plant, invertebrate, or mammal tissue). Therefore, chemical uptake may be under- or over-estimated.

Overall, the combination of several conservative assumptions in the exposure assessment have likely resulted in an overestimation of exposure to VECs in the ERA.

5.4 Hazard Assessment

Hazard assessments determine the potential for COCs to adversely affect the VECs, and involve evaluating scientific data for relevance to the assessment endpoints and the EcoCSM. If the concentrations of COCs exceed threshold effect levels, adverse effects to the survival, growth, or reproduction of VECs residing at the RA Property may be possible. Threshold effect levels can be represented in various ways (Government of Canada 2012):

- A guideline for environmental media (for example, soil or groundwater)
- A threshold value derived from toxicological summaries or a literature review
- A threshold value developed from site-specific toxicity testing or studies

For this ERA, the threshold effect levels are referred to as EcoBMCs. These values are represented by regulatory guidelines derived to be protective of the receptor groups and pathways discussed in Sections 5.2 and 5.3.1, respectively.

5.4.1 Soil

Multiple COCs were determined to potentially adversely affect the growth, reproduction, and survival of populations of soil organisms (earthworms), terrestrial plants (grasses and Manitoba Maple trees), birds (American Woodcock, Red-tailed Hawk, and Red-winged Blackbird), and mammals (Meadow Vole, Red Fox, and Short-tailed Shrew), based on comparisons to the MECP Table 6 SCS, which are based on both human health and ecological toxicological data.

EcoBMCs were identified as part of the hazard assessment to focus the assessment on ecological effects. The MECP ecotoxicological component values provided in the Rationale Document (MECP 2011b) were the primary source of EcoBMCs. As the Table 6 SCS component values are based on the Table 2 Standard (*Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition)*, the component values associated with the Table 2 Standard (residential/parkland/ institutional; coarse soil texture) were used. Alternate sources of EcoBMCs were used to facilitate the assessment of other COCs for which no MECP EcoBMC was available or if only one MECP EcoBMC existed (for example, an MECP soil organism or plant EcoBMC was available, but no MECP bird or mammal EcoBMC existed). Canadian Council of Ministers of the Environment (CCME), provincial, U.S. Environmental Protection Agency (EPA), and other reference sources were searched for relevant EcoBMCs. Based on jurisdictional relevancy and MECP preference[2], CCME EcoBMCs were reviewed and used first, followed by those from provincial, EPA, and other reference sources, as needed. The CCME, provincial (Alberta Environment and Parks [AEP]), MECP, and EPA EcoBMCs were considered appropriate for use in this ERA, as they have been peer-reviewed and are supported by regulators.

CCME (2008) values for PHCs are similar to the MECP ecological component values in that they are also protective of terrestrial receptors through the soil and food ingestion pathways. The derivation of these values is provided in the document entitled *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale, Supporting Technical Document* (CCME 2008). The MECP actively participated in the "development of protocols for setting effects-based soil quality criteria" (MECP 2011b) for CCME documents (CCME 2006, 2008); therefore, EcoBMCs from this source are considered to afford a similar level of protection to ecological receptors as the MECP component values and are appropriate for use in this ERA.

AEP (2019) values for PHCs are similar to the CCME guidelines and MECP ecological component values in that they are also protective of terrestrial receptors through the soil and food ingestion pathways. The CCME (and by extension, the MECP) have not provided PHC values applicable to birds and mammals on the basis that this "pathway is negligible for birds and mammals since PHCs do not accumulate in plant tissue (diet) and are readily metabolized and excreted by vertebrates" (CCME 2008). AEP (2019) has evaluated this pathway for soil ingestion only, noting the same assumption as CCME in regard to the diet pathway. AEP only derives values for this pathway under the Natural Areas and Agricultural land use categories. The values for a Natural Area were adopted for this ERA and are considered sufficiently protective of birds and mammals that may inhabit the RA Property. AEP adopts the CCME methodology for the derivation of soil and groundwater criteria; therefore, EcoBMCs from this source are considered to afford a similar level of protection to ecological receptors as the MECP component values and are appropriate for use in this ERA.

The EPA Office of Solid Waste and Emergency Response has published Interim Ecological Soil Screening Level (Eco-SSL) documents for some metals and pesticides, as well as polycyclic aromatic hydrocarbons and

[2] Refer to Section 5.3 of the Rationale Document (MECP, 2011b).

polychlorinated biphenyls. The derivation of the Eco-SSLs is provided in the document entitled *Guidance for Developing Ecological Soil Screening Levels* (EPA 2005). These values have been derived in a manner similar to the MECP component values, and are protective of one or more of plants, soil invertebrates, birds, and mammals via direct or indirect contact with soil (including food chain). Based on these considerations, EcoBMCs from this source are considered to afford a similar level of protection to ecological receptors as the MECP component values and are appropriate for use in this ERA.

The Oregon Department of Environmental Quality has adopted criteria from various sources as part of their 2001 document entitled *Guidance for Ecological Risk Assessment*. The Level II values are intended as screening values for the purposes of ecological risk assessments and are not to be used as remediation targets. Only a plant value for bismuth was available from this source. In the absence of other available screening values for bismuth, this value was deemed to be sufficient for use in the ERA for the evaluation of terrestrial organisms and plants.

Ontario Typical Range (OTR) values (MECP 2011b) were adopted as the EcoBMCs for the assessment of calcium, iron, and magnesium. A literature search did not identify any published effects-based EcoBMCs for these COCs.

An EcoBMC protective of birds and mammals for bismuth was not available. This COC was assessed qualitatively (Section 5.5.3).

Tables 5-6a and 5-6b summarize selected EcoBMCs used for the hazard assessment for plants and soil organisms, and birds and mammals, respectively. The source of each EcoBMC is also included in Tables 5-6a and 5-6b. These EcoBMCs were considered relevant for the assessment of risks at the RA Property.

5.4.2 Groundwater

EcoBMCs are not readily available to support the assessment of ecological risks related to terrestrial plant exposure to groundwater COCs. The MECP's Table 2 Standard[3] groundwater-to-surface water (GW3) component values (protective of aquatic receptors via the groundwater-to-surface water pathway) were applied as the EcoBMCs for this pathway, since the GW3 values for groundwater are considered protective of terrestrial plants (that is, risks exceeding acceptable levels would not be expected at the GW3 concentrations). Table 5-7a summarizes the source and concentration of the groundwater EcoBMCs used for the risk characterization assessment of terrestrial plants.

The potential for risks to aquatic receptors in the nearest downgradient surface water body (that is, Eramosa River) from groundwater leaving the RA Property was determined using the MECP (2011b) Table 6 GW3 component values. Table 5-7b summarizes the source and concentration of the groundwater EcoBMCs used for the hazard assessment of offsite aquatic receptors.

The MECP (2011b) has also published soil values that are protective of aquatic receptors from COCs in soil leaching to groundwater with subsequent discharge to surface water (S-GW3). Table F1-5a in Appendix F1 presents the S-GW3 component values (Table 2 values were used in the absence of Table 6-specific values); note, the MECP did not develop S-GW3 values for metals and inorganics (except for mercury), petroleum hydrocarbon (PHC) fraction (F)3, or PHC F4, as these compounds are not considered mobile or are not significantly mobile under normal soil conditions (for example, if soil pH is within the acceptable range). The development of S-GW3 assumes soils are located 36.5 m away from surface water (MECP 2016); however, the nearest surface water body from the RA property is 500 m away. Therefore, Jacobs

[3] While the Table 6 SCS is applicable to the RA Property in general, use of the Table 2 GW3 values are considered appropriate for the evaluation of potential risks to terrestrial plants.

calculated site-specific S-GW3s based on the distance of 500 m to the nearest surface water body using the MECP's Modified Generic Risk Assessment (MGRA) model (MECP 2016).

Based on the comparison to the site-specific S-GW3, three soil COCs were identified with estimated maximum concentrations in soil greater than the site-specific S-GW3 component value within the RA Property:

1) Acenaphthylene
2) Anthracene
3) PHC F2

The S-GW3 values are calculated using GW3 values, combined with partitioning and transport models. As an intermediate step in the MECP's calculation of the S-GW3 soil values, concentrations of COCs in groundwater that have leached from soil are estimated. However, site-specific groundwater data are available to directly consider groundwater concentrations, as data from 94 monitoring well locations across the RA Property are included in the RA dataset (refer to Appendix D2). These measured groundwater concentrations provide a more direct and site-specific reflection of actual groundwater conditions, including potential leaching from soil. Of the three COCs with soil concentrations greater than the site-specific S-GW3, all three parameters were retained for further assessment in groundwater based on its maximum observed groundwater concentration exceeding the generic Table 6 SCS (refer to Table F1-2 in Appendix F1).

Contamination at the RA Property resulted from historical sources. The RA considers groundwater data from 2007 to 2020; therefore, the past and present potential for contaminant leaching to groundwater is reflected by the currently measured groundwater concentrations. Based on this information, potential risks to offsite aquatic receptors from RA Property groundwater were evaluated primarily by comparing measured groundwater concentrations to the GW3 values. Table F1-5e in Appendix F1 presents the GW3 component values. As the RA Property is considered a shallow soil property, the Table 6 GW3 values cannot be modified in the MGRA model to account for the site-specific distance of the groundwater impacts to the water body as "one cannot assume that dilution occurs in the bedrock aquifer" (MECP, 2011b). Consequently, the calculation of site-specific GW3 values using the MGRA model was not applicable.

Based on the comparison to the generic Table 6 GW3 values, ten groundwater COCs were identified with estimated maximum concentrations greater than the GW3 component value within the RA Property:

1) Anthracene
2) Benzo(a)anthracene
3) Benzo(a)pyrene
4) Benzo(b&j)fluoranthene
5) Benzo(k)fluoranthene
6) Chrysene
7) PHC F1
8) PHC F2
9) Pyrene
10) Zinc

Estimated maximum concentrations of COCs in groundwater greater than the GW3 component values indicate a potential impact to the growth, reproduction, or survival, or some combination of these, of populations of pelagic invertebrates, fish, amphibians, aquatic reptiles, and aquatic plants in the nearest downgradient surface water bodies (that is, the Eramosa River). Table F1-5e in Appendix F1 lists the GW3 values used for the hazard assessment of aquatic receptors in offsite water bodies.

5.4.3 Uncertainty

For the hazard assessment, there is uncertainty related to the EcoBMCs used, especially as there are no reference values specific to the RA Property or to ecological receptors inhabiting the area. Toxicity assessments rarely incorporate direct data about the effects of environmental chemicals on wildlife receptors, including those likely to inhabit the RA Property. Toxicity data are typically obtained from tests completed using approved test species that are exposed under controlled, laboratory conditions. As a result, there are uncertainties about applying the literature-based toxicity data toward the development of receptor-specific exposure limits and in extrapolating the laboratory toxicity data to field conditions. These uncertainties include the use of VECs to represent receptors that actually inhabit a site, the use of interactions within chemical mixtures, and the use of different species and differently sized animals to assess effects.

There is some uncertainty regarding the level of protection afforded to ecological receptors at the RA Property by using non-MECP criteria. However, the regulatory guidelines and benchmark values from other jurisdictions that were used in this assessment were considered appropriate and sufficiently protective, as they were set using a conservative approach, similar to the approach used by the MECP in the derivation of the ecological component values, and have undergone peer review by credible specialists, regulatory bodies, and academia.

5.5 Risk Characterization

5.5.1 Interpretation of Ecological Risks

Risk characterization integrates the results of the exposure and hazard assessments to estimate risks (the likelihood of effects given the exposure). The risk attributable from each COC to the identified VECs is provided semi-quantitatively (primarily through use of the hazard quotient [HQ] method) and qualitatively in Sections 5.5.2 and 5.5.3, respectively.

5.5.2 Quantitative Interpretation of Ecological Risks

Risks to ecological receptors and VECs were semi-quantitatively evaluated using an HQ method, which is a unitless ratio between the exposure and the response (Government of Canada 2012), given by the following equation:

$$HQ = Exposure/Threshold\ Effect\ Level$$

As Sections 5.3.2 and 5.4 discuss, there are several ways that the exposure and threshold effect level terms in the HQ equation can be represented. This assessment employs media concentrations (as the exposure term) and regulatory benchmark concentrations (as the threshold effective level term) to determine the potential for effects (per CCME [1997]). Therefore, the specific HQ formula variation employed in this ERA is as follows:

$$HQ = Media\ Concentration/Benchmark\ Concentration$$

Where:

Media Concentration = estimated maximum concentrations in soil or groundwater at the RA Property.

Benchmark Concentration = MECP ecological component values (or equivalent value from a credible agency) (that is, EcoBMCs).

If the HQ is less than or equal to 1, risks greater than MECP limits for ecological receptors are unlikely to occur. If the HQ is greater than 1, there is a potential risk to the identified receptor at levels greater than MECP limits. Uncertainties that may influence the risk estimates and, therefore, the risk conclusions, are summarized following the risk characterization.

Section 5.5.4 discusses the development of proposed EPSSs based on the semi-quantitative assessment. In all cases, Jacobs adopted the estimated maximum concentration of each COC as the EPSS; RMMs were proposed where HQs greater than 1 were estimated based on the semi-quantitative assessment.

5.5.2.1 Soil

COCs were identified based on a comparison of soil concentrations from previous investigations to the Table 6 SCS. Concentrations of these COCs were then compared to the EcoBMCs presented in Tables 5-6a (plants and soil organisms) and 5-6b (birds and mammals), and an HQ was calculated.

As Table 5-8a shows, HQ values for terrestrial plants and soil organisms ranged from less than 1 to 480. The greatest HQ value is associated with benzo(a)anthracene (HQ of 480), followed by naphthalene (HQ of 430), indeno(1,2,3-cd)pyrene (HQ of 250), and zinc (HQ of 200).

As Table 5-8b shows, HQ values for birds and mammals for the ingestion of soil and diet and food chain pathways ranged from less than 1 to 1100. The greatest HQ is associated with fluoranthene (HQ of 1100), followed by lead (HQ of 380), zinc (HQ of 240), and benzo(a)anthracene (HQ of 220).

COCs with HQs greater than 1 are considered to possibly pose risks greater than the MECP limit to soil organisms (earthworms), terrestrial plants (grasses and Manitoba Maple trees), birds (Red-tailed Hawk, American Woodcock and Red-winged Black Bird), and mammals (Red Fox, Meadow Vole, and Short-tailed Shrew) residing at the RA Property, if RMMs are not implemented. For this reason, Jacobs recommends actions to reduce risks to ecological receptors from COCs in soil (Section 7).

5.5.2.2 Groundwater

COCs were identified, based on a comparison of groundwater concentrations from the Phase Two investigation to the Table 6 SCS. Concentrations of these COCs were then compared to the EcoBMCs presented in Table 5-7a for terrestrial plants and an HQ was calculated.

As Table 5-9 shows, HQ values for terrestrial plant uptake of groundwater ranged from less than 1 to 1500. The greatest HQ is associated with PHC F2 (HQ of 1500), followed by chrysene (HQ of 64) and anthracene (HQ of 37). Groundwater EcoBMCs protective of terrestrial plants have not been derived for heavy PHC fractions (F3 and F4) by regulatory agencies (MECP 2011b, CCME 2008; and Atlantic PIRI, 2012) because these fractions are “considered insufficiently soluble to migrate to groundwater from soil” (Atlantic PIRI 2012). However, for this RA, the presence of petroleum-related NAPL may pose a risk to terrestrial plants via uptake from PHC F3 and PHC F4; therefore, the HQs for these COCs are assumed to be greater than one.

COCs with HQs greater than 1 are considered to pose possible risks to terrestrial plants (grasses and Manitoba maple trees) residing at the RA Property, if RMMs are not implemented. For the COCs with an HQ greater than 1, the exceedances were limited to groundwater collected from wells located within the northeastern portion of the RA Property.

PHC (Fractions 1 and 2) with an HQ greater than 1, or an assumed HQ greater than 1 (Fractions 3 and 4)[4] were limited to groundwater collected from 6 wells:

- OW22S (screened from 1.36 to 4.1 mbgs)
- OW23S (screened from 2.52 to 5.26 mbgs)
- OW23D (screened from 6.55 to 7.77 mbgs)
- OW24D (screened from 6.55 to 7.77 mbgs)
- OW25 (screened from 1.98 to 4.72 mbgs)
- MW17-104S (screened from 1.22 to 3.66 mbgs)
- MW18-135S (screened from 4.27 to 5.79 mbgs)

PAHs with an HQ greater than 1 were limited to groundwater collected from 8 wells:

- OW18-I (screened from 1.81 to 4.86 mbgs)
- OW22S (screened from 1.36 to 4.1 mbgs)
- OW23S (screened from 2.52 to 5.26 mbgs)
- OW25 (screened from 1.98 to 4.72 mbgs)
- MW17-104S (screened from 1.22 to 3.66 mbgs)
- MW17-104D (screened from 6.1 to 7.62 mbgs)
- MW17-109S (screened from 1.79 to 4.32 mbgs)
- MW18-125S (screened from 4.26 to 1.79 mbgs)

Metals (zinc) with an HQ greater than 1 were collected from 11 wells with screen depths ranging from 1.36 to 8 mbgs.

The screened depths of two of the wells with an HQ greater than 1 for terrestrial plants (OW22S and MW17-104S) is within the MECP assumed rooting zone for terrestrial plants (that is, 1.5 mbgs). The minimum groundwater level of 0.93 mbgs is associated with OW22S; however, the average groundwater level at this location is 1.54 mbgs (based on 24 monitoring events). The minimum and average groundwater levels at MW17-104S are 1.52 mbgs and 1.98 mbgs, respectively (based on 8 monitoring events). Groundwater levels in the remaining wells where parameters with an HQ greater than 1 were identified have ranged from 1.52 to 3.98 (average of 3.04). The maximum fluctuation of the water table at these locations straddles the MECP's assumed rooting zone of plants, but the average depth to the water table is deeper than the MECP's assumed rooting zone depth of 1.5 mbgs. The typical MECP (2011a, 2011c) rooting zone assumption of 1.5 mbgs is considered conservative. Several studies state that the rooting zone is much shallower than 1.5 mbgs, including Perry (1982), who indicates that 99 percent of roots are usually present in the top metre of soil; Roberts et al. (2006), who states that over 90 percent "of total root length is found in the upper metre of soil"; and Jackson et al. (1996), who states "by far the majority of ecosystem root biomass resides in the upper 1 m of soil. The 1 m root zone depth may also be considered conservative, in that the Jackson et al. (1996) study estimates that globally, 75 percent of roots are in the top 0.4 m of soil. Based on this additional information, for this RA, a rooting zone depth of 1 mbgs was used to evaluate the potential for risks to terrestrial plants and is also considered conservative. Since a groundwater level less than 1 mbgs has only been measured in 1 of 67 monitoring wells (screened in the overburden/bedrock contact zone) on 1 occasion over 27 monitoring events (refer to Table G2-1 in Appendix G2), risks to terrestrial plants at the population level from groundwater at the Site are unlikely.

Therefore, based on this review of the groundwater analytical data, and the locations and depths to groundwater impacts producing HQs greater than 1, the groundwater concentrations measured at the RA Property are unlikely to pose a risk to terrestrial plant populations onsite, and RMMs are not required.

[4] HQs were assumed to be greater than one for PHC F3 and PHC F4 where the groundwater concentrations were greater than the Table 6 SCS of 500 µg/L. Wells where this occurred include: OW22S, OW23S, OW23D, and OW25.

This conclusion is supported by visual observations of the existing vegetation, which visually do not appear to be stressed (despite the known environmental conditions at the Site). Likewise, NAPL is unlikely to pose a risk to terrestrial plants, as the minimum (2.36 mbgs) and average (3.31 mbgs) water levels from the three monitoring wells where NAPL has been observed are deeper than the MECP assumed rooting zone for terrestrial plants of 1.5 mbgs. Therefore, NAPL contact with terrestrial plants in these areas is unlikely.

Refer to Section 5.5.3.4 for the qualitative assessment of the groundwater-to-surface-water pathway.

5.5.3 Qualitative Interpretation of Ecological Risks

A qualitative assessment was completed for pathways where data or information was insufficient to complete a semi-quantitative assessment and for the assessment of potential risk to offsite receptors. The following subsections provide the rationale and results of the qualitative assessment.

Section 5.5.4 discusses the development of proposed EPSSs based on the qualitative assessment. In all cases, Jacobs adopted the estimated maximum concentration of each COC as the EPSS; RMMs were proposed where unacceptable risks to ecological receptors were inferred based on the qualitative assessment.

5.5.3.1 Qualitative Assessment of Minor and Secondary Exposure Pathways

As Section 5.3.1 and Table 5-3 discuss, several exposure pathways are considered minor or secondary for ecological receptors that were not evaluated semi-quantitatively:

- Inhalation of volatiles and particulates for soil organisms, birds, and mammals
- Stem and foliar uptake of ambient air for terrestrial plants
- Dermal contact with soil for birds and mammals

For these pathways, the following factors were considered when determining whether a qualitative or semi-quantitative assessment would be completed:

- There is lack of inhalation toxicity for ecological receptors (SABCS 2008).
- Ingestion exposure is generally assumed to be greater than inhalation exposure (SABCS 2008). EPA compared oral versus inhalation risks for select chemicals and found inhalation risks averaged approximately 0.02 percent of the oral risks (EPA 2003).
- Feathers and fur reduce the likelihood of dermal contact with contaminated media (Suter et al. 2000). The dermal contact pathway has been estimated to "contribute less than 1 percent to 11 percent of the total risk compared to oral exposures" (EPA 2005).
- There is a lack of regulatory- and industry-accepted methods to estimate exposure from these pathways.

Therefore, exposure from these pathways is assumed to be negligible compared to the primary pathways that were semi-quantitatively assessed. Recommended RMMs to protect ecological receptors from the primary exposure pathways (via the semi-quantitative assessment in Section 5.5.2) are assumed to also protect ecological receptors (both onsite and offsite) from these secondary exposure pathways.

5.5.3.2 Qualitative Assessment of Reptiles Onsite

As described in Section 5.2.2, the data and the methods needed to estimate exposure and evaluate toxicity for reptiles (and amphibians) are generally not available (Hopkins 2000, MECP 2011b). Potential risks to reptiles onsite were evaluated in the context of risks to other onsite ecological receptors. As shown in Tables 5-8a and 5-8b, HQs greater than 1 were estimated for several COCs. Therefore, it is assumed that

risks are also possible to reptiles residing at the RA Property, if RMMs are not implemented. The RMMs proposed for the protection of onsite plants, soil organisms, birds, and mammals, are assumed to afford some protection to reptiles, if present onsite.

5.5.3.3 Qualiative Assessment of Birds and Mammals Indirect Exposure to Groundwater via Diet (Vegetation)

The results of the semi-quantitative assessment of terrestrial plant uptake of groundwater (Section 5.5.2.2) concluded that risks to terrestrial plants from groundwater (or NAPL) are unlikey. Therefore, indirect risks to birds and mammals from groundwater via the ingestion of onsite vegetation are similarily unlikely.

5.5.3.4 Qualitative Assessment of Groundwater to Surface Water Pathway

Jacobs qualitatively assessed the potential for groundwater COCs at the RA Property to migrate offsite and effect aquatic receptors in the nearest downgradient surface water body (that is, the Eramosa River).

As Section 5.4.2 discusses, the use of the GW3 component values was concluded to be a more accurate and reliable way of evaluating of potential risks to offsite aquatic receptors from RA Property groundwater than the use of the S-GW3 component values. Therefore, risks to offsite aquatic receptors were primarily evaluated by comparing measured groundwater concentrations to the Table 6 GW3 values.

Thirty chemicals in groundwater were retained as COCs, based on the initial screening against the Table 6 SCS (Section 3.3.2; Appendix F1, Table F1-2). The potential for groundwater leaving the RA Property to impact aquatic receptors in the nearest downgradient surface water body (that is, the Eramosa River) was evaluated by first comparing the estimated maximum concentrations of groundwater COCs to the generic Table 6 GW3 component values (MECP 2011b) (Appendix F1, Table F1-5e). The GW3 values are based on aquatic protection values (APVs), combined with an assumed 10 times dilution within the surface water body. Exceedances of the Table 6 GW3 values indicate concentrations of COCs in groundwater could affect the growth, reproduction, or survival (or all three) of populations of pelagic invertebrates, fish, amphibians, aquatic reptiles, and aquatic plants.

As described in Section 5.4.2, the MGRA model cannot be used to derive site-specific GW3 component values for shallow soil properties. Therefore, the generic Table 6 GW3 values were used for the assessment. Based on the comparison to the Table 6 GW3, ten groundwater COCs were identified to potentially pose a risk to aquatic receptors in the downgradient water body (Appendix F1, Table F1-5e). PHC F3 and PHC F4 are typically not considered soluble or mobile in groundwater. While petroleum-related NAPL is present at the RA Property, the NAPL is not considered mobile (per the discussion in Section 3.21); therefore, offsite risks from NAPL (including PHC F3 and F4) are considered unlikely.

The estimated maximum groundwater concentrations were selected to represent the worst-case groundwater concentrations. High molecular weight PAHs are not expected to be very mobile in soil or groundwater; therefore, offsite risks to aquatic receptors are not anticipated from the following COCs:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b&j)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Pyrene

Concentrations of anthracene, PHC F1, ~~and~~ PHC F2, and zinc greater than the ~~site-specific~~ GW3 values were located in several wells. Additional details for these exceedances are as follows:

- Concentrations of anthracene were greater than the GW3 in two wells (OW22S and OW23S) between 2014 and 2016.
- Concentrations of PHC F1 were greater than the GW3 in two wells (OW22S and OW24D) between 2010 and 2016.
- Concentrations of PHC F2 were greater than the GW3 in five wells (MW17-104S, MW18-135S, OW22S, OW23S, and OW25) between 2010 and 2018.
- Concentrations of zinc were greater than the GW3 in eleven wells (MW18-131S, OW07-32, OW09-I, OW13, OW14, OW18-I, OW18-II, OW19, OW22S, OW24D, and OW24S) between 2007 and 2018.

Therefore, concentrations of these four COCs in groundwater have the potential to pose a risk to aquatic receptors in the downgradient waterbody, since the estimated maximum concentrations are predicted to be greater than the generic Table 6 GW3 value. To mitigate the potential risks to the offsite aquatic receptors, groundwater monitoring for these COCs is recommended as part of the RMP (Section 7). The groundwater monitoring plan also includes monitoring for the presence/absence of NAPL in select monitoring wells where NAPL has historically been observed and at the downgradient property boundary.

5.5.3.5 Qualitative Assessment of the Presence of Residual Nonaqueous Phase Liquid

Over the course of the Phase Two investigation activities, nonaqueous phase liquid (NAPL) was measured in three locations: OW23S, MW17-108S, and MW18-135S. NAPL has been measured at OW23S (screened from 2.52 and 5.26 mbgs) at thicknesses of 0.005 to 0.97 m in 21 monitoring events between 2010 and 2020. At MW17-108S (screened from 1.93 and 4.98 mbgs), NAPL has been measured at thicknesses of 0.002 and 0.18 m in six monitoring events between 2017 and 2020. At MW18-108S (screened from 4.27 to 5.79 mbgs), NAPL has been measured at thicknesses of 0.02 and 0.93 m in five monitoring events between 2019 and 2020. Therefore, additional consideration of potential risks related to NAPL, and the potential need for additional RMMs due to the presence of NAPL, is warranted. The MECP SCS and component values considered in the evaluation of COCs for the RA Property, and the equations applied in the calculations of risk and hazard, are based on the assumption that the petroleum hydrocarbons are distributed between the dissolved, vapour, and sorbed phases (that is, three phases are considered). With NAPL potentially present at the RA Property, nonaqueous-phase hydrocarbon could be present in addition to the dissolved, vapour, and sorbed phases (that is, four phases are present).

Direct contact exposure to NAPL itself is possible. As the depth to groundwater is less than the MECP assumed rooting zone depth of plants (that is, 1.5 mbgs), there is potential for terrestrial plants to encounter NAPL at the water table. However, because the presence of NAPL would be associated with the reported PHC impacts in groundwater, and risks to terrestrial plants from dissolved PHCs in groundwater was concluded to be unlikely (Section 5.5.2.2); risks to terrestrial plants from NAPL floating on the water table is also considered unlikely. Exposure to residual NAPL within the soil column near the water table may still be possible. Groundwater monitoring is required at the property boundary to monitor the potential movement of anthracene and PHC F2 offsite with potential impacts to aquatic receptors in the Eramosa River. Based on this assessment, RMMs are required to protect offsite aquatic receptors from exposure to PAHs and PHCs in soil with or with the presence of NAPL.

The semi-quantitative assessment of risks due to impacts in soil and groundwater (refer to Section 5.5.2) has already indicated unacceptable risks are likely present for the following pathways:

- Direct contact with soil for plants, soil organisms, birds, and mammals

- Food chain for birds and mammals
- Terrestrial plant uptake from soil

Based on this assessment, RMMs are required to protect plants and soil organisms from exposure to impacts in soil with or without the presence of NAPL.

5.5.3.6 Qualitative Assessment of Contaminants of Concern without Toxicity Reference Values

A EcoBMC protective of birds and mammals for bismuth were not available. Therefore, the risks from this COC to birds and mammals are unknown. As RMMs are recommended to protect these receptors from the existing RA Property soil, the proposed EPSS will be based on the estimated maximum concentration of this COC.

5.5.4 Ecological Property-specific Standards

Based on the results of the risk characterization and following MECP guidance, EPSSs must be proposed for the RA Property; where risk is present, they must consider RMMs. The recommended RMMs, once implemented, will afford ecological receptors the same level of protection as intended by the MECP's generic SCS (MECP 2011c).

The estimated maximum concentration (defined as the maximum observed concentration plus 20 percent [of detected values]) for each COC was selected to be representative of a reasonable upper-estimate of soil and groundwater concentrations remaining on the RA Property. If the observed maximum concentration of a COC was based on an MDL, the observed maximum was selected as the estimated maximum concentration.

Proposed PSSs for soil and groundwater applicable to ecological health were selected as described in the following subsections.

5.5.4.1 Soil

Table 5-10 presents the EPSSs for soil analytes identified as COCs for the RA Property. The EPSSs for soil were selected based on the following factors:

- The estimated maximum concentration, if no unacceptable risks were predicted in the semi-quantitative or qualitative assessments
- The estimated maximum concentration, if unacceptable risks were predicted in the semi-quantitative or qualitative assessments, and exposure pathways with risk exceeding ecological EcoBMCs (that is, HQ values were greater than 1; Tables 5-8a and 5-8b) are mitigated using RMMs (Section 7).

5.5.4.2 Groundwater

Based on the results of the semi-quantitative and qualitative assessments, the EPSSs for groundwater are based on the estimated maximum concentrations. Table 5-11 presents the EPSSs for groundwater analytes identified as COCs for the RA Property. Risk management was determined to be required for parameters with estimated maximum concentrations that exceeded their respective EcoBMCs (that is, HQ values were greater than 1 [Table 5-9 for the Site; Table F-6b for downgradient waterbodies]) and where additional considerations (for example, one or more of location-specific groundwater depth or mobility) indicated that a risk was possible.

5.5.5 Special Considerations

The special conditions for environmentally sensitive areas, shallow soil properties, and water bodies cited under Sections 41 and 41.3 of O. Reg. 153/04 apply to the RA Property. Specifically, due to shallow bedrock conditions on a portion of the property, the RA Property is considered a shallow soil property per Section 43.1. This condition was considered in the initial screening of COCs to be assessed in the RA (refer to Section 3.3). Section 41 (for environmentally sensitive areas) and Section 43.1 (specifically with respect to water bodies) do not apply to the RA Property. The proposed PSSs for ecological health have accounted for the conditions cited under Section 41of O. Reg. 153/04 because they are represented by MECP-supported standards and criteria for sites in this setting, and been given special consideration. RMMs will also be implemented at the RA Property to block or monitor the exposure of ecological receptors to contaminated soil and groundwater.

5.5.6 Interpretation of Off-Site Ecological Risks

The proposed EPSS for soil COCs (presented in Table 5-10) are not anticipated to result in concentrations exceeding the applicable generic MECP standards (inferred to be the Table 6 SCS) at the nearest offsite property. Soil has the potential to migrate offsite via dust originating from soils at the RA Property; however, this mechanism is unlikely to result in a material change to offsite soil concentrations. Vapour and soil inhalation and stem and foliar uptake of ambient air are considered minor pathways for onsite receptors (Section 5.5.3.1) and therefore, are considered negligible for offsite receptors.

The proposed EPSS for groundwater COCs (presented in Table 5-11) could result in concentrations exceeding the applicable generic MECP standards (inferred to be the Table 6 SCS) at the nearest offsite property if groundwater containing COCs at EPSS concentrations greater than the Table 6 SCS migrates offsite (Table 5-12). Groundwater flow appears to flow south, and is influenced by groundwater pumping from municipal water supply wells as well as rivers including the Eramosa River and Speed River.

Offsite terrestrial plants at properties located hydraulically downgradient of the RA property are not expected be affected, despite the fact that the minimum depth to groundwater on the RA Property is 0.93 mbgs (OW22S). This is because the depth to groundwater at wells downgradient of OW22S and closer to the southern Site boundary is greater than 2 mbgs. The average depth to groundwater across the RA Property is greater than 2 mbgs, and therefore deeper than the rooting zone assumed by the MECP (that is, 1.5 mbgs).

Potential effects to aquatic receptors from groundwater discharging from the RA Property to downgradient waterbodies are possible from anthracene, PHC F1, ~~and~~ PHC F2, and zinc.

5.5.7 Discussion of Uncertainty

Uncertainty is an inherent component in any RA. The nature and magnitude of uncertainties depend on the amount and quality of data available, the degree of knowledge concerning site conditions, and the assumptions made to perform the assessment.

This ERA assumed the MECP Table 6 SCS, and other criteria used in the assessment, are set at limits such that adverse effects to ecological receptors and VECs are not expected for concentrations of chemicals at or less than these values. Benchmarks are typically set at very conservative levels; that being the case, they can overestimate ecological risks at a site. Therefore, this area of uncertainty is not expected to affect the conclusions of the ERA.

As is typical for most site investigations and RAs, it is possible that greater or lesser concentrations of chemicals exist onsite compared to those currently measured. This ERA employed a conservative approach to address the potential for underestimation of risks by using the maximum and estimated maximum concentrations of COCs. No effects on the results or conclusions of the ERA are expected from this type of uncertainty.

Ecological receptors typically only contact surface soils (that is, soil within 1.5 m of the ground surface). This ERA assumed subsurface and surface soils could be mixed during redevelopment and construction activities. In the future, subsurface soil could become surface soil and vice versa, so soil data were not segregated into subsurface and surface categories, but were grouped and screened as a single unit. These assumptions tend to overestimate exposure, but would not be expected to affect the conclusions of the ERA.

There is uncertainty related to the EcoBMCs used in the hazard assessment. Though no EcoBMCs specific to the RA Property or selected ecological receptors exist, the ERA used MECP-supported values, as well as other regulatory guidelines and EcoBMCs that have undergone peer review by credible experts, regulatory bodies, and academia. This type of uncertainty, however, is not expected to affect the conclusions of the ERA.

The toxicological information used represents information currently available from published literature. Over time, as more information from studies and research become available, toxicological information for constituents is updated. As a result, the TRVs the EcoBMCs are based on are also expected to change over time. If TRVs are updated, changed, or added, they could inherently change the magnitude of the risk; however, the overall conclusions of the ERA are not expected to change.

There is uncertainty regarding the level of protection afforded to terrestrial reptiles onsite. The data and the methods needed to estimate exposure and evaluate toxicity are generally not available (Hopkins 2000); therefore, this receptor was not assessed quantitatively. It is likely that, based on the conservativeness of the assessment and potential overestimation of effects, the RMMs proposed (for example, clean fill caps) will afford some protection to reptiles, if present, at the RA Property.

There is uncertainty regarding the level of protection afforded to amphibians and aquatic reptiles offsite in the Eramosa River using the MECP APVs (and therefore, the GW3 values). At least one MECP APV has been derived based on effects to frog tadpoles; therefore, in general, the protection of amphibians has been considered in APV derivation. Amphibians and aquatic reptiles experience similar water-mediated exposure pathways as the other aquatic receptors (that is, pelagic invertebrates, fish, and aquatic plants), and the MECP APVs and GW3 values are protective of these receptors. For this assessment, the evaluation of pelagic invertebrates, fish, and aquatic plants was used as a surrogate for the qualitative assessment of amphibians and reptiles.

An EcoBMC specific to birds and mammals was not identified for bismuth. As such, the ERA does not assess risks from this COC to birds and mammals. However, the lack of an EcoBMC for this COC has little effect on the conclusions of the evaluation. Since an elevated risk has already been determined for this receptor or pathway, the recommendation that RMMs should be implemented is not affected by this uncertainty.

The bioavailability of all COCs in all environmental media was assumed to be 100 percent. The bioavailability of each chemical was assumed to be equivalent to that observed or assumed within the study upon which the EcoBMC was based. These assumptions tend to overestimate exposure and would not be expected to affect the conclusions of the ERA.

The assumption that all exposures related to food and soil ingestion occur on the RA Property is conservative. The home or foraging range of mobile VECs is unlikely to be confined to the RA Property; therefore, these assumptions have likely overestimated VEC exposure.

The possibility of a significant risk to go undetected is limited. The use of conservative estimates of exposure has likely resulted in an overestimation of actual risks present at the RA Property. The RMMs that will be implemented in the RA Property area have been developed with due consideration of the uncertainties in the RA. It is likely that, based on the conservativeness of the assessment and potential overestimation of effects, the RMMs developed will be protective of soil organisms, terrestrial plants, birds, and mammals at the RA Property. For example, risks to terrestrial VECs will be addressed by blocking exposure pathways to contaminated soil.

Overall, the combination of several conservative assumptions in the exposure assessment have likely resulted in an overestimation of exposure and, therefore, risk to VECs in the ERA.

5.5.8 Ecological Fill Cap Target Concentrations

The fundamental approach to preventing contact with contaminated soils is to construct a cap or soil barrier in areas where RMMs are required. The purpose of the barrier is to prevent exposure (for example, through dermal contact, ingestion, and root uptake) of terrestrial VECs to contaminants in soil, leaching of soil to groundwater with subsequent discharge to a surface water body is also considered. Overall Ecological Risk-based Target Concentrations were developed based on the lowest of the selected EcoBMCs used in the ERA (for plants and soil organisms [Table 5-6a], ~~or~~ birds and mammals [Table 5-6b] , or soil leaching [generic S-GW3]) or the higher of the lowest EcoBMC and the Table 6 SCS (so that the selected values are not more stringent than MECP generic standards) (Table 5-13). The Ecological Risk-based Target Concentrations were also used to develop the Fill Cap Target Concentrations (Table 6-3).

5.6 References

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6. Conclusions and Recommendations

6.1 Recommended Standards

The recommended Property-specific Standards (PSSs) for 200 Beverley Street, in Guelph, Ontario (the Risk Assessment [RA] Property, or Site) are the more applicable and stringent of the human-health-based standards proposed in Section 4 (Table 4-~~39~~40), and the ecological-based standards proposed in Section 5 (Table 5-10). Choosing the most stringent of these values protects ecological and human receptors that are either currently present or anticipated to be present near the RA Property in the future and after its potential redevelopment. Table 6-1 presents the soil and groundwater PSSs for the Site.

These PSSs are based on a qualitative and quantitative evaluation of risk due to exposure to the contaminants of concern (COCs) present on the RA Property. This evaluation indicated risks exceeding target levels are either anticipated to be present onsite now, or to be present following its redevelopment. The evaluation considered the Site's geological and hydrogeological characteristics, the expected onsite receptors, and chemical properties. Jacobs used site-specific information where possible. The recommended PSSs are based on reasonable upper estimates of the concentrations of the COCs remaining at the Site (defined as the maximum detected value plus 20 percent or the highest detection limit). The PSSs have been qualitatively or quantitatively evaluated considering the requirements for risk management.

Jacobs conducted the RA and developed PSSs for the RA Property using the following assumptions:

- The Site currently consists of vacant land historically used for industrial purposes and will be redeveloped to mixed residential, parkland, and commercial use.
- Groundwater is considered potable.
- The soil texture is considered coarse, as defined by O. Reg. 153/04 (as amended).
- The measured groundwater elevations (water table) taken between March 2010 and February 2020 ranged from 311.48 to 314.56 metres above sea level (masl) (0.93 to 4.97 mbgs). The calculated average depth to groundwater is 2.70 mbgs. It is, therefore, assumed that direct contact with groundwater would be limited to subsurface excavations that intercept the groundwater table.
- Subsurface and surface soils are assumed to mix during redevelopment and construction. In the future, subsurface soil could become surface soil and vice versa, so soil data were not segregated into subsurface and surface categories, but were grouped and screened as a single unit.
- Receptors exposed to groundwater could be exposed to COCs observed in groundwater at any depth or from any of the groundwater units identified at the RA Property. Consequently, all units were treated as one unit, and groundwater data sets were aggregated.
- Human receptors are currently present at the RA Property, and may also exist in the future, assuming the potential future land uses mentioned. Consequently, human receptors could be exposed to COCs, and risks were assessed based on future Site conditions, assuming no risk management measures (RMMs) were in place.
- Ecological receptors are currently present and may also exist in the future at constructed ornamental gardens or unmaintained areas. Risks were assessed assuming no RMMs (that is, no clean fill capping layer).
- Exposure events will involve contact with estimated maximum concentrations of COCs, which are estimated based on the observed maximum plus 20 percent (as applied within the MECP Modified

Generic Risk Assessment [MGRA] Model [MECP, 2016]), or by applying the method detection limit (MDL).

- Noncancer endpoints for the HHRA assume a maximum target hazard quotient (HQ) of 0.2 for all COCs except PHCs and inhalation of trichloroethylene, which assume a maximum target HQ of 0.5.
- Cancer endpoints for the HHRA assume a maximum target incremental lifetime cancer risk (ILCR) of 1 in 1 million (1×10^{-6}).
- Ecological health endpoints assume a maximum target HQ of 1.0.
- PSSs were based on the site characterization of soil and groundwater. The PSSs were developed based on the estimated Site maximums (Table 1-1). The estimated Site maximums were derived by applying the greater of the maximum detected concentration, multiplying it by 1.2, and then rounding it down to two significant digits, as appropriate, or by applying the MDL.

6.2 Special Considerations for Groundwater Standards

The risk of free-phase product formation must be considered when proposing PSSs for the RA Property. If the proposed groundwater PSS is greater than 50 percent of the solubility limit, or the proposed soil PSS is greater than the free-phase threshold, the risk of free-phase product formation must be evaluated and, if required, RMMs or remediation proposed to mitigate the formation of free-phase product.

6.2.1 Site-specific Soil Free-phase Thresholds

The risk of free-phase product formation must be considered when proposing PSSs for the RA Property. Mobile free-phase product formation occurs when the residual saturation limit is reached. The PSSs proposed in Sections 4 and 5 for all COCs at the RA Property are within the MECP's theoretical free-phase product thresholds, apart from the proposed PSS for PHC fraction (F) 2, F3, and F4 (see Table 6-2a).

The Canadian Council of Ministers of the Environment (CCME) (2008) indicates that for most petroleum products and soil types, the residual saturation limit occurs with total PHC concentrations on the order of 20,000 to 30,000 milligrams per kilogram (mg/kg). To protect against the formation of a mobile free product, CCME (2008) has established a limit of 2 percent total PHC in soil (or 20,000 mg/kg), of which not more than 1 percent should be in the sum of F1 to F3 and 1 percent in F4.

Theoretical free-phase product thresholds for PHC fractions are reported for residential/parkland land use under nonpotable water conditions and a coarse-textured soil scenario (MECP, 2011). The free-phase product thresholds for these conditions are as follows:

- 2,700 mg/kg for PHC F2
- 5,800 mg/kg for PHC F3
- 6,900 mg/kg for PHC F4

Site-specific, free-phase product threshold values for PHC F2, F3, and F4 were developed based on the site-specific soil characteristics at the RA Property. The MECP's procedure for calculating the theoretical free-phase product threshold (2011, 2016) was also used to develop this value. Based on characterization of the grain size at the RA Property, the following Johnson and Ettinger (J&E) spreadsheet model (EPA, 2004) defaults for sand soil were used in the calculations:

- Bulk Density: 1.66 grams per cubic centimetre (g/cm^3)
- Total Porosity: 0.375 cubic centimetre per cubic centimetre (cm^3/cm^3)
- Moisture Content: 0.054 cm^3/cm^3

For PHC fractions, a theoretical Site-specific free-phase threshold was calculated for each of the subfractions that contribute to the PHC fraction (see Table 4-5 for subfractions). MECP physical-chemical properties (for example, soil sorption coefficient [K_{oc}], solubility, Henry's Law Constant [H], and molecular weight) for these subfractions were adopted from MECP's Rationale Document (2011) and MGRA model spreadsheet (2016).

The equation used to calculate the Site-specific free-phase threshold is:

$$SSFPT = Sol * (Koc * foc + \frac{\eta_w + \eta_a * H'}{\rho_b}) \quad (1)$$

Where:

SSFPT = Site-specific free-phase threshold (mg/kg)

Sol = Subfraction- (or chemical-) specific solubility (milligrams per litre [mg/L])

K_{oc} = Chemical-specific organic carbon partitioning coefficient (cubic centimetres per gram [cm^3/g])

f_{oc} = MECP generic fraction of organic carbon (unitless)

η_w = Water-filled porosity (cm^3/cm^3)

η_a = Air-filled porosity (cm^3/cm^3)

H' = Unitless Henry's Law Constant

ρ_b = Soil bulk density (grams per cubic centimetre [g/cm^3])

Each of the SSFPTs for subfractions contributes to the PHC fractions (based on the proportions in Table 4-5). The following CCME algorithm was used to determine the final PHC fraction concentration:

$$PHC\ Fraction = \sum \frac{1}{\frac{MF_{sub}}{SSC_{sub}}} \quad (2)$$

Where:

PHC Fraction = Concentration for the specific PHC fraction (for example, F1 through F4) (mg/kg)

MF_{sub} = Mass fraction of each subfraction (Table 4-5) (dimensionless)

SSC_{sub} = Site-specific free-phase threshold concentration (mg/kg) for each subfraction based on the MECP generic f_{oc} value (SSFPT calculated previously)

The MECP also includes 1 percent pore volume in addition to the theoretical calculation presented here. As described in this section, the default J&E spreadsheet model values for sand were used for air-filled porosity, water-filled porosity, and soil bulk density.

The calculated site-specific free-phase threshold concentrations for PHC F2 were confirmed using the MECP's MGRA model (2016).

The following site-specific values were estimated as the theoretical free-phase product threshold:

- PHC F2 = 2,800 mg/kg
- PHC F3 = 5,900 mg/kg
- PHC F4 = 7,000 mg/kg

The estimated maximum concentration of PHCs in soil at the RA Property are:

- PHC F2 = 4,300 mg/kg
- PHC F3 = 27,000 mg/kg
- PHC F4 = 8,700 mg/kg

Considering the site-specific theoretical free-phase product thresholds, Site conditions could lead to free-phase product formation based on the known soil concentration of PHC F2, F3, and F4, and will require either monitoring or management, or both. Therefore, establishing the PSS based on the estimated maximum concentration of this COC at the RA Property may not be appropriate to protect against the formation of mobile free product.

Over the course of the Phase Two investigation activities, nonaqueous phase liquid (NAPL) was measured in three locations OW23S, MW17-108S, and MW18-135S. NAPL has been measured at OW23S (screened from 2.52 and 5.26 metres below ground surface [mbgs]) at thicknesses of 0.005 to 0.97 m in 21 monitoring events between 2010 and 2020. At MW17-108S (screened from 1.93 and 4.98 mbgs), NAPL has been measured at thicknesses of 0.002 and 0.18 m in six monitoring events between 2017 and 2020. At MW18-108S (screened from 4.27 to 5.79 mbgs), NAPL has been measured at thicknesses of 0.02 and 0.93 m in five monitoring events between 2019 and 2020.

Since establishing PSSs based on the estimated maximum concentration of PHC F2, F3, and F4 at the RA Property may not be appropriate to protect against the formation of mobile free-phase product, an action is required for these areas (for example, remediation, treatment, ongoing monitoring, or a combination thereof).

A review of the analytical data for the measured free-phase threshold exceedances indicates that the exceedances are limited to four locations as follows:

COC	Location	Sample Depth (mbgs)	Area
PHC F2	BH07-46	1.22 to 1.68	East, within area previously remediated
PHC F3	BH07-40	0.3 to 1.22; 2.13 to 2.39	East; southeast of previously remediated area
	BH07-67	0.05 to 0.91	West
	BH07-46	1.22 to 1.68	East, within area previously remediated
	MW17-108S	2.74 to 2.9	East, southeast of previously remediated area
PHC F4	BH07-67	0.05 to 0.91	West

The Phase Two ESA (Jacobs, 2020) states that PHC impacts in soil were found in both the upper fill and deeper native silt overburden units, including at the contact with the shallow bedrock surface, a depth at where the groundwater table is present on the east portion of the Site. Light nonaqueous phased liquid (LNAPL) has been found in wells in the area of BH07-40 and MW17-108S, in the eastern portion of the Site. The PHC soil impacts in this area were often found in the deeper native soil, with lesser impacts or no impacts in the upper fill, suggesting that the PHC concentrations were the result of smearing of the LNAPL from the seasonal fluctuations of the water table and not from a separate surficial source. The PHC exceedances in soil may also be acting as a contaminant source mass contributing to the groundwater impacts; however, these impacts are limited to the overburden and bedrock contact zone aquifer unit based on vertical delineation completed (Jacobs, 2020).

Figure 6-1 presents the locations of PHCs exceeding the Site-specific, free-phase product threshold values derived. Because the PSSs for PHC parameters have been based on the estimated maximum concentrations at the RA Property, monitoring will be required in areas such as at the western propery boundary, to ensure mobile free-phase formation does not occur where it has not already been identified at the RA Property. Monitoring of areas with known NAPL is included in Section 7.

PHC Fraction	MECP Free-phase Product Threshold Value[a] (mg/kg)	Estimated Maximum (mg/kg)	Site-specific Free-phase Threshold Value (mg/kg)	Existing Location with Exceedance
F2	2,700	4,300	2,800	Yes
F3	5,800	27,000	5,900	Yes
F4	6,900	8,700	7,000	Yes

[a] Component values from table entitled *Soil Components for Table 2 – Full Depth, Potable Water Scenario (Coarse Textured Soil, Residential/Parkland Land Use)* (MECP, 2011).

6.2.2 Half-solubility Limits

The groundwater PSSs require the potential for free-phase product formation to be considered. The groundwater PSSs proposed in Sections 4 and 5 for all COCs are less than the half-solubility limits as set by the MECP (2011), apart from the proposed PSSs for the following PAHs and PHCs (see Table 6-2b):

- Anthracene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b&j)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- PHC F2
- PHC F3
- PHC F4
- Pyrene

The PSSs for PAHs and PHCs in groundwater have been established at the estimated maximum concentrations. These concentrations are greater than the MECP's theoretical half-solubility limit to protect against the formation of free-phase product; however, the implementation of RMMs (such as groundwater monitoring) can facilitate the management of these concentrations in place. Furthermore, PAHs, PHC F3, and PHC F4 have low aqueous solubility, limited mobility, and are usually associated with soil sediment rather than the dissolved phase; therefore, establishing the PSSs for these parameters at the estimated maximum concentration is considered appropriate for the RA Property.

PHC F2 is a potentially mobile parameter. The following monitoring wells have had groundwater concentrations of PHCs greater than the MECP half-solubility limit:

Location	COC	Screened Interval (mbgs)	Area	NAPL Observed?
MW17-104S	PHC F2, PHC F3	1.22 to 3.66	East	No
MW18-135S	PHC F2	4.27 to 5.79	East	**Yes**
OW09-I	PHC F3	1.79 to 4.84	Southeast	No
OW18-II	PHC F2, PHC F3	6.32 to 7.84	East	No
OW19	PHC F3	1.77 to 4.82	Northeast	No

OW22S	PHC F2, PHC F3, PHC F4	1.36 to 4.1	East	No
OW23S	PHC F2, PHC F3, PHC F4	2.52 to 5.26	East	**Yes**
OW23D	PHC F3	6.55 to 7.77	East	No
OW25	PHC F2, PHC F3	1.98 to 4.72	South-Central	No

As discussed in Section 6.2.1, three locations with the eastern portion of the RA Property (OW23S, MW17-108S, and MW18-135S) have had measurable NAPL during Phase Two ESA investigations.

Considering the site-specific theoretical free-phase product thresholds, Site conditions could lead to free-phase product formation based on the known soil concentrations of PHCs, and will require either monitoring, management, or both. Figure 6-2 shows the existing sample locations that have groundwater concentrations exceeding MECP theoretical half solubility limits for the most mobile PHCs (that is, PHC F2).

6.3 Other Considerations

6.3.1 Nonaqueous Phase Liquid

The potential exists for NAPL to be currently present onsite as residual or mobile NAPL. Typically, NAPL is evaluated in terms of NAPL saturation in soil as a percentage of NAPL that occupies a pore space. The total NAPL saturation in soil comprises residual and mobile NAPL. Residual NAPL is unable to move because the capillary pressures inside pore spaces hold the NAPL in place. Monitoring wells installed adjacent to residual saturation will not accumulate measurable NAPL thickness. Mobile NAPL is any saturation in excess of residual saturation that can move if sufficient hydraulic gradient is present (for example, regional groundwater gradient). The presence of mobile NAPL is typically indicated by the presence of measurable NAPL thickness (not sheens) in monitoring wells or through more complex laboratory testing of undisturbed soil cores.

As discussed in Section 3.21 and 6.2.1, measurable NAPL has been observed during Phase Two ESA investigation in three monitoring wells. The source of the NAPL is likely related to the historical contamination in the northeastern area of the Site which was remediated (soils excavated to bedrock) in 1998. The remaining NAPL on the Site is to the south of the historical excavation, and situated at or below the bedrock contact. Remediation of the NAPL would be technically impractical based on the following rationale:

- The NAPL was found at depths of at least 4.6 mbgs within the fractures of the bedrock.
- The NAPL contains a significant amount of long chain hydrocarbons, such as PHC F3 and F4, which would make recovery challenging.

The data available from the Phase Two ESA and previous investigations suggest the NAPL is contained within the eastern portion of the Site, and migration has been limited given the source or release of contaminants would have occurred over 20 years ago, and the NAPL has been measured in the same area of the Site since at least 2004.

The PSS established in the RA are specific to soil and groundwater. These PSS are not comparable to concentrations that may be present within residual or mobile NAPL. Per MECP (2011), collected soil and groundwater samples should be inspected for multiphase conditions before analysis, to support decision making regarding sample treatment and processing. If NAPL is observed, the need for, and type of analysis required for, those samples should be assessed in the context of what information may be needed to support decision making regarding NAPL RMMs. If NAPL is not observed, the analysis of the soil and

groundwater samples can proceed for comparison of concentrations to PSS, as needed. Section 7 discusses the RMM requirements for the RA Property.

6.4 Special Considerations for Fill Caps

The fundamental approach to preventing contact with contaminated soils is to construct a cap or soil barrier where RMMs are required. The cap or barrier must prevent human and ecological exposure to COCs and prevent the mobilization of the contaminants.

The cap target concentrations consider risk-based concentrations (RBCs) and MECP standards. The RBCs for fill caps were developed based on a mixed residential, parkland, and commercial land use scenario. RBCs were based on residents, as the toddler is expected to be the most sensitive receptor. The following RBCs for fill caps were based on the following:

- Fill cap RBCs considered dermal and ingestion exposure to soil by Residents (Human Health Residential RBC), inhalation in a generic building (for a residential use), and direct ecological receptor contact with soil or soil leaching to groundwater with subsequent discharge to a water body (Ecological RBC) for a future residential land use. As documented in Appendix A3, the Fill Cap Target Concentrations are also protective of worker inhalation in a trench.
- The resulting risk for the fill caps will be less than or equal to the target risk of an ILCR of 1 in 1 million ($1x10^{-6}$), an HQ of 0.2/0.5[1] (human health), and an HQ of 1 (ecological health).

For parameters with RBCs less than the Table 6 Standard, the fill cap target concentration is set at the Table 6 Standard.

Tables 6-3 presents the RBCs for both human health and ecological receptors for mixed residential and commercial use, and also provides the final Fill Cap Target Concentrations for the Site. The cap concentrations are set based on the lowest of the calculated RBCs (human and ecological), and the observed maximum, unless this value is less than the Table 6 SCS, in which case the Table 6 SCS is applied. The fill cap targets apply to all areas of the RA Property and are protective of offsite adjacent buildings that do not have VI RMMs in place. These fill cap targets apply to soil with a soil pH between 5 and 9 and a soil fraction of organic carbon (f_{oc}) of 0.005 (the MECP's default) or greater.

The development of the fill cap targets does not account for potential gardening in fill caps to produce edible fruits and vegetables or potential odours from cap soil. The risks related to the consumption of garden produce are mitigated through the implementation of RMMs that limit or prohibit gardens that produce fruits and vegetables for consumption, or by requiring that home gardens only be grown in aboveground containers or containerized plots. The potential for soil odour issues within the cap are mitigated through the implementation of RMMs that require that soil used in fill caps must meet the Fill Cap Target Concentrations for the Site and also pass a visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris). With these RMMs in place the Fill Cap Target Concentrations will afford the same protection to Site users at the surface.

6.5 References

Canadian Council of Ministers of the Environment (CCME). 2008. Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale. Supporting Technical Document. PN 1399. January.

[1] PHCs and TCE (inhalation only) have a target HQ of 0.5. All other COCs have a target HQ of 0.2.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. *Modified Generic Risk Assessment Model*. Microsoft Excel spreadsheet. November 1.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. Washington, DC: Office of Emergency and Remedial Response. February 22.

7. Risk Management Plan

The objective of this risk management plan (RMP) is to eliminate or minimize human and ecological health risks estimated in the risk assessment (RA), by interrupting or blocking pathways of exposure. This section identifies the conceptual risk management measures (RMMs) intended to reduce the risks from exposure to that contaminants of concern (COCs) in soil and groundwater to acceptable levels.

As this RA has stated, the intended future land use of 200 Beverley Street, Guelph, Ontario (the RA Property or Site) is mixed residential, parkland, and commercial use. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place.

This RMP has been organized as required by Schedule C, Table 1 of Ontario Regulation (O. Reg.) 153/04 (MECP, 2011a) as follows:

- Section 7.1, Risk Management Performance Objectives
- Section 7.2, Risk Management Measures
- Section 7.3, Duration of Risk Management Measures
- Section 7.4, Requirements for Monitoring and Maintenance
- Section 7.5, Financial Assurance
- Section 7.6, References

7.1 Risk Management Performance Objectives

RMMs are needed for the pathways identified by the RA to pose potential risks to human and ecological receptors. The purpose of the RMMs is to reduce receptors' potential risk to acceptable target levels (that is, for human receptors, the incremental lifetime cancer risk [ILCR] is reduced to less than or equal to 1×10^{-6}, and the human health hazard quotient [HQ] is reduced to less than or equal to 0.2 [or less than or equal to 0.5 for petroleum hydrocarbons {PHCs} and trichloroethylene {TCE} for inhalation only]; and for ecological receptors, the HQ is reduced to less than or equal to 1).

Based on the RA, the predicted risk may exceed the Ontario Ministry of the Environment, Conservation and Parks' (MECP's) target levels for the following receptors:

- Residents and Site Visitors (all ages)
- Indoor Workers
- Outdoor Workers
- Construction and Utility Workers
- Offsite Surface Receptors (Residents, Visitors, Patrons) and Offsite Construction and Utility Workers
- Ecological Receptors (soil invertebrates, terrestrial plants, birds and mammals, and offsite aquatic receptors)

The potential for unacceptable risk at the RA Property, as Table 7-1 indicates, can be placed in one of the following broad categories:

1) Exposure to indoor air through inhalation (human – Residents, Indoor Workers, and Site Visitors only)
2) Exposure to soil, either through ingestion (human and ecological), dermal contact (human and ecological), or dust inhalation (human)
3) Exposure to groundwater, through incidental ingestion and dermal contact (human – Construction and Utility Workers only, and ecological)

4) Exposure to nonaqueous phase liquid (NAPL) through direct contact (human and ecological)
5) Exposure to outdoor air in a trench (human – Construction and Utility Workers only)
6) Exposure to groundwater, through ingestion and dermal contact with drinking water (human – Residents and Site Visitors)

The following performance objectives have been established for the RMMs to address the risks associated with these pathways and receptors:

1) Block inhalation exposure for human receptors of volatile COCs in soil and groundwater migrating into enclosed structures built on the RA Property.
2) Block direct contact (dermal or ingestion) of COCs in soil for both human and ecological receptors.
3) Block inhalation exposure of COCs on dust particles for human receptors.
4) Block direct contact (dermal or ingestion) of COCs in groundwater for human receptors in excavations or trenches
5) Block direct contact for human and ecological receptors from NAPL.
6) Block or reduce inhalation exposure for human receptors of volatile COCs in soil and groundwater migrating into trenches or excavations on the RA Property.
7) Restrict direct contact (dermal or ingestion) of COCs in groundwater for human receptors (via the potable pathway)
8) Monitor groundwater leaving the Site at downgradient property boundary (for potable, inhalation, and aquatic pathways for off-site receptors)

These objectives will be achieved by implementing RMMs, including caps to prevent contact with soil where existing soil does not meet the Fill Cap Target Concentrations, vapour intrusion (VI) mitigation systems, and administrative controls.

The required percentage reduction in COC concentrations, based on the RA calculations are presented in the following tables:

- VI Mitigation Systems (soil to indoor air): Table 7-2a
- VI Mitigation Systems (groundwater to indoor air): Table 7-2b
- Fill Cap Barrier: Table 7-2c
- Soil Direct Contact (Subsurface Workers): Table 7-2d
- Groundwater Direct Contact: Table 7-2e
- Trench Air Monitoring (Outdoor Air): Table 7-2f

It is expected that these RMMs will effectively block or mitigate each of the exposure pathways to reduce potential risk to acceptable levels. Capping is expected to result in 100 percent risk reduction, while vapour mitigation is expected to reduce risk by between 95 and 100 percent.

7.2 Risk Management Measures

This section outlines the following specific RMMs recommended to meet the risk management performance objectives. The proposed RMMs include:

- VI mitigation systems for newly designed and constructed enclosed structures (to mitigate exposure to volatile soil and groundwater COCs via the indoor air inhalation pathway) (Section 7.2.1). In addition, restriction of subgrade occupied structures in select areas of the Site, where NAPL has been

observed, is included as an administrative control to mitigate exposure to volatile COCs sourced from NAPL in indoor air (Section 7.2.3).

- Capping (fill caps, hard caps, or both to prevent direct contact with soil COCs by human and ecological receptors) (Section 7.2.2)
- Administrative controls, including requirements for health and safety plans (HSPs), soil and groundwater management plans (SGMPs), restrictions on the installation of potable or commercial wells at the Site to mitigate exposure to soil and groundwater COCs and exposure to potential NAPL (Section 7.2.3).

The following activities are also required to confirm the RMMs are properly installed and applied, and the efficacy of the RMMs is maintained:

- Monitoring of subslab vapours (and indoor air, if required)
- Inspecting and maintaining cap and VI mitigation systems
- Recordkeeping and reporting
- Contingency planning

In addition, while not intended for risk reduction, groundwater monitoring is also proposed to evaluate the risk to off-site receptors, including the potable water supply from any off-site migration of groundwater impacts.

Section 7.4 further describes these additional activities.

7.2.1 Vapour Intrusion

The results of the VI modelling (Section 4) using estimated maximum soil and groundwater concentrations predicted indoor air inhalation risks at levels exceeding the MECP acceptable target levels for a generic residential building (that is, 1,225-cm-by-1,225-cm building with an enclosed-space height of 366 cm) and generic commercial building (that is, 2,000-cm-by-1,500-cm buildings with an enclosed-space height of 300 cm).

No design plans currently exist for future buildings at the Site. Additionally, it is currently unknown where on the Site future buildings may be constructed; these buildings may or may not be located in the areas where elevated volatile organic compound (VOC) concentrations or NAPL may be observed in soil or groundwater. Until data are available that demonstrates (1) that the indoor air exposure pathway is not complete for a building planned for construction or (2) that the pathway does not present an unacceptable risk, VI RMMs are required for all future buildings.

During the planning phase for new enclosed structures on the RA Property, and prior to the initiation of construction, soil vapour surveys may be completed in the area where the building(s) are to be placed. The soil vapour surveys must be completed under the direction and oversight of a qualified person (QP), must consider the area within 30 metres (m) of the proposed footprint of the building and consider potential seasonal variations. If these construction-specific VI assessment activities for new construction conclude impacts to indoor air exceeding the health-based targets are not expected, application may be made to the MECP to modify the required vapour mitigation for the proposed construction work. In that case, additional reporting to the MECP Director will be required. The construction specific VI assessment report, signed by the QP, will be submitted to the MECP Director for review and approval before the building design(s) are finalized, construction is initiated, and the CPU requirements are modified by the MECP, for some or all of the RA property.

The general VI design and implementation process illustrated on Figure 7-1 can be applied to support the development of VI mitigation measures. The vapour mitigation system will be designed by an appropriately qualified licensed Professional Engineer (P.Eng.) in consultation with a Qualified Person (QP) in accordance with an applicable conceptual design, as determined by the building type and location. If pre-construction soil vapour assessments are completed to focus and refine VI mitigation approaches, application can be made to the MECP Director to use alternate approaches in consultation with a QP and as directed by a qualified P.Eng. Table 7-3 presents the VI RMMs recommended for various possible future building constructions on the RA property.

Key elements of the conceptual designs for VI RMMs must include:

- Vapour-proof barriers
- Passive subslab or submembrane venting systems, including suction pits (or plenum boxes)

These may be further refined through a pre-construction survey and combined with any of the following:

- Vapour cut-off trench
- Foundation and penetration sealing
- Building design (for example, parking garage at ground level) with mechanical ventilation
- Building restrictions in certain areas of the Site (for example, no enclosed buildings in select areas of the RA Property)

Appendix I provides an engineering report prepared in accordance with O. Reg. 153/04 (MECP, 2011a), Schedule C, 4(6)7, that gives additional details and typical drawings for vapour mitigation measures. Vapour barrier, suction pit, subslab venting, submembrane venting, and/or vapour cut-off trench as-built drawings signed by a P.Eng., as well as documentation outlining the testing and performance requirement for each installed VI mitigation system, must be produced for each building constructed with a VI mitigation system. This documentation should outline the testing and performance results (the quality assurance [QA] and quality control [QC] processes applied and the results of these assessments) during installation.

Passive subslab venting systems may run through the footprint of the building, or be strategically placed only under certain portions of the building, based on the results of a building specific VI assessment. The total number of venting pipes would be determined by the extent of the impacts and area of influence modelling. Suction pits may be used instead of venting pipes and be strategically placed as needed within the portions of the buildings where subslab vapours are identified as an issue.

Vapour cut-off trenches can be employed where construction-specific VI assessment activities indicate vapours are migrating towards the building from beyond the building footprint. Vapour cut-off trenches are strategically placed exterior to the building, to prevent movement of vapour into the building.

If a passive venting system is inadequate, then contingency activities can include converting the passive venting system to an active depressurization system. Section 7.4.1 describes scenarios where the implementation of such contingency measures is warranted.

Additional mitigation measures that are typically employed through a MECP Tier 2 RA process may also be considered in tandem with passive measures, such as no first storey residential use and may be appropriate in select areas of the RA Property and would need to be supported by pre-construction VI assessment to determine the applicability of these measures and application to the Director would have to be made under the CPU. If pre-construction VI assessment indicates that soil vapour concentration exceed the screening concentration then an alternate approach may be to restrict occupied buildings in select areas in order to avoid significant VI mitigation requirements.

7.2.2 Fill Caps and Hard Caps

The fundamental approach to preventing contact with contaminated soils is to construct a physical barrier (either a fill or hard cap) in areas where impacted soil is being managed in place. This barrier will also prevent the movement of impacted soil, and will thus inhibit opportunities for soil COCs to impact offsite receptors, including dust migration. Upon redevelopment of the RA Property, a physical barrier (either a fill or hard cap) is required across the entire Site. The suitability of fill caps versus hard caps and their required minimum thicknesses depend on the planned use and management of the area. In areas where ~~there are potential risks to terrestrial plants, soil invertebrates, birds, and mammals, and~~ the land use requires unconsolidated material for vegetation growth, a fill cap can be used as the RMM. Fill caps are generally thicker than hard caps because they are prone to penetration by digging animals, and from erosion and desiccation. Fill caps can be constructed or established from unimpacted material over impacted soils.

Unimpacted fill is defined as soil that meets the Fill Cap Target Concentrations (FCTC) (Table 7-2c) developed as part of this RA (for soil located on the RA Property) or the applicable generic standard (for soil imported to the RA Property) and passes visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris). Unimpacted fill may also include other inert material, virgin granular material, and products.

FCTCs have been developed as part of this RA to support the reuse of soil located on the RA Property for the following scenario:

- The development of the FCTC includes consideration of future human residential and visitor users and ecological receptors that may access these materials.
- The derivation of FCTC considers indoor air exposure, and hence FCTC are applicable to the reuse of soil in areas within 30 m of an enclosed building without VI RMMs (such as buildings immediately offsite).

For parameters for which the calculated risk-based concentrations are less than the *Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* (Residential/ Parkland/Institutional Property Use) (Table 6 SCS) (MECP, 2011c), the FCTC are set at the Table 6 SCS.

The application of the FCTCs are specific to reuse of soils from the RA Property. See Appendix I for further details. Soil located off the RA Property and considered for importation to the RA Property as unimpacted fill must meet the Table 6 SCS and the soil must also pass visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris).

Appendix I elaborates on the definition of unimpacted fill and unimpacted fill sources.

Upon redevelopment of the RA property, a physical barrier is required where impacted soil is present at or within 1,000 mm below the soil surface. Both fill and hard caps can be used on the RA Property. Table 7-4 summarizes the required barrier thicknesses. Appendix I includes an engineering report prepared in accordance with O. Reg. 153/04, Schedule C, 4(6)7, that gives additional details and typical drawings for fill and hard caps.

Where there is an existing hard cap that is not going to be reconstructed (for example, existing building slabs or existing asphalt surfaces), this hard cap can remain in place to serve as the barrier provided it is confirmed by a QP to be competent and meets the minimum required thickness for hard caps.

In general, the caps discussed herein are not intended to limit or prevent surface water infiltration to mitigate leaching of contaminants from shallow, unsaturated soils.

Following the implementation of caps, a site plan prepared and signed by a QP will be submitted to the MECP within 3 months of either the completion of RA Property development or of its occupancy, whichever occurs first. The site plan will describe the RA Property, and the placement and quality of the barriers to RA Property soils; and will include a plan and cross-section drawings specifying the lateral extent and thickness of the barriers.

Following the barrier's construction, the use of commercially available topsoil for landscaping and gardening does not require characterization or recordkeeping, per the SGMP (see Section 7.2.3.2).

7.2.3 Administrative Requirements

Exposure to contaminated media will be mitigated by restricting activities and implementing requirements for individuals (such as Construction and Utility Workers) undertaking tasks that may put them into direct contact with contaminated materials, when conducting subgrade work below caps. Table 7-5 summarizes the requirements that represent administrative controls, and presents the timeframe for which the administrative controls apply (for example, current conditions, future conditions, or both).

Until the RA Property is redeveloped, the following interim administrative requirements will apply unless barriers are in place:

- Maintain the current fences surrounding the RA Property to prevent access by unauthorized personnel (that is, trespassers) or large terrestrial receptors (that is, mammals). The existing fences should be inspected semi-annually for deficiencies that may allow unauthorized access portions of the RA Property. Deficiencies should be repaired in a timely fashion. Evidence of entry of unauthorized personal should be recorded. If trespassing is noted to occur frequently, the need for upgrading fencing or security should be evaluated.
- Maintain existing asphalt and landscaped or vegetated areas before the redevelopment of all, or portions of, the RA Property.

The remainder of this section outlines the administrative requirements that apply at the site at all times (that is, now and in the future).

7.2.3.1 Site-specific Worker Health and Safety Plan

A HSP that accounts for the presence of the COCs in soil and groundwater and NAPL at the RA Property and the related potential risks to Construction and Utility Workers (such as inhalation of dust derived from Site soils, direct contact with soil or groundwater, direct contact with NAPL in soil or groundwater, inhalation of vapours generated from volatile soil or groundwater COCs, or inhalation of vapours derived from NAPL), must be prepared by a Competent Person, as defined by the *Occupational Health and Safety* Act (Government of Ontario, 2016), and implemented before excavation activities at the RA Property.

The HSP will be prepared per applicable Ontario Ministry of Labour health and safety regulations, and consider the potential risks identified in the RA. The HSP will include provisions for occupational hygiene requirements, personal protective equipment (PPE), contingency plans, and contact information. Appropriate levels of PPE for normal dermal protection should be used (for example, U.S. Occupational Safety and Health Administration Level D PPE), with an upgrade to a greater level of protection if deemed appropriate by the onsite health and safety officer or coordinator.

The HSP will not address other health and safety Project related requirements that must be addressed by the Constructor.

The HSP requirements as related to this risk assessment are as follow:

- All subsurface work, including future subsurface work that may involve breaching of the caps, activities will require appropriate levels of PPE for normal dermal protection (for example, U.S. Occupational Safety and Health Administration Level D PPE) against contact with soil and groundwater COCs and NAPL, with an upgrade to a greater level of protection if deemed appropriate by the onsite health and safety officer or coordinator. All above-grade work that may involve contact with contaminated soil will also require the use of PPE for dermal protection (that is, gloves).
- For subsurface workers that may perform work in a trench (defined as an excavation that is deeper than it is wide), as per O. Reg. 213/91 for construction projects, all projects shall be adequately ventilated by natural or mechanical means, to be determined by appropriate monitoring.

Before initiating any "project" (as defined in the Ontario *Occupational Health and Safety Act*, as amended [Government of Ontario, 2016]) on the RA Property, the local Ontario Ministry of Labour office is to be notified of the planned activities and informed that the RA Property contains contaminated soil and groundwater, and NAPL. The HSP must be overseen by an appropriately qualified person, who must review the provisions of the HSP for planned site work and must conduct daily inspections. The owner will retain a copy of the plan, which will be available for review by the MECP upon request. Additionally, where required for a "project", an annual report will be prepared to document all records related to the health and safety plan in place during the previous calendar year. The annual report will be prepared on or before March 31 each year, until written approval to discontinue the program is obtained from the MECP. The annual report is to be retained by the owner and submitted to the MECP upon request.

7.2.3.2 Soil and Groundwater Management Plan

Contact with contaminated soil and groundwater, and potentially NAPL at the Site may result in unacceptable risk to Construction and Utility Workers. The implementation and use of a SGMP reduces the risk of contact with potentially contaminated subsurface soils and groundwater and additionally accounts for the potential to encounter NAPL. This plan will be prepared under the oversight of a QPESA before work begins, and will be required for intrusive work potentially exposing onsite soils, groundwater, or NAPL. The SGMP is used during activities that involves contact with subsurface soils under the cap, including excavation, stockpiling and relocation, as well as any importation or reuse of soil.

The SGMP will involve an approach specific to where excavation activities are proposed and based on the background information and data used to derive the PSSs. The plan (according to typical MECP Certificate of Property Use [CPU] requirements) will identify, at a minimum, provisions for soil excavation, stockpiling, tracking, dust management, odour management, characterization, disposal, and recordkeeping, specifically:

- Dust control measures and the prevention of soil tracking by vehicles and personnel from the RA Property, including wetting of soil with potable water, truck tarping, enforcing reduced speeds for vehicles, providing tire washing stations, and restricting work under high-wind conditions (weather monitoring).
- Odour control measures including, weather monitoring (temperature, humidity, wind), monitoring with a photoionization detector, ambient air quality sampling (depending on the extent and duration of the excavation activities), specifications regarding the size of open excavations, wetting of soil with potable water, implementation of atomization equipment or foam suppression, tarping odourous soil, or ceasing work to reassess the source of odour and to evaluate the appropriate control measure.

- Management of excavated materials, including equipment decontamination, placing materials for stockpiling on designated areas lined and covered with polyethylene sheeting, berming and fencing these areas to prevent access, and implementing runoff control to minimize contact.
- Characterization of excavated materials from the RA Property to determine if materials exceed the PSS or FCTCs. Characterization of soil to be reused on-site as soil barrier material will be conduced per Table 2, Schedule E of O. Reg. 153/04, as presented in Table 7-6. As per Section 36 of Schedule E of O. Reg. 153/04, if the stockpile volume is greater than 5,000 cubic metres (m^3), the minimum number of samples that must be collected and analyzed as described in paragraph 5 is the amount determined in accordance with the following formula:

$$N = 32 + (V - 5000) \div 300$$

Where,

N = the minimum number of samples, and

V = the stockpile volume in cubic metres.

- Excavated material meeting the Cap Target Concentrations (Table 7-2c) may be placed within the soil barrier if deemed suitable by a QP. This soil must also pass a visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris), where relevant.
- Characterization of soil to be reused onsite under cap will be sampled at a frequency of 1 per 500 m^3. Excavated material from the RA Property meeting the PSSs may be placed onsite below the soil barrier, with the exception of PHCs. Soils to be reused onsite under the cap must meet the FPT for PHCs as per Table 6-2a in Section 6. This soil must also pass a visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris), where relevant. Geotechnical considerations for soil reuse are outside the scope of this assessment.
- Excavated soils requiring offsite disposal as a waste will be disposed of per the provisions of O. Reg. 347 (MECP, 1990a) as amended.
- Excess groundwater collected during construction activities can be disposed of in accordance with O. Reg. 347. The collected groundwater can also be disposed of to the local sewer system, provided the appropriate approval is in place, and the groundwater meets the sewer use bylaw discharge limits. Where necessary, the groundwater can be pumped to a temporary groundwater treatment system and treated prior to discharge.
- Where soil or other material containing visible sheen (residual NAPL) are encountered during construction, appropriate removal and disposal of this material must be conducted as per O. Reg. 347 (MECP, 1990a) as amended and notification must be provided to the Director in writing within 24 hours of the NAPL being encountered and may require one or all of the following measures:
  - If NAPL is encountered, it must be removed before excavation continues, to avoid mixing the NAPL with the excavated material. Removal may include use of a vacuum truck.
  - Material with residual NAPL should be managed to minimize the requirements for stockpiling. If stockpiling is required, an impermeable barrier (for example, tarp or equivalent) must be placed on the ground.
- Recordkeeping will include dates and duration of work; weather and site conditions; stockpile management and drainage; characterization results for all materials; names of the QPs, contractors, and haulers; receiving sites for any materials removed from the RA Property; and any complaint received related to site activities.

A copy of the plan, any amendments to the plan, and the records kept per the plan will be made available for review by the MECP upon request. Additionally, if required, an annual report will be prepared to document the soil and groundwater management plan activities conducted during the previous calendar year. The annual report will be prepared on or before March 31 each year, until written approval to discontinue the program is obtained from the MECP. The annual report is to be retained by the owner and submitted to the MECP upon request.

For parameters for which a FCTC, PSS, or both, have not been developed, soil placed at the RA Property must meet the Table 6 SCS (MECP, 2011c) and the soil must also pass visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris).

7.2.3.3 Groundwater Control and Management

Groundwater control and management is not required for buildings with foundations that do not intersect the water table. However, if buildings with foundations that intersect the water table are to be constructed, groundwater management may require compliance with *Ontario Building Code* requirements, depending on the design of the building. Often, groundwater is collected by a sump or a weeping tile installed around the perimeter of the foundation.

Collected groundwater can be managed in several ways, including the following:

- It can be pumped to a temporary groundwater treatment system (operated with appropriate approvals), treated, and discharged as per City of Guelph Sewer Use and Stormwater Disposal Bylaws (City of Guelph, 1996).
- It can be pumped directly to the stormwater system without onsite pretreatment, if the water meets the local discharge limits as per local storm sewer-use by-laws and municipality approval through the development application process.

The type of treatment will be determined by the sewer use bylaws, which consider groundwater quality and quantity (that is, contaminant loading). If groundwater is intended to be discharged to the natural environment, a Section 53 approval under the *Ontario Water Resources Act* will be required. Special dispensation may be required from the local municipality, and payments are required for estimated or measured usage.

In addition to managing groundwater that may need to be removed from the Site during excavation, the use of trench plugs or low permeability collars are required to prevent the migration of impacted groundwater or NAPL offsite or along utility corridors. The engineering report in Appendix I includes additional conceptual designs for this measure.Where groundwater containing visible sheen (residual NAPL) is encountered during excavation, appropriate removal and disposal of this material must be conducted as per O. Reg. 347 (MECP, 1990a), as amended, and notification must be provided to the Director in writing within 24 hours of the NAPL being encountered. Groundwater with NAPL may be removed by vacuum truck or collected to separate the NAPL for disposal with the remaining water treated to meet discharge criteria.

7.2.3.4 Land Use Restriction

Construction of the following structure types or features is prohibited:

- Single family freehold dwellings; property must have oversight or management
- Due to the presence of soil impacts at the RA Property and development of FCTCs that have not considered the human exposure pathway to edibles, a restriction will be placed on the property,

preventing the use of green spaces for the planting of garden produce unless in aboveground or containerized plots.

- The landscaping plans for the RA Property must consider the potential for mature tree root systems to on rare occasions, contact the water table at depths less than 1.5 mbgs and limited occasions between 1.5 and 2 mbgs, during wetter periods of the year. Tree selections must consider the potential for this condition and tolerant species must be selected. Measures may be considered to provide additional separation between the surface and water table (for example, additional grading or backfill).

Although freehold single-family use residences have not been identified as a probable future use for the RA Property; use of the RA Property for single detached freehold homes with CPU conditions would be problematic to implement and manage. Therefore, this is considered a land use restriction. Future use of the RA Property must include property management oversight in order to ensure RMMs are maintained and the terms of the CPU are abided by.

7.2.3.5 Building Restrictions Due To Nonaqueous Phase Liquid

Residual NAPL and NAPL may be present on the RA Property and the area potentially affected by residual NAPL or NAPL, requiring additional management and consideration is identified in Figure 7-2. This area is based on the previous detection of NAPL in the wells as indicated with the affected area extending outwards to the next NAPL-free shallow well, or where practical due to close proximity, extended to the property boundary.

Within the area indicated on Figure 7-2, the construction of buildings with basements or occupied below-grade structures will be prohibited until it can be shown that the NAPL has been removed through a remediation program. This program could proceed during RA Property redevelopment (that is; excavation) or prior to development and must be directed by all other conditions of the applicable CPU including a HSP and SGMP.

Further, within the area identified in Figure 7-2 or if NAPL is identified elsewhere on the RA Property during construction, the potential presence of NAPL along with the other COCs that may be present, must be taken into consideration when selecting suitable construction materials for slab-on-grade buildings and below grade unoccupied structures.

To summarize, the following additional restrictions apply to the area as designated on Figure 7-2:

- No subgrade occupied structures are allowed within the area unless it can be shown that NAPL is no longer present through a successful remediation program through application to the Director and accepted by the MECP District Office.
- Materials selected for slab-on-grade buildings, including vapour barriers, and subgrade structures, such as utility conduits, must consider the potential presence of NAPL and the design of utility corridors must limit the potential for NAPL migration along these corridors.

The remediation and further characterization of NAPL extent to support the removal of the administrative restriction must be supervised and certified by a QP, and an application to remove this restriction must be submitted to and accepted by the Director and MECP District Office.

7.2.3.6 Potable and Commercial Well Restrictions and Municipal Water Supply Consideration

It has been assumed in the RA that the pathway to the municipal potable water or domestic contact with the groundwater at the Site is likely to be incomplete based on the Site stratigraphy. This pathway was included and quantitatively assessed in the RA and potential risks to receptors were determined if the groundwater was directly contacted either through ingestion or dermal contact. A municipal by-law restricting the installation of new private wells has not yet been adopted by the City of Guelph but may be in the future. It is proposed that an additional restriction, specific to this property, be put in place as part of

the CPU for the RA property to prevent any use of groundwater from the RA Property as a source of water, either domestic or commercial.

As per the CSM included in Appendix D3, a review of the Permit to Take Water database identified nine Permits to Take Water within one kilometer (km) of the Site, which include an industrial water user north of the Site, remediation wells east of the Site, irrigation use to the south (on the opposite side of the Eramosa River), and dewatering and commercial uses located south-southeast of the Site (MECP, 2020a). A review of Ontario Water Well Records found that although 86 water wells (test holes and observation wells) exist within 250 m of the property, no wells were listed as being for potable use (MECP 2020b).

There are nine municipal groundwater supply wells within 3 km of the RA Property, none of which are immediately downgradient between the RA Property and the Eramosa River (see Section 1.4 of Appendix D3).

The City of Guelph categorizes regions of the City within Wellhead Protection Areas (City of Guelph, 2012). The RA Property is within Wellhead Protection Area B. The Site is not located within an Intake Protection Zone (GRCA, 2017). The proposed PSSs for groundwater are in most cases greater than the Ontario Drinking Water Standards or GW1 (MECP, 2011b) values. In order to address the potential long-term impacts to the municipal drinking water supply, it is proposed that the groundwater monitoring program, which includes wells along the downgradient perimeter of the Site, monitor concentrations of COCs compared to GW1 concentrations. Should these GW1 concentrations be exceeded during the monitoring program, contingency measures may include additional fate and transport assessments to further characterize this pathway. Section 7.4.3 presents the details of the proposed groundwater monitoring program.

7.2.4 Implications of the Risk Management Plan for Offsite Human and Ecological Receptors

Each of the proposed RMMs, in particular, the capping of the RA Property to mitigate dust generation, will further reduce the potential risk to offsite human and ecological receptors as a result of impacted soil at the RA Property. The proposed monitoring program (see Section 7.4.3), although not intended to mitigate exposure to groundwater COCs by off-site receptors, will serve to assess the potential offsite risk, and hence allow for timely implementation of contingency measures, if required, to mitigate the risk.

7.3 Duration of Risk Management Measures

The RMMs will continue until the MECP Director amends or revokes the CPU upon request by the owner.

7.3.1 Duration of Risk Management Measures for Vapour Intrusion

For new building construction, unless data are available that demonstrate the indoor air exposure pathway is not complete, or the pathway does not present an unacceptable risk, a vapour mitigation system will need to be in effect for the life of the structure.

7.3.2 Duration of Risk Management Measures for Caps and Soil Barriers

Barriers over portions of the RA Property where existing soil does not meet the applicable FCTC be maintained for as long as the COCs are present at concentrations exceeding the FCTC.

7.3.3 Duration of Administrative Requirements

The administrative requirements will be maintained as follows:

- Current fencing surrounding the RA Property will be maintained until the Site is redeveloped or capping RMMs are in place.
- The Site-specific HSP for workers exposed to site soils, groundwater, or NAPL will be maintained for as long as the COCs in soil and groundwater are present at concentrations exceeding the generic Table 6 SCS or NAPL is present on the RA Property.
- A SGMP will be required for activities that potentially place workers in contact with site soil or groundwater (including NAPL), such as events where soil or groundwater is exposed through excavation.
- Groundwater control and appropriate management through treatment and municipal approved discharge agreements is required as long as excess groundwater is generated either through short-term (construction) or long-term (foundation drainage) discharge requirements.
- Restriction on the use of the RA Property for single family freehold dwelling will remain in place for as long as the COCs in soil are present at concentrations exceeding the generic Table 6 SCS on the RA Property.
- Vegetable gardens, except in aboveground containers or containerized plots, will be prohibited for as long as the COCs in soil are present at concentrations exceeding the generic Table 6 SCS on the RA Property.
- Consideration of appropriate tree species, to minimize potential impacts to the trees as a result of root contact with contaminants at the water table or below 1.5 mbgs will be required for as long as the COCs in soil or groundwater are present at concentrations exceeding the generic Table 6 SCS on the RA Property.
- Restrictions on subgrade buildings within the area identified in Figure 7-2, will remain in place until it can be shown that NAPL is no longer present and successful application is made to the Director have this restriction removed from the CPU.
- Consideration of material selection for vapour barriers for slab-on-grade buildings and unoccupied subgrade structures within the area identified in Figure 7-2 and designs to limit the potential for NAPL migration along utility corridors will remain in place until it can be shown that NAPL is no longer present and successful application is made to the Director have this restriction removed from the CPU.
- Restriction on private wells for potable or commercial supply wells is required for as long as groundwater concentrations in wells of all-depths exceed the Table 6 SCS. This restriction would only be discontinued if it can be shown that all depths of groundwater, including the depth proposed for water supply at the RA Property can be shown to be less than the generic Table 6 SCS.

7.4 Requirements for Monitoring and Maintenance

7.4.1 Vapour Intrusion Risk Management Measure

Figure 7-1 identifies a process, typically used in brownfield redevelopment, leading to specific VI RMM design and monitoring strategies. In addition to building-specific assessment to support design decisions, the process identifies maintenance, monitoring, and reporting activities to be conducted following construction of the VI RMM both before and during the building occupancy. These later activities monitor that the RMM is operating as designed and that appropriate modifications are made (for example, passive system converted to an active system), as needed, so the performance objectives (Section 7.1) are met.

If pre-construction surveys alter the requirements for location and type of VI RMMs, any proposed monitoring would also need to be revaluated and proposed to be consistent with application for changes

to the CPU formally requested through the MECP Director. In absence of data indicating otherwise, VI monitoring programs for all enclosed spaces will be required, prior to and possibly following, the occupancy of any structures.

7.4.1.1 Subslab Vapour or Indoor Air Monitoring Program

A subslab vapour or indoor air monitoring program will be prepared by an appropriately qualified person (a QPESA, P.Eng., or Certified Industrial Hygienist) for buildings prior to building occupancy and before the initiation of VI RMM monitoring. This monitoring is required to demonstrate the objective of the VI RMM is being met for each structure. Subslab vapour monitoring is generally preferred, as it is less likely for the results to be affected by ambient sources.

To be protective of human health for any persons using or occupying the buildings on the RA Property, the building-specific monitoring program will identify VI RMM sampling locations, as well as the total number of each type of sample to be collected. The VI RMM indoor air, ambient air, and/or subslab vapour samples will be analyzed per U.S. Environmental Protection Agency (EPA) Air Method, Toxic Organics-15 (Method TO 15) (EPA, 1999a), Compendium Method, Toxic Organics-17 (Method TO 17) (EPA, 1999b), or equivalent methods for the relevant COCs. The monitoring program will include specific details regarding all elements of the subslab vapour or indoor air monitoring work, including pre-monitoring inspections and surveys, and the operation of building venting systems before and during sampling, as applicable. The number of samples required is dependent on the square footage of the building. Based on information provided by the State of Oregon Department of Environmental Quality (DEQ) Guidance for Assessing and Remediation Vapour Intrusion in Buildings (Oregon DEQ, 2010), the minimum sampling requirement is one per 150 m^2 for buildings up to 1,000 m^2, and one per 250 m^2 for buildings greater than 1,000 m^2.

Sub-slab or indoor air monitoring will involve assessing the volatile COCs that may pose unacceptable risk levels via indoor air inhalation. These COCs are listed in Tables 7-7 and 7-8 along with their target indoor air and subslab soil vapour indicator levels, respectively. Indoor air target levels were calculated using the toxicity reference values (TRVs) presented in Section 4 using the MECP's Modified Generic Risk Assessment (MGRA) Model Spreadsheet (MECP, 2016). The selected soil vapour indicator levels (Table 7-8) were back-calculated from the Indoor Air Indicator Concentrations as shown in Table 7-7, and MECP (2011b) recommended empirical attenuation factors.

The indoor air or soil vapour monitoring will begin with a Baseline Performance Assessment that will last for 1 year, to be followed by 1 year of confirmation monitoring. Baseline performance monitoring will be conducted on a quarterly basis, with the first event occurring before building occupancy. Confirmation monitoring will be conducted three times per year in spring, summer, and winter (sampling events will be timed so summer and winter events occur during maximum heating and cooling seasons). Following at least 2 years of VI RMM monitoring (that is, 1 year of Baseline Performance Assessment and 1 year of confirmation monitoring), the building owner may consider, with the assistance of an MECP QP for Risk Assessment (QPRA), applying to the MECP Director for discontinuation of monitoring.

If any or all of the following occur, the owner should provide written notice to the MECP Director within 14 calendar days of the receipt of laboratory results or date of occurrence:

- Target analytes in soil vapour or indoor air are detected above the target levels indicated in Tables 7-7 and 7-8 followed by:
  - Resampling of exceedance; if resampling meets criteria then continue sampling program. If resampling does not meet criteria then notify MECP and propose contingency actions which may include, but not be limited to, further evaluation, remediation or conversion of a passive system to active.

- There is a reason to change the program as proposed as part of the Baseline Performance Assessment or confirmation monitoring.

VI RMMs will be considered effective if subslab vapour or indoor air samples collected as part of the RMM compliance monitoring meet the selected indicator levels provided in Table 7-7 and 7-8, unless it can be demonstrated to the MECP that the observed elevated COC levels (for indoor air sampling only) are demonstrated to result from other sources unrelated to soil and groundwater conditions (ambient air or building-related sources). If, during any sampling event, sampling results indicate the VI RMM does not meet the performance, the owner will have an appropriate QP prepare and submit a plan to the MECP Director, providing recommendations for modifying the system or implementing VI RMM contingencies (Section 7.4.1.3). Following the implementation of VI RMM contingencies, VI RMM monitoring must include at least two rounds of indoor air or subslab vapour sampling (summer and winter).

An annual report documenting the results of the building-specific monitoring program will be prepared by a QP on or before March 31 following each year of monitoring, until the owner receives written approval from the Director to discontinue the program. The annual report is to be retained by the owner and submitted to the MECP upon request. The annual report will include:

- Laboratory results and laboratory certificates of analysis
- Field logs, leak testing (as necessary), and documentation of QA/QC
- Discussion and interpretation of the results in comparison to the respective target subslab vapour or indoor air concentrations
- Conclusions and recommendations with respect to the need for additional or continued monitoring as may be warranted

7.4.1.2 Vapour Intrusion Mitigation System Inspection and Maintenance Activities

Necessary inspection and maintenance activities for VI RMMs will be identified by a QPESA or P.Eng, and implemented before occupancy to confirm the continuing integrity of the vapour mitigation system and subslab venting RMMs. The inspection and maintenance activities for VI RMMs will be specific to each system and its associated structure, and will be based on the building-specific mitigation measures. The inspection work will include, at a minimum, annual inspections of all vapour mitigation system and subslab venting RMMs. Any deficiencies noted during the inspections will be promptly repaired.

The VI RMM inspection and maintenance activities should include developing and implementing an inspection checklist that includes, for vapour barriers, inspections of the inside surface of the below-grade exterior walls and floors for potential breaches (for example, foundation cracks, penetrations, and infiltrating groundwater). For buildings containing subslab venting systems (including plenum boxes) and vapour cutoff trenches, inspections of the venting systems, where visually accessible, will be conducted to identify potential breaches. Building or site operations that might compromise or damage a component of the system will be prohibited (for example, penetrating a subslab barrier without appropriately sealing the area, disconnecting piping, or turning off electricity to blowers).

If inspections indicate breaches have occurred, the checklist must include information regarding the maintenance and repair of the VI mitigation system. Information regarding the operations and maintenance of the vapour mitigation system, along with as-built drawings and specifications for the vapour mitigation system incorporated into each building, must be documented and retained by the owner, and reviewed as relevant in the identification of appropriate inspection and maintenance activities. Information regarding the operation of any mechanical equipment (including items such as valves,

blowers, and fans) is to be included in this documentation, if relevant, so the equipment can be maintained in accordance with the manufacturer's instructions.

Recordkeeping for inspections, maintenance, and repair activities will be conducted, and records will be available to the MECP upon request.

The need for VI RMM inspection and maintenance activities should consider the results of the subslab vapour monitoring program. If, following at least 2 years of VI RMM monitoring (that is, 1 year of Baseline Performance Assessment and 1 year of Confirmation Monitoring), the results of the monitoring indicate subslab vapour concentrations are protective of indoor air, the building owner may consider, with the assistance of a QPRA, applying to the MECP Director for a reduction or discontinuation of monitoring, inspection and maintenance activities.

7.4.1.3 Contingency for Vapour Intrusion

A goal of monitoring, inspection, and maintenance for a vapour mitigation system is to evaluate the need for contingencies if a mitigation system fails or is ineffective at mitigating VI as designed. The VI RMM monitoring, inspection, and maintenance planning must provide a method for identifying and addressing the two primary types of failure:

1) System failures as a result of damaged components (including, for example, how parts can be replaced or repaired, and specifications for products to repair new cracks in a slab)
2) Systems ineffective as designed (for example, a passive venting layer and sealed slab or membrane barrier do not fully mitigate VI)

Potential system failures or needs for contingencies must be evaluated on an individual basis and must be specific to the operational conditions over time at each structure. If a component of the system is damaged, contingency repairs or replacement of damaged parts should be implemented as soon as the damage is identified.

If, during any event, monitoring results indicate the VI RMM does not meet the performance objectives, the owner will have an appropriate QP prepare and submit a contingency plan to the MECP Director. This plan must provide recommendations for modifying the system or implementing VI RMM contingencies.

The following contingency options have been identified for the various construction types:

- **New buildings** – Increase the number of passive venting points, or initiate existing subslab/submembrane venting system to an active depressurization system.
- **Parking garages** – Increase supply of outdoor air at a rate not less than 3.9 litres per second (L/s) for each square metre (m^2) of floor area (run ventilation system intermittently or full-time as required).

As discussed, VI RMM monitoring following the implementation of contingencies must include at least two rounds of subslab vapour or indoor air sampling (summer and winter).

These contingency options have been acknowledged in the conceptual design drawings and discussions provided in Appendix I, so they can be considered during the initial design and implementation of the primary VI RMMs.

7.4.2 Fill Caps and Hard Caps

Inspection and maintenance activities (as per Table 7-4) will be implemented at the RA Property to promote the continuing integrity of the fill caps and hard caps. At a minimum, there will be semi-annual

inspections (spring and fall). Any deficiencies noted during the barrier inspections will be promptly repaired. The inspection and maintenance activities should include developing and using an inspection checklist with information regarding the construction of the caps, along with as-built drawings and specifications for final cap components. The checklist should also include information regarding how to complete the inspections (for example, timing, and items to look for and document). The cap is to be free of cracks or visible deterioration such that subsurface soils are visible. The checklist should also include information regarding the maintenance and repair of the caps, should inspections reveal cracks, erosion, distressed vegetation, or other indicators the caps may have been compromised. Compromised caps will be repaired immediately, using a suitable seal or repair.

Recordkeeping will take place for inspections, maintenance, and repair activities, and records will be available to the MECP upon request.

Contingency measures for maintaining the fill cap barriers include temporarily fencing off areas where the cap has been severely damaged and making repairs with material compatible and consistent with the original barrier material and with non-destructive repair methods. It is expected that some minor cracking or rutting will occur, but provided the surface material is not entirely compromised, the underlying structural base layer will provide additional isolation from the underlying impacted soils until repairs are required.

7.4.3 Groundwater Monitoring

A period of continued groundwater monitoring is required to identify potential exposures associated with offsite migration of contaminants and the potential impacts on offsite indoor air quality, offsite construction/utility workers, potable water supply or ecological receptors. Monitoring is also required to monitor for the presence of and stability of the onsite NAPL at the RA Property for a period following redevelopment of the RA Property.

7.4.3.1 Groundwater Monitoring Program

The performance objective of the Groundwater Monitoring Program (GMP) is to evaluate the subsurface groundwater regime to determine:

1) Whether there is a substantial change in the chemistry of the groundwater entering or exiting the RA Property
2) Whether NAPL requires management at the RA Property by assessing NAPL stability and mobility
3) Whether indoor air inhalation in offsite buildings is of potential concern for groundwater moving offsite
4) Whether risks to aquatic receptors in downgradient water bodies are possible from groundwater moving offsite
5) Whether risks to offsite workers involved in excavations offsite are a potential concern
6) Whether groundwater concentrations leaving the Site are likely to impact the potable groundwater pathway

Continued monitoring will allow seasonal effects, if present, to be observed within groundwater chemistry and identify concentration trends. As per the CSM for the RA Property, the Site has not been determined to be within the radius of influence of any municipal water supply wells and therefore monitoring for this pathway has been focused on the interpreted downgradient flow path.

Wells have been selected in part based on:

- Groundwater flow direction (that is, the downgradient perimeter of RA property)
- Past or current presence of NAPL
- Suitability of depth of screen to monitor for NAPL at the water table
- Locations situated downgradient of locations with soil or groundwater concentrations above MECP free-phase thresholds (FPT) or half-solubility limits (MECP, 2011b)
- Proximity to downgradient offsite properties

Wells that contain concentrations of COCs that could be attributed to an offsite source (to the west of the RA Property) have been proposed as part of the monitoring program to provide an indication of groundwater concentration from offsite sources that are entering the RA Property. Specifically, wells OW24S/D and OW13-39S/D have been included in the GMP.

The GMP includes the following elements:

- Sampling frequency (seasonal)
- Sampling locations and rationale, including locations for physical inspection for NAPL
- COCs to be assessed, and relevant criteria to which results are to be compared
- Reporting criteria, including frequency
- Well maintenance and inspection
- Waste management plans for investigation-derived wastes
- Triggers for activating contingency action
- Contingency plans

Groundwater from all monitoring wells will be sampled and analyzed according to the *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* (MECP, 2011d).

Figure 7-3 presents the proposed groundwater monitoring well locations based on groundwater flow direction and regional hydrogeology. The selection of locations considers the presence of existing wells that could be used for the monitoring program subject to them still being present and in good condition at the start of the Groundwater Monitoring Program. To monitor the stability of the onsite NAPL, existing monitoring wells in the area where NAPL has been observed will be maintained and monitored (specifically, MW18-135S, MW17-108S and OW23S) for presence or absence of NAPL. In addition, wells hydraulically downgradient of the NAPL area will also be monitored to evaluate if the NAPL is advancing (specifically, MW19-137S and OW09-I). If new monitoring wells are required, they should be installed at a similar depth as the above noted wells (that is, straddling the water table where NAPL would be found, if present).

Table 7-9 outlines the proposed locations with the associated rationale. Trigger concentrations (TCs) have been determined based on the well and the pathway that it is intended to address. TCs for each pathway based on either generic component values or onsite RBCs determined in this RA (for select pathways) have been identified and are presented in Table 7-10. The COCs were selected based on the summary provided in Tables 4-40 and 5-12. Those COCs that are not determined to be mobile in groundwater have not been considered further (for example, select PAHs). The recommended TCs have then been categorized as follows:

- PSSs – these apply to all locations at the Site and represent the concentration not to be exceeded at the Site as per O. Reg 153/04. Samples for all locations will be compared to the PSSs.

- TC-A – these apply to the shallow (water table) wells immediately upgradient of the offsite commercial areas and monitor the groundwater to indoor air pathway
- TC-B - these apply to the shallow (water table) wells immediately upgradient of the closest offsite residential areas and monitor the groundwater to indoor air pathway
- TC-C – these apply to all wells in the GMP except the background wells and provide data for the ongoing assessment of potential impacts to downgradient offsite aquatic receptors
- TC-D – these apply to all wells in the GMP except the background wells and provide data for the ongoing assessment of potential impacts to downgradient offsite construction/utility workers
- TC-E – these apply to all wells in the GMP except the background wells and provide data for the ongoing assessment of potential impacts to the municipal potable water supply

All conceptual groundwater monitoring well locations will be monitored for the presence or absence of NAPL (for example, with an interface probe or clear bailer).

The GMP will be initiated within 90 calendar days of the issuance of the CPU for the RA Property. The GMP will include quarterly events in year one and semi-annual events in year two. Following 2 years of groundwater monitoring, the property owner may consider, with the assistance of a QP, applying to the MECP Director to discontinue monitoring.

If any or all of the following occur, the owner should notify the MECP Director within 14 calendar days of the occurrence or receipt of laboratory results:

- There is a reason to change the selected groundwater monitoring wells included as part of the Groundwater Monitoring Program.
- Any measured groundwater concentrations exceed the PSS (Table 6-1).
- Any measured groundwater concentrations exceed the pathway- and location-specific groundwater trigger values (Table 7-10).
- NAPL is observed in a monitoring well that has previously not been identified to contain NAPL.
- NAPL thickness is detected above the trigger value thickness (Table 7-9) in a monitoring well where NAPL has been observed in the past.

In the event of exceedance of the PSS or TCs:

- The owner will retain a QP to evaluate whether the concentrations are increasing in relation to the historical monitoring data trends. If no historical data are available, monitoring will continue per the schedule so results from three events can be assessed for trends.
- Should the evaluation of concentration trends confirm increasing concentrations, the owner will retain a QP to assess the site conditions and determine whether contingency measures need to be implemented (further details regarding contingency measures are presented below). The outcome of the evaluation will be submitted to the MECP Director for consideration.

In the event NAPL is observed in a monitoring well that has previously not been identified to contain NAPL or NAPL thickness is detected above the trigger value thickness (Table 7-9) in a monitoring well where NAPL has been observed:

1) Monitoring will continue per the schedule so results from three events can be assessed.
2) If NAPL is observed over three consecutive monitoring events in a monitoring well where NAPL has not previously been identified or above the trigger value thickness in a monitoring well where NAPL has

been observed, the owner will retain a QP to assess the site conditions and determine whether contingency measures need to be implemented. Further details regarding contingency measures are presented in the following paragraph. The outcome of the evaluation will be submitted to the MECP Director for consideration.

Contingency measures for offsite groundwater movement or NAPL observations may include:

- Further investigation or assessment including modelling or fate and transport assessments
- Removal of NAPL to characterize and assess persistence and volume
- Installation of additional monitoring wells or soil vapour probes
- Completion of a remedial option feasibility study, remedial action plan, or both
- Assessing and implementing remedial technology options to prevent such offsite migration; or
- Some combination of these

The remediation measures, if required, will be designed by a P.Eng. and may include in situ chemical or biological treatment, installation of a passive NAPL collection system, hydrogeological or reactive barrier wall, vapour cut-off trench, or altering groundwater flow patterns using a pump-and-treat system.

An annual report will be prepared to document the activities conducted during the previous calendar year's Groundwater Monitoring Program. The annual report will be prepared on or before March 31 following each year of monitoring, until written approval to discontinue the program is obtained from the MECP. The annual report is to be retained by the owner and submitted to the MECP upon request. The annual report will document the sample results, sample locations, and borehole logs and monitoring well construction information, and will evaluate the temporal trends in groundwater quality and NAPL stability and assess the potential for offsite migration of impacted groundwater.

For robust data collection, accuracy, and security of the hydrostratigraphic units from surface and cross-aquifer contamination, the groundwater monitoring well network should be maintained in good working order. The condition of each well included in the Groundwater Monitoring Program is to be inspected and documented during each sampling event. Only data from wells considered to be in good condition are considered reliable in the context of the Groundwater Monitoring Program. Contingency should be made for the ongoing maintenance of the groundwater well network, so damage and deterioration to the network are fixed in a timely manner. Contingency also should be made to allow the replacement of monitoring wells if wells are found to be in poor condition or damaged by redevelopment activities. Any monitoring wells that are damaged or no longer required as part of the Groundwater Monitoring Program will be appropriately decommissioned. The maintenance, replacement, and decommissioning of monitoring wells will be completed in accordance with O. Reg. 903 (as amended) (MECP, 1990b). Any replacement monitoring well must be screened at the same depth interval as the well it is intended to replace.

Investigation-derived wastes (that is, soil or groundwater) generated as part of implementing the Groundwater Monitoring Program are to be managed as follows:

- Purged groundwater generated from the sampling of the monitoring well will be contained onsite in labelled drums (or other appropriate container) pending the receipt of analytical results. The groundwater will be removed from the RA Property by a MECP-registered waste hauler, if deemed necessary, based on the analytical results.
- Excess soil generated as part of the decommissioning or replacement of any monitoring well will be contained onsite in labelled drums (or other appropriate container) pending the receipt of analytical results, and disposed of per O. Reg. 347.

7.5 Financial Assurance

Financial Assurance (FA) can be required at sites requiring RMMs – particularly sites requiring RMMs that are anticipated to be privately owned. These funds are allotted to support the long-term care and monitoring often required for RMMs. Although the City currently owns the RA Property, there is potential for the RA Property to be sold for redevelopment in the future. Understanding the CPU will be the appropriate regulatory vehicle for FA, it is considered herein to support the development of the CPU, should FA be required.

Section 6.3.3 of Guideline F-15 (MECP, 2005) states:

> *"The amount of Financial Assurance should be based on the expected one-time and recurring costs of each compliance activity specified in relevant regulations or in specific orders or approvals over the intended planning period."*

FA estimates and endorsement of the withheld funds by the MECP need to be established with the landowner under separate cover during CPU development. However, it is expected that the monitoring outlined in this document will form the balance of FA for the RA Property; therefore, this section includes cost items for the RMMs requiring monitoring of media (that is, groundwater and air) as well as a cap and VI barrier inspection and maintenance program.

7.5.1 Vapour Intrusion Monitoring

VI monitoring will need to be completed for each building on the RA Property that includes a VI mitigation system. To identify an estimated cost for FA purposes, several assumptions about the sampling program have been made; however, the final monitoring plan, with the specific number of analytical samples for each structure, will need to be developed in the future based on the actual size, design, layout, and construction of the buildings, and should be prepared by an appropriate QP.

The costs presented in Table 7-11 represent a cost opinion that was developed using the following assumptions:

- The RA Property contains three separate structures (up to 600 m^2 each) that require a passive venting vapour mitigation system.
- The Baseline Performance Assessment for each structure consists of four indoor air or four subslab vapour samples, based on assumed building size (Oregon DEQ, 2010) to be collected during four events during the first year. An ambient (outdoor) air sample will be collected for comparison to subslab vapour and indoor air samples. One duplicate sample will also be collected per event, for a total of six samples per event.
- In Year 2, during Confirmation Monitoring for the structures, three VI sampling events will be conducted during the spring, summer, and winter. Sampling events will be timed so summer and winter events occur during maximum heating and cooling seasons.
- A 20 percent contingency exists for resampling to further assess unexpected results or account for sample container failures.
- Each vapour sample analysis costs $750.
- A consumer price index of 3 percent year-over-year will apply.

Based on the components of the monitoring program outlined, an initial cost estimate is provided in Table 7-11. A 2-year indoor air monitoring FA is estimated at approximately $347,000 for the RA Property.

VI monitoring reports will be prepared annually by an appropriate QP.

7.5.2 Groundwater Monitoring

Based on the components of the monitoring program outlined in Section 7.4.3, an initial cost estimate is provided in Table 7-12. This cost assumes four wells will need to be installed (that is, the proposed existing wells to be included in the GMP will be in place when the GMP is initiated). The 2-year groundwater monitoring FA is estimated to be approximately $225,000.

An annual Groundwater monitoring report with interim letter reports after each event will be prepared by an appropriate QPESA.

7.5.3 Inspection and Maintenance – Cap and Vapour Intrusion Barrier

It is assumed that the monitoring of cap and VI systems will be conducted as part of routine property/building maintenance. Therefore, no additional costs would be incurred as a result of the monitoring requirement.

7.5.4 Financial Assurance Summary

The total FA required for VI monitoring, groundwater monitoring, and cap and VI barrier inspection activities is based upon the number of buildings assumed to require VI mitigation measures within the RA Property, the number of monitoring wells used in groundwater monitoring, and the assumption that repairs to barriers and contingencies activities (for example, additional sampling) are not required. Based on the assumptions documented in Sections 7.5.1, 7.5.2, and 7.5.3, the total FA required for the first 2 years will be approximately $572,000.

7.6 References

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U.S. Environmental Protection Agency (EPA). 1999b. *Compendium Method Toxic Organics-17 (TO-17): Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition: Determination of Volatile Organic Compounds in Ambient Air Using Active Sampling onto Sorbent Tubes*. EPA/625/R-96/010b. January.

8. Public Communication Plan

8.1 Optional Communication Plans

CH2M HILL Canada Limited (CH2M), now Jacobs Engineering Group Inc. (Jacobs), participated in the implementation of an optional Public Communication Plan (PCP) for the planned redevelopment of 200 Beverley Street, Guelph on behalf of the City of Guelph (City). Jacobs's specific role was to consult the public as part of the environmental site assessment (ESA), risk assessment (RA), and redevelopment process. Per Ontario Regulation (O. Reg.) 153/04 (as amended), Schedule C, Table 1, this section provides the following information:

1) *A description of the plan, including any opportunities given to the public to comment on the proposed risk assessment*
2) *A summary of the comments received during the consultation*
3) *A description of how the public comments were considered as part of the risk assessment process.*

8.1.1 Description of Communication Plan

The City includes a PCP as part of brownfield redevelopment activities to proactively involve stakeholders in the project planning process, and to facilitate public participation and communication in an open and transparent forum. The City initiated communication through a public information meeting (PIM) in January 2018, where Jacobs presented items specific to the ESA and RA work (undertaken and planned).

Note, the PCP was not specific to the RA work; public communication regarding the RA Property reviewed the following:

- The planned and completed investigative work
- The potential remedial and management options (for example, risk assessment)
- The scope and schedule of work

The PCP as part of the ESA and RA work was based on the following objectives:

- Conduct open and inclusive activities to engage a broad spectrum of the community in the project.
- Provide sound science and technical information in an accessible and understandable format.
- Focus effort on the project rather than other agendas.
- Provide diversity in opportunities to participate.
- Track and manage issues throughout the project to achieve community support and endorsement of the project.

8.1.1.1 Public Information Meetings

The PIM was held at the Italian Canadian Club, Guelph, Ontario on January 23, 2018. The public was notified about the PIMs using the following methods:

- Notices of PIM on the City's website
- Meeting notices, which were mailed to those on the stakeholder mailing list, as well as area-wide residents

Additional information has been made available electronically for review by the public via the City's website, as well as the developer's website:

- https://guelph.ca/city-hall/planning-and-development/brownfield-redevelopment/200-beverley-street/
- https://arqi.ca/village-200-beverley/

The PIM consisted of the following elements:

- A Microsoft PowerPoint presentation outlining the work done to date, the results to date, and schedule projections
- A question and answer period following the presentation

Approximately 30 to 40 people attended the PIM.

The PIM was focused on the following topics:

- Update on Environmental Process (City/Jacobs)
- ARQi and the Design and Planning Team
- Draft Development Principles
- Roundtable Discussions
- Next Steps and Closing Remarks

Appendix J1 contains a copy of the presentation materials for the PIM.

8.1.2 Summary of Comments Received

Table 8-1 summarizes the comments received at the PIMs, and the responses provided.

8.1.3 Consideration of Public Comments during the Risk Assessment Process

The PIM generally presented all aspects of the ESA investigations conducted to date and the planned ESA and RA work. No specific feedback from the public has influenced the development of the RA for the RA Property.

In February 2021, the City received a request to provide various environmental reports for the RA Property for review and comment. The City provided the documents to the requestor. Comments on the RA were subsequently received by the City in March 2021 and provided to Jacobs for review. Appendix J2 contains the public comments on RA report and Jacobs' response to the comments.

8.2 Required Communication Plans for Risk Assessment Properties in Wider Area of Abatement

The Ontario Ministry of the Environment, Conservation and Parks District Office has not declared the RA Property as part of a "wider area of abatement." Therefore, a PCP for RA Properties in Wider Area of Abatement was not required. Section 8.1 provides details regarding the optional PCP that applies to the RA Property.

Tables

Table 1-1. Proposed Property-specific Standards for the RA Property

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	Recommended PSS - All Receptors	Dominant Exposure Pathway	Risk Management Required [c]	Potential for Offsite Exceedance of Table 6 SCS [d]
Soil (Full Depth)	2-(1-)Methylnaphthalene	µg/g	4.93	0.5	0.99	5.9	Direct Contact - Plants and Soil Organisms	No	No
Soil (Full Depth)	Acenaphthene	µg/g	94	0.63	7.9	110	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	Yes	No
Soil (Full Depth)	Acenaphthylene	µg/g	1	2	0.15	2	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	No	No
Soil (Full Depth)	Anthracene	µg/g	160	0.5	0.67	190	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Antimony	µg/g	18.6	2	7.5	22	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Arsenic	µg/g	23	--	18	27	Soil Direct Contact - Composite Resident	Yes	No
Soil (Full Depth)	Benzene	µg/g	0.26	0.1	0.21	0.31	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	Yes	No
Soil (Full Depth)	Benzo(a)anthracene	µg/g	200	0.5	0.5	240	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Benzo(a)pyrene	µg/g	130	0.5	0.3	150	Soil Direct Contact - Composite Resident	Yes	No
Soil (Full Depth)	Benzo(b)fluoranthene	µg/g	190	0.5	0.78	220	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Benzo(g,h,i)perylene	µg/g	70	0.5	6.6	84	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Benzo(k)fluoranthene	µg/g	66	0.5	0.78	79	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Bismuth	µg/g	150	1	--	180	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Cadmium	µg/g	83.4	0.5	1.2	100	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Calcium	µg/g	220000	--	--	260000	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Chrysene	µg/g	180	0.5	7	210	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Cobalt	µg/g	393	2	22	470	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	Copper	µg/g	2460	--	140	2900	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Dibenzo(a,h)anthracene	µg/g	26	0.5	0.1	31	Soil Direct Contact - Composite Resident	Yes	No
Soil (Full Depth)	Electrical Conductivity	mS/cm	2.19	--	0.7	2.6	Direct Contact - Plants and Soil Organisms	Yes	No

Table 1-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	Recommended PSS - All Receptors	Dominant Exposure Pathway	Risk Management Required [c]	Potential for Offsite Exceedance of Table 6 SCS [d]
Soil (Full Depth)	Ethylbenzene	µg/g	4.1	0.05	1.1	4.9	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	No	No
Soil (Full Depth)	Fluoranthene	µg/g	660	0.5	0.69	790	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Fluorene	µg/g	150	0.63	62	180	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Indeno(1,2,3-Cd)Pyrene	µg/g	80	0.5	0.38	96	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Iron	µg/g	128000	--	--	150000	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	Lead	µg/g	10100	--	120	12000	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Magnesium	µg/g	120000	--	--	140000	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Mercury	µg/g	0.319	0.05	0.27	0.38	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	Molybdenum	µg/g	35	3	6.9	42	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Naphthalene	µg/g	220	0.25	0.6	260	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	Nickel	µg/g	117	2	100	140	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	PCB, Total	µg/g	1.65	0.05	0.35	1.9	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	PHC F2	µg/g	3600	50	98	4300	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	Yes	No
Soil (Full Depth)	PHC F3	µg/g	23000	50	300	27000	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	PHC F4	µg/g	7300	50	2800	8700	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Phenanthrene	µg/g	900	0.46	6.2	1000	Direct Contact - Plants and Soil Organisms	Yes	No
Soil (Full Depth)	Pyrene	µg/g	470	0.5	78	560	Direct Contact - Plants and Soil Organisms	Yes	No

Table 1-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	Recommended PSS - All Receptors	Dominant Exposure Pathway	Risk Management Required [c]	Potential for Offsite Exceedance of Table 6 SCS [d]
Soil (Full Depth)	Thallium	µg/g	6	2	1	7.2	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	Yes	No
Soil (Full Depth)	Trichloroethylene	µg/g	35.4	0.05	0.061	42	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	Yes	No
Soil (Full Depth)	Vanadium	µg/g	100	0.3	86	120	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Soil (Full Depth)	Xylenes, Total	µg/g	3.9	0.07	3.1	4.6	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	Yes	No
Soil (Full Depth)	Zinc	µg/g	67200	--	340	80000	Direct Contact and Food Chain - Birds and Mammals	Yes	No
Groundwater	1,1,1-Trichloroethane	µg/L	37.1	20	23	44	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	1,1-Dichloroethane	µg/L	29.5	5	5	35	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	Yes	Yes
Groundwater	1,1-Dichloroethene	µg/L	64	25	0.5	76	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	2-(1-)Methylnaphthalene	µg/L	280	14	3.2	330	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	Acenaphthene	µg/L	40	10	4.1	48	Potable Site Groundwater Direct Contact - Composite Resident	Yes	Yes
Groundwater	Anthracene	µg/L	31	20	1	37	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Yes	Yes
Groundwater	Arsenic	µg/L	45.7	1	25	54	Potable Site Groundwater Direct Contact - Composite Resident	Yes	Yes
Groundwater	Benzene	µg/L	66.8	5	0.5	80	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	Yes	Yes
Groundwater	Benzo(a)anthracene	µg/L	21	5	1	25	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	Benzo(a)pyrene	µg/L	2.4	2	0.01	2.8	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	Benzo(b&j)fluoranthene	µg/L	6.1	10	0.1	10	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No

Table 1-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	Recommended PSS - All Receptors	Dominant Exposure Pathway	Risk Management Required [c]	Potential for Offsite Exceedance of Table 6 SCS [d]
Groundwater	Benzo(k)fluoranthene	µg/L	0.06	10	0.1	10	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	Chrysene	µg/L	38	10	0.1	45	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	cis-1,2-Dichloroethene	µg/L	960	5	1.6	1100	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	Ethylbenzene	µg/L	8.46	5	2.4	10	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	No	Yes
Groundwater	Fluoranthene	µg/L	24	20	0.41	28	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	Lead	µg/L	17	0.5	10	20	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Yes	No
Groundwater	Naphthalene	µg/L	27	15	7	32	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	n-Hexane	µg/L	7.46	5	5	8.9	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	PHC F1	µg/L	550	100	420	660	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	PHC F2	µg/L	210000	100	150	250000	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	PHC F3	µg/L	850000	500	500	1000000	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	No
Groundwater	PHC F4	µg/L	37000	500	500	44000	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	No
Groundwater	Phenanthrene	µg/L	110	1.4	1	130	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	Yes

Table 1-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	Recommended PSS - All Receptors	Dominant Exposure Pathway	Risk Management Required [c]	Potential for Offsite Exceedance of Table 6 SCS [d]
Groundwater	Pyrene	µg/L	59	0.05	4.1	70	Potable Site Groundwater Direct Contact - Composite Resident	Yes	No
Groundwater	Tetrachloroethene	µg/L	1.14	0.5	0.5	1.3	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	Yes	Yes
Groundwater	trans-1,2-Dichloroethene	µg/L	81	5	1.6	97	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	Yes	Yes
Groundwater	Trichloroethylene	µg/L	7900	5	0.5	9400	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	Yes	Yes
Groundwater	Vinyl Chloride	µg/L	86	100	0.5	990	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	Yes	Yes
Groundwater	Zinc	µg/L	4500	10	890	5400	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	Yes	Yes

Source:
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act* . April 15.

[a.] Maximum concentration detected onsite; all quantitatively assessed COCs were modelled using the estimated site maximums.
[b.] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for Residential Land Use with Coarse Textured Soils (MECP, 2011).

[c.] Risk management required when estimated site maximum results in risks exceeding target levels
[d.] Refer to Tables 4-~~40~~ 41 and 5-12.

Notes:
-- = no value
µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
COC = contaminant of concern
Est Max = estimated maximum
F = fraction
GW = groundwater
m = metre(s)
max = maximum
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not applicable
ND = nondetect
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
PSS = Property-specific Standard
RA Property = 200 Beverley Street, Guelph, Ontario
SCS = site condition standard
y = year(s)

Table 3-1. Property Information
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Municipal Address	Property Identification Number	Legal Description
200 Beverley Street, Guelph, ON	71343-0074(LT) [a]	Part of Lots 1, 2 & 3, Range 3, Division F, City of Guelph; Part Beverley Street, Plan 343, closed by DEP2184; as in RO706184; S/T RO706184; Guelph

[a] Ontario Land Title

Table 3-2. Contact Information, Owner of Risk Assessment Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Agency	Role	Contact Information
The City of Guelph	Owner	Mr. Prasoon Adhikari Environmental Engineer, City of Guelph City Hall 1 Carden Street Guelph, ON, N1H 3A1 (519) 822-1260 x 2946 prasoon.adhikari@guelph.ca

Table 4-1. Human Health Secondary Screening Results Summary – Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Retained Human Health Pathway				Maximum Concentration [d] (µg/g)	Estimated Maximum Concentration [e] (µg/g)
	Direct Contact [a]	Inhalation (Indoor Air) [b]	Inhalation (Outdoor Air Volatiles) [b]	Inhalation (Dust Particulates) [c]		
2-(1-)Methylnaphthalene	×	✓	✓	×	4.93	5.9
Acenaphthene	✓	✓	✓	✓	94	110
Acenaphthylene	×	✓	✓	×	2	2
Anthracene	×	✓	✓	×	160	190
Antimony	✓	×	×	✓	18.6	22
Arsenic	✓	×	×	✓	23	27
Benzene	×	✓	✓	×	0.26	0.31
Benzo(a)anthracene	✓	✓	✓	✓	200	240
Benzo(a)pyrene	✓	×	×	✓	130	150
Benzo(b)fluoranthene	✓	×	×	✓	190	220
Benzo(g,h,i)perylene	✓	×	×	✓	70	84
Benzo(k)fluoranthene	✓	×	×	✓	66	79
Bismuth	✓	×	×	✓	150	180
Cadmium	✓	×	×	✓	83.4	100
Calcium	✓	×	×	✓	220000	260000
Chrysene	✓	×	×	✓	180	210
Cobalt	✓	×	×	✓	393	470
Copper	✓	×	×	✓	2460	2900
Dibenzo(a,h)anthracene	✓	×	×	✓	26	31
Electrical Conductivity [f,g]	×	×	×	×	2.19	2.6
Ethylbenzene	×	✓	✓	×	4.1	4.9
Fluoranthene	✓	×	×	✓	660	790
Fluorene	×	✓	✓	×	150	180
Indeno(1,2,3-Cd)Pyrene	✓	×	×	✓	80	96
Iron	✓	×	×	✓	128000	150000
Lead	✓	×	×	✓	10100	12000
Magnesium	✓	×	×	✓	120000	140000
Mercury	×	✓	✓	×	0.319	0.38
Molybdenum	×	×	×	×	35	42
Naphthalene	×	✓	✓	×	220	260
Nickel	×	×	×	×	117	140
PCB, Total	✓	×	×	✓	1.65	1.9

Table 4-1. Human Health Secondary Screening Results Summary – Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Retained Human Health Pathway				Maximum Concentration [d] (µg/g)	Estimated Maximum Concentration [e] (µg/g)
	Direct Contact [a]	Inhalation (Indoor Air) [b]	Inhalation (Outdoor Air Volatiles) [b]	Inhalation (Dust Particulates) [c]		
Petroleum Hydrocarbons F2 (C10-C16)	✓	✓	✓	✓	3600	4300
Petroleum Hydrocarbons F3 (C16-C34)	✓	×	×	✓	23000	27000
Petroleum Hydrocarbons F4 (C34-C50)	✓	×	×	✓	7300	8700
Phenanthrene	✓	✓	✓	✓	900	1000
Pyrene	✓	×	×	✓	470	560
Thallium	✓	×	×	✓	6	7.2
Trichloroethylene	✓	✓	✓	✓	35.4	42
Vanadium	✓	×	×	✓	100	120
Xylenes, Total	×	✓	✓	×	3.9	4.6
Zinc	✓	×	×	✓	67200	80000

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. "Modified Generic Risk Assessment Model." Microsoft Excel Spreadsheet. November 1.

[a] COCs were retained for assessment of this pathway when estimated maximum concentrations were greater than the component used to derive the Table 2 SCS (that is, the Table 2 S1 [Direct Contact] component). Appendix F1, Table F1-3 provides the full screening table (including comparison of concentrations to component values).

[b] Volatile COCs were retained for assessment of this pathway when estimated maximum concentrations were greater than the component used to derive the MECP Table 2 SCS (that is, the Table 2 S-IA [Inhalation of Indoor Air] component) and the MECP residential health based indoor air criteria (HBIAC), as shown in Appendix F2, Table F2-2.

[c] The COCs retained for assessment based on comparison to the Table 2 S1 (Direct Contact) component values were retained here for assessment of this pathway. Appendix F1, Table F1-3 provides the full screening table (including comparison of concentrations to component values).

[d] The maximum concentration is the greater of the maximum detected concentration or the maximum detection limit of each parameter.

[e] Estimated maximum concentration is the maximum detected concentration plus 20 percent (according to MECP 2016), or the maximum detection limit.

[f] Parameter retained for ecological assessment; not applicable to human health.

[g] Units for conductivity are mS/cm

Notes:

× = not retained

✓ = retained

µg/g = microgram(s) per gram

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

Table 4-1. Human Health Secondary Screening Results Summary – Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Retained Human Health Pathway				Maximum Concentration [d] (µg/g)	Estimated Maximum Concentration [e] (µg/g)
	Direct Contact [a]	Inhalation (Indoor Air) [b]	Inhalation (Outdoor Air Volatiles) [b]	Inhalation (Dust Particulates) [c]		

mS/cm = milliSiemen(s) per centimetre

SAR = sodium adsorption ration

PCB = polychlorinated biphenyls

Table 4-2. Human Health Secondary Screening Results Summary - Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Retained Human Health Pathway		Maximum Concentration [c] (µg/L)	Estimated Maximum Concentration [d] (µg/L)
	Direct Contact [a]	Inhalation (Indoor and Outdoor Volatiles) [b]		
1,1,1-Trichloroethane	×	✓	37.1	44
1,1-Dichloroethane	✓	✓	29.5	35
1,1-Dichloroethene	✓	✓	64	76
2-(1-)Methylnaphthalene	✓	✓	280	330
Acenaphthene	✓	✓	40	48
Anthracene	×	✓	31	37
Arsenic	✓	×	45.7	54
Benzene	✓	✓	66.8	80
Benzo(a)anthracene	✓	✓	21	25
Benzo(a)pyrene	✓	×	2.4	2.8
Benzo(b&j)fluoranthene	✓	×	10	10
Benzo(k)fluoranthene	✓	×	10	10
Chrysene	✓	×	38	45
cis-1,2-Dichloroethene	✓	✓	960	1100
Ethylbenzene	✓	×	8.46	10
Fluoranthene	✓	×	24	28
Lead	✓	×	17	20
Naphthalene	×	✓	27	32
n-Hexane	✓	✓	7.46	8.9
Petroleum Hydrocarbons F1 (C6-C10)	×	✓	550	660
Petroleum Hydrocarbons F2 (C10-C16)	✓	✓	210000	250000
Petroleum Hydrocarbons F3 (C16-C34)	✓	×	850000	1000000
Petroleum Hydrocarbons F4 (C34-C50)	✓	×	37000	44000
Phenanthrene	✓	✓	110	130
Pyrene	✓	×	59	70
Tetrachloroethene	×	✓	1.14	1.3
trans-1,2-Dichloroethene	✓	✓	81	97
Trichloroethylene	✓	✓	7900	9400

Table 4-2. Human Health Secondary Screening Results Summary - Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Retained Human Health Pathway		Maximum Concentration [c] (µg/L)	Estimated Maximum Concentration [d] (µg/L)
	Direct Contact [a]	Inhalation (Indoor and Outdoor Volatiles) [b]		
Vinyl Chloride	✓	✓	100	100 (990)[c]
Zinc	✓	×	4500	5400

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at*

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. "Modified Generic Risk Assessment Model." Microsoft Excel Spreadsheet.

Notes:

[a] COCs were retained for assessment of this pathway when estimated maximum concentrations were greater than the component used to derive the Table 2 SCS (that is, GW1 [Direct Contact] component from the table entirled Groundwater Components for Potable Water Scenario). Appendix F1, Table F1-4 provides the full screening table (including comparison of concentrations to component values).

[b] Volatile COCs were retained for assessment of this pathway when estimated maximum concentrations were greater than the MECP Table 2 (potable) GW2 component and the MECP residential health based indoor air criteria (HBIAC), as shown in Appendix F2, Table F2-2.

[c] The maximum concentration is the greater of the maximum detected concentration or maximum detection limit of each parameter.

[d] Estimated maximum concentration is the maximum detected concentration plus 20 percent (according to MECP 2016), or the maximum detection limit.

[e] Theoretical vinyl chloride maximum shown in brackets. Refer to Table 4-7.

× = not retained

✓ = retained

µg/L = microgram per litre

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

Table 4-3. Benzo(a)pyrene Toxicity Equivalence Factors Used in the Risk Assessment

Risk Assessment, 200 Beverley Street, Guelph, Ontario

PAH	TEF [a]
Acenaphthene	0.001
Acenaphthylene	0.01
Anthracene	0.01
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(g,h,i)perylene	0.01
Benzo(k)fluoranthene	0.1
Chrysene	0.01
Dibenzo(ah)anthracene	1
Fluoranthene	0.01
Fluorene	0
Indeno(1,2,3-cd)pyrene	0.1
Methylnaphthalene, 2-(1-)	No TEF [b]
Naphthalene	No TEF [b]
Phenanthrene	0
Pyrene	0.001

[a.] TEF values were obtained from MECP (2011b).

[b.] TEF values have not been derived for naphthalene or 1-,2-methylnaphthalene in the source selected by the MECP (Kalberlah et al, 1995); however, when retained based on the secondary screening process, these chemicals have been assessed as carcinogens for certain pathways as individual COCs. Nisbet and LaGoy (1992) have cited TEF values of 0.001 and 0.1 for naphthalene and 1-,2-methylnaphthalene, respectively. These two TEFs have not been adopted for use in the B[a]PE calculation in this RA for the following reasons:

- The MECP did not select these TEFs for use in Rationale Document (MECP, 2011b) or the proposed Beneficial Reuse Assessment Tool (MECP, 2018).
- These TEFs do not correspond well with the magnitude of the TRVs selected for carcinogenic effects of naphthalene and 1-,2-methylnaphthalene as individual chemicals (that is, individual TRVs indicate greater toxicity than the B[a]P TRV with the TEFs applied for these COCs), and
- Due to the low magnitude of the TEFs, they have a negligible contribution to calculation of the B[a]PE value (that is, the B[a]PE value does not change when these TEFs are considered).

Notes:

Full references provided in Section 4.

B[a]PE = benzo[a]pyrene Equivalent

MECP = Ontario Ministry of the Environment, Conservation and Parks.

PAH = polycyclic aromatic hydrocarbon

TEF = toxicity equivalence factor

TRV = toxicity reference value

Table 4-4. Summary of Maximum Detected PAH Concentrations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

PAH	Maximum Concentration in Soil (µg/g)	Maximum Concentration in Groundwater (µg/L)
1+2-Methylnaphthalene	NA [c]	NA [c]
Acenaphthene	94	21
Acenaphthylene	<2	NA [d]
Anthracene	160	30
Benzo(a)anthracene	200	21
B(a)P	130	2.1
Benzo(b)fluoranthene	190	5.6
Benzo(g,h,i)perylene	70	NA [d]
Benzo(k)fluoranthene	66	<5
Chrysene	180	35
Dibenzo(ah)anthracene	26	NA [d]
Fluoranthene	660	13
Fluorene	150	<50
Indeno(1,2,3-cd)pyrene	80	NA [d]
Naphthalene	NA [c]	NA [c]
Phenanthrene	900	110
Pyrene	470	47
Benzo(a)pyrene Equivalent [a]	235	8.6
Estimated Maximum Benzo(a)pyrene Equivalent [b]	282	10.3

[a.] The calculation of B(a)PE is described in Section 4.1.3.2.

[b.] Estimated maximum concentration is the maximum B(a)PE value plus 20% (according to MECP, 2011c).

[c.] Not applicable. Per Table 4-3, there is no toxicity equivalence factor for this analyte. Therefore, this analyte does not factor into the calculation of B(a)PE.

[d.] Not applicable. Result is non-detect, but the detection limit is not considered representative.

Notes:

Parameters that were nondetect are evaluated using the maximum detection limit.

µg/g = microgram(s) per gram

µg/L = microgram(s) per litre

B(a)P = benzo(a)pyrene

PAH = polycyclic aromatic hydrocarbon

Table 4-5. Proportion of TPHCWG Sub-Fractions Used in CCME Fractions for Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

TPHCWG Sub-fractions	F1	F2	F3	F4
Aliphatics				
C6-C8	0.55	-	-	-
C>8-C10	0.36	-	-	-
C>10-C12	-	0.36	-	-
C>12-C16	-	0.44	-	-
C>16-C21	-	-	0.56	-
C>21-C34	-	-	0.24	-
C>34	-	-	-	0.80
Aromatics				
C>7-C8	Not included, as the toxicity data were based solely on toluene			
C>8-C10	0.09	-	-	-
C>10-C12	-	0.09	-	-
C>12-C16	-	0.11	-	-
C>16-C21	-	-	0.14	-
C>21-C34	-	-	0.06	-
C>34	-	-	-	0.20
Sum Sub-fractions	1.00	1.00	1.00	1.00

Notes:

Full references found in Section 4.

Based on CCME (2008)

- = not applicable

> = greater than

CCME = Canadian Council of Ministers of the Environment

F = fraction

TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group

Table 4-6. Proportion of TPHCWG Sub-fractions Used in CCME Fractions for Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Sub-fractions	F1	F2	F3	F4
Aliphatics				
C6-C8	0.605	-	-	-
C>8-C10	0.063	-	-	-
C>10-C12	-	0.024	-	-
C>12-C16	-	0.0015	-	-
C>16-C21	-	-	0.000095	-
C>21-C34	-	-	0.0000000026	-
C>34	-	-	-	0
Aromatics				
C>7-C8	Not included, as the toxicity data were based solely on toluene			
C>8-C10	0.332	-	-	-
C>10-C12	-	0.603	-	-
C>12-C16	-	0.371	-	-
C>16-C21	-	-	0.949	-
C>21-C34	-	-	0.051	-
C>34	-	-	-	1.00
Sum Sub-fractions	1.00	1.00	1.00	1.00

Notes:

Based on Health Canada (2008)

Full references are in Section 4.

- = not applicable

> = greater than

CCME = Canadian Council of Ministers of the Environment

F = fraction

TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group

Table 4-7. Vinyl Chloride Concentrations in Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Medium	Chemical	Units	Maximum Concentration [a]	Qualifier [b]	10% of Maximum Concentration [c]	Potential Maximum VC Concentration (using 10% of Parent Compounds) [d]	Estimated Maximum VC Concentration [e]	Final Maximum VC Concentration [f]
Groundwater	Tetrachloroethylene	µg/L	1.14		0.114	NA	NA	NA
	Trichloroethylene	µg/L	7900		790	NA	NA	NA
	1 1-Dichloroethylene	µg/L	64		6.4	NA	NA	NA
	1 2-cis-Dichloroethylene	µg/L	860		86	NA	NA	NA
	1 2-trans-Dichloroethylene	µg/L	81		8.1	NA	NA	NA
	VC	µg/L	100	U	NA	990.6	100	**990**

Notes:

[a.] Maximum nondetected or detected concentration, as reported in the analytical data received from the laboratory.

[b.] U: Chemical was not detected.

[c.] Calculated for the parent compounds (tetrachloroethylene; trichloroethylene; 1,1-dichloroethylene; 1,2-cis-dichloroethylene; and 1,2 trans-dichloroethylene). Value is 10% of the maximum concentration (as reported by the laboratory).

[d.] The parent compound (tetrachloroethylene; trichloroethylene; 1,1-dichloroethylene; 1,2 cis-dichloroethylene; and 1,2 trans-dichloroethylene) concentrations were summed, and 10% of the sum was added to the maximum VC concentration (as reported by the laboratory).

[e.] Estimated maximum concentration is the maximum detected concentration plus 20% (according to MECP, 2016a), or the maximum detection limit.

[f.] Final maximum VC concentration used as the input value in modelling and risk calculations. Concentration was selected as the greatest value using either: (1) 10% of the parent compounds' concentrations or (2) the estimated maximum VC maximum concentration rounded to two significant figures.

% = percent
µg/L = microgram per litre
Max = maximum
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
VC = vinyl chloride

Table 4-8. Risk Assessment Receptors

Risk Assessment, 200 Beverley Street, Guelph Ontario

Quantitatively Assessed	Qualitatively Assessed
• Resident	• Offsite Surface Receptors • Site Visitors (onsite)
• Outdoor Worker	
• Indoor Worker	
• Construction Worker	• Offsite Construction Worker
• Utility Worker	• Offsite Utility Worker
• Pregnant Female (Resident, Construction or Utility Worker, Indoor Worker, Outdoor Worker)	

Table 4-9. Generic Exposure Assumptions

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Units	Symbol	Infant Resident [a] (0 - 5 mo.)	Toddler Resident [a] (6 mo. - 4 y)	Child Resident [a] (5 - 11 y)	Teen Resident [a] (12 - 19 y)	Adult Resident [a] (20+ y)	Pregnant Female Resident [b] (20+ y)	Composite Resident	Outdoor Worker (Long-term)	Pregnant Female Outdoor Worker [b] (Long-term)	Utility Worker (Long-term)	Construction Worker	Pregnant Female Construction/ Utility Worker [b]	Indoor Worker (Long-term)	Pregnant Female Indoor Worker [b] (Long-term)
Body Weight	kg_{BW}	BW	8.2	16.5	32.9	59.7	70.7	63.1	NA [c]	70.7	63.1	70.7	70.7	63.1	70.7	63.1
Exposure Duration	years	ED	0.5	4.5	7	8	56	56	NA [c]	56	56	56	1.5	56	56	56
Averaging $Time_{NC}$	days	AT_{NC}	182.5 [d]	1642.5 [d]	2555 [d]	2920 [d]	20440 [d]	20440	NA [c]	20440	20440	20440	547.5	20440	20440	20440
Averaging $Time_C$	days	AT_C	182.5 [e]	1642.5 [e]	2555 [e]	2920 [e]	20440 [e]	NA [b]	27740 [f]	20440	NA [b]	20440	20440	NA [b]	20440	NA [b]
Frequency of Exposure for Outdoors	weeks/year	$EF1_{OD}$	39	39	39	39	39	52	39 [g]	39	52 [h]	2	39	52 [h]	0	0
Frequency of Exposure for Indoors	weeks/year	$EF1_{ID}$	50	50	50	50	50	52	50 [g]	0	0	0	0	0	50	52 [h]
Frequency of Exposure for Indoors and Outdoors	days/week	EF2	7	7	7	7	7	7	7 [g]	5	7 [h]	5	5	7 [h]	5	7 [h]
Frequency of Exposure for Outdoors	hours/day	$EF3_{OD}$	2 [f]	2 [f]	4 [f]	4 [f]	2 [f]	24	NA [c]	9.8 [j]	24 [h]	9.8 [j]	9.8	24 [h]	0	0
Frequency of Exposure for Indoors	hours/day	$EF3_{ID}$	24	24	22.23	21.83	22.5	24	NA [c]	0	0	0	0	0	9.8	24 [h]

a. Receptor inputs used only for the assessment of the Composite Resident for carcinogens

b. Receptor inputs used only for the assessment of noncarinogenic developmental COCs (if present).

c. Not applicable. Composite receptor is a sum of the individual receptor ages.

d. Assumed. Rationale Document (MECP 2011) says "Averaging Period for non-cancer is equivalent to exposure duration for each receptor" but does not list all age groups.

e. Value presented to support development of total carcinogenic averaging time of composite receptor by summing of individual age groupings. Carcinogenic risk is not calculated for the individual age groupings.

f. Carcinogenic averaging time is the equivalent of 76 years multiplied by 365 days per year, or the sum of the averaging times of all receptors comprising the composite receptor.

g. Value referenced is for carcinogens only.

h. Exposures for pregnant females are not prorated. That is, exposures are assumed to occur for 24 hours per day, 7 days per week, 52 weeks per year.

i. Values based on minutes per day spent outside by age group taken from EPA's *Child Specific Exposure Factors Handbook* (EPA, 2008).

j. Assumed, but consistent with MECP for Construction Worker scenario.

Notes:

Full references can be found in Section 4.

All values outlined are taken from Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario (MECP, 2011) unless otherwise noted.

$Averaging\ Time_C$ = Averaging time for carcinogens

$Averaging\ Time_{NC}$ = Averaging time for noncarcinogens

kg_{BW} = kilogram(s) body weight

MECP = Ontario Ministry of the Environment, Conservation and Parks

mo. = month(s)

NA = not applicable

y = years(s)

Table 4-10. Dermal Exposure Assumptions

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Units	Symbol	Infant Resident [a] (0 - 5 mo.)	Toddler Resident [a] (6 mo. - 4 y)	Child Resident [a] (5 - 11 y)	Teen Resident [a] (12 - 19 y)	Adult Resident [a] (20+ y)	Pregnant Female Resident [b] (20+ y)	Composite Resident	Outdoor Worker (Long-term)	Pregnant Female Outdoor Worker [b] (Long-term)	Utility Worker (Long-term)	Construction Worker	Pregnant Female Construction/ Utility Worker [b]	Indoor Worker (Long-term)	Pregnant Female Indoor Worker [b] (Long-term)
Soil Adherence Factor	$mg/cm^2/d$	SAF	0.07	0.2	0.2	0.07	0.07	0.07	NA [d]	0.2	0.2	0.2	0.2	0.2	NA [c]	NA [c]
Skin Surface Area - Arms	cm^2		550	890	1480	2230	2500	2270	NA [d]	NA	NA	NA	NA	NA	NA [c]	NA [c]
Skin Surface Area - Hands	cm^2		320	430	590	800	890	820	NA [d]	890	820	890	890	820	NA [c]	NA [c]
Skin Surface Area - Legs	cm^2		910	1690	3070	4970	5720	5390	NA [d]	NA	NA	NA	NA	NA	NA [c]	NA [c]
Skin Surface Area - Feet	cm^2		250	430	720	1080	1190	1130	NA [d]	NA	NA	NA	NA	NA	NA [c]	NA [c]
Skin Surface Area - Head	cm^2		275	445	740	1115	1250	1135	NA [d]	1255	1135	1255	1255	1135	NA [c]	NA [c]
Skin Surface Area - Forearms	cm^2		275	445	740	1115	1250	1135	NA [c]	1255	1135	1255	1255	1135	NA [d]	NA [d]
Skin Surface Area - Lower Legs	cm^2		455	845	1535	2485	2860	2695	NA [c]	NA	NA	NA	NA	NA	NA [d]	NA [d]
Skin Surface Area - Soil Exposure	cm^2	ESSA	1105 [e]	1745 [e]	2822 [e]	3858 [e]	4343 [e]	3988 [e]	NA [c]	3400 [f]	3090 [f]	3400 [f]	3400 [f]	3090 [f]	NA [d]	NA [d]
Frequency of Events - Soil Contact	events/day	FE_{SL}	1	1	1	1	1	1	NA [c]	1	1	1	1	1	NA [d]	NA [d]
Frequency of Events - Groundwater Contact	events/day	FE_{GW}	1.3 [g]	1.3 [g]	1.3 [g]	1.3 [g]	1.3 [g]	1.3 [g]	NA	NA	NA	1 [h]	1 [h]	1 [h]	NA	NA
Exposure Duration - Dermal contact with groundwater	hr/event	EDDermWat	0.4 [i]	0.3 [i]	0.5 [i]	0.5 [i]	0.3 [i]	0.3 [i]	NA	NA	NA	0.0833 [j]	0.0833 [j]	0.0833 [j]	NA	NA
Thickness of Stratum Corneum	cm	Isc	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	NA	NA	NA	1.00E-03	1.00E-03	1.00E-03	NA	NA
Skin Surface Area - Groundwater Exposure	cm^2	$ESSA_w$	3620 [k]	6130 [k]	10140 [k]	15470 [k]	17670 [k]	16750 [k]	NA	NA	NA	3400 [f]	3400 [f]	3090 [f]	NA	NA

a. Receptor inputs used only for the assessment of the Composite Resident for carcinogens

b. Receptor inputs used only for the assessment of noncarinogenic developmental COCs (if present).

c. Not applicable. Composite receptor is a sum of the individual receptor ages.

d. Not applicable. Indoor Worker dermal contact is qualitatively assessed. Outdoor Worker exposure is considered protective of the Indoor Worker.

e. Value represents a time-weighted average of exposed skin surface area, as outlined in the Rationale Document (MECP, 2011).

f. Value represents the sum of head, hands, and forearms, as outlined in the Rationale Document (MECP, 2011).

g. Value represents the average number of showers or bathing events for an adult between the ages 18 and 64 from the EPA Exposure Factors Handbook (2011). In the absence of EPA and MECP values, it is assumed that ages 0 through 17 have the same average of showering and bathing

h. It is assumed that the Construction and Utility Worker are exposed to groundwater one time per day. Limited exposure is assumed to occur during the handling of hoses used to dewater excavations.

i. Value represents the greater of the mean time for showering or bathing, as outlined in the EPA Exposure Factors Handbook (2011). Values were adjusted to match MECP (2011) life stages.

j. It is assumed that the Construction and Utility Worker are exposed to groundwater for 5 minutes per event. Exposure is assumed to occur during the handling of hoses used to dewater excavations.

k. Value represents the sum of all Skin Surface Area, as outlined in the Rationale Document (MECP, 2011).

k. Receptor inputs from the Canadian Exposure Factors Handbook (1997), consistent with the values used to derive the MECP Skin Surface Areas (2011).

Notes:

Full references can be found in Section 4.

All values outlined are taken from Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario (MECP, 2011) unless otherwise noted.

cm = centimetre

cm^2 = centimetre squared

event/day = number of events per day

GW = groundwater

hr/event = duration of event

$mg/cm^2/day$ = milligram(s) per centimetre squared per day

mo = month(s)

MECP = Ontario Ministry of the Environment and Climate Change

NA = not available

y = year(s)

Table 4-11. Ingestion Exposure Assumptions

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Units	Symbol	Infant Resident [a] (0 - 5 mo.)	Toddler Resident [a] (6 mo. - 4 y)	Child Resident [a] (5 - 11 y)	Teen Resident [a] (12 - 19 y)	Adult Resident [a] (20+ y)	Pregnant Female Resident [b] (20+ y)	Composite Resident	Outdoor Worker (Long-term)	Pregnant Female Outdoor Worker [b] (Long-term)	Utility Worker (Long-term)	Construction Worker	Pregnant Female Construction/ Utility Worker [b]	Indoor Worker (Long-term)	Pregnant Female Indoor Worker [b] (Long-term)
Rate of Soil Ingestion	mg-soil/d	SIR	30	200	50	50	50	50	NA [c]	100	100	100	100	100	NA [d]	NA [d]
Rate of Incidental Groundwater Ingestion [e]	L/event	IR_W	NA	NA	NA	NA	NA	NA	NA [c]	NA	NA	0.05 [f]	0.05 [f]	0.05 [f]	NA [d]	NA
Drinking Water Intake Rate	L/day	IR_{DW}	0.6	1.2	1.3	1.7	2.3	2.1	NA [c]	NA	NA	NA	NA	NA	NA [d]	2.1
Frequency of Exposure for Ingestion of Groundwater as Drinking Water	weeks/year	$EF1_{IngDW}$	50	50	50	50	50	52 [g]	50	NA	NA	NA	NA	NA	NA [d]	52 [g]

a. Receptor inputs used only for the assessment of the Composite Resident for carcinogens

b. Receptor inputs used only for the assessment of noncarinogenic developmental COCs (if present).

c. Not applicable. Composite receptor is a sum of the individual receptor ages.

d Not applicable. Indoor Worker incidental ingestion is qualitatively assessed. Outdoor Worker exposure is considered protective of the Indoor Worker for soil and the Resident for drinking water.

e. Refers to incidental ingestion of groundwater while completing site work that extends to the water table. Groundwater is potable.

f. Value obtained from EPA (1989); estimated intake of water while swimming. This value is conservative for construction worker and utility worker incidental ingestion exposure to groundwater.

g Exposures for pregnant females are not prorated. That is, exposures are assumed to occur for 24 hours per day, 7 days per week, 52 weeks per year.

Notes:
Full references can be found in Section 4.
All values outlined are taken from Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario (MECP, 2011) unless otherwise noted.
EPA = U.S. Environmental Protection Agency
L/event = litre per event
mg-soil/d = milligram soil per day
mo. = month
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
y = year

Table 4-12. Dust Inhalation Exposure Assumptions
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Units	Symbol	Infant Resident [a] (0 - 5 mo.)	Toddler Resident [a] (6 mo. - 4 y)	Child Resident [a] (5 - 11 y)	Teen Resident [a] (12 - 19 y)	Adult Resident [a] (20+ y)	Pregnant Female Resident [b] (20+ y)	Composite Resident	Outdoor Worker (Long-term)	Pregnant Female Outdoor Worker [b] (Long-term)	Utility Worker (Long-term)	Construction Worker	Pregnant Female Construction/ Utility Worker [b]	Indoor Worker (Long-term)	Pregnant Female Indoor Worker [b] (Long-term)
Concentration of PM10 in Air	$\mu g_{soil}/m^3$	PM_{10}	0.76 [c]	0.76 [c]	0.76 [c]	0.76 [c]	0.76 [c]	0.76 [c]	NA [d]	0.76 [c]	0.76 [c]	100 [e]	100 [e]	100 [e]	NA [f]	NA [f]
FPMinh: Fraction of PM10 that is deposited	unitless	FPMinh	0.6	0.6	0.6	0.6	0.6	0.6	NA [d]	0.6	0.6	0.6	0.6	0.6	NA [f]	NA [f]
IRw: Inhalation rate during exposure period	m^3/hr	IR_A	0.092 [g]	0.346 [g]	0.604 [g]	0.65 [g]	0.692 [g]	0.692 [g]	NA [d]	1.5 [h]	1.5 [h]	1.5 [h]	1.5	1.5	NA [f]	NA [f]

a. Receptor inputs used only for the assessment of the Composite Resident for carcinogens
b. Receptor inputs used only for the assessment of noncarinogenic developmental COCs (if present).
c. Based on average airborne concentration of respirable particulate matter presented in Health Canada (2012).
d. Not applicable. Composite receptor is a sum of the individual receptor ages.
e. Value of 100 is applied to represent higher PM_{10} levels that could be present at the Site; this value is consistent with a subsurface worker, as presented in the Rationale Document (MECP, 2011) and is also applied for the Female Construction/Utility Worker.
f. Not applicable. Indoor Worker dust inhalation is qualitatively assessed. Outdoor Worker exposure is considered protective of the Indoor Worker.
g. Health Canada (2012); daily rate was divided by 24 hours for hourly rate.
h. Assumed, but consistent with MECP for Construction Worker scenario.

Notes:
Full references can be found in Section 4.
All values outlined are taken from Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario (MECP, 2011) unless otherwise noted.
$\mu g/m^3$ = microgram(s) per cubic metre
$\mu g_{soil}/m^3$ = microgram(s) soil per cubic metre
m^3/hr = cubic metre(s) per hour
mo. = month
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
PM_{10} = particulate matter less than 10 µm in diameter
y = year(s)

Table 4-13. Pathway Analysis Summary

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Pathway	Receptor								Rationale
	Construction Worker	Utility Worker	Outdoor Worker	Resident	Site Visitor	Indoor Worker	Offsite Surface Receptors	Offsite Construction/ Utility Worker	
Ingestion Exposure - Soil	**Included**	**Included**	**Included**	**Included**	Qualitative	Qualitative	Excluded	Excluded	Pathway is complete for all onsite receptors. Onsite receptors may come into contact with site soils in the absence of RMMs. Offsite surface receptors and workers will be discussed in the context of the onsite receptors; site visitors will be discussed in the context of residents; and indoor workers will be discussed in the context of outdoor workers.
Dermal Contact Exposure - Soil	**Included**	**Included**	**Included**	**Included**	Qualitative	Qualitative	Excluded	Excluded	Pathway is complete for all onsite receptors. Onsite receptors may come into contact with site soils in the absence of RMMs. Offsite surface receptors and workers will be discussed in the context of the onsite receptors; site visitors will be discussed in the context of residents; and indoor workers will be discussed in the context of outdoor workers.
Ingestion Exposure - Groundwater	**Included**	**Included**	Excluded	Excluded	Excluded	Excluded	Excluded	Qualitative	Pathway is complete for certain receptors. Construction and Utility Workers (both onsite and offsite) may come into contact with groundwater while working in the subsurface. Exposure and risk to offsite receptors will be discussed in the context of the onsite results as onsite concentrations, exposure, or both are expected to be greater. Receptors at the surface (that is, Residents, Outdoor Workers, Indoor Workers, and Site Visitors) are not expected to come into contact with groundwater at the water table.
Dermal Contact Exposure - Groundwater	**Included**	**Included**	Excluded	Excluded	Excluded	Excluded	Excluded	Qualitative	Pathway is complete for certain receptors. Construction and Utility Workers (both onsite and offsite) may come into contact with groundwater while working in the subsurface. Exposure and risk to offsite receptors will be discussed in the context of the onsite results as onsite concentrations, exposure, or both are expected to be greater. Receptors at the surface (that is, Residents, Outdoor Workers, Indoor Workers, and Site Visitors) are not expected to come into contact with groundwater at the water table.
Ingestion Exposure - Groundwater as Potable Water	Excluded	Excluded	Excluded	**Included**	Qualitative	Qualitative	Qualitative	Excluded	Pathway is complete for certain receptors. Groundwater in the area is considered potable; therefore, a Resident may be exposed to groundwater as drinking water. Construction, Utility, and Outdoor Workers are not anticipated to drink potable water onsite during construction or maintenance activities. Exposure and risk to offsite receptors will be discussed in the context of the onsite results as onsite concentrations, exposure, or both are expected to be greater. Site visitors and indoor workers will be discussed in the context of residents.
Dermal Contact Exposure - Groundwater as Potable Water	Excluded	Excluded	Excluded	**Included**	Qualitative	Qualitative	Qualitative	Excluded	Pathway is complete for certain receptors. Groundwater in the area is considered potable; therefore, a Resident may be exposed to groundwater as drinking water. Construction, Utility, and Outdoor Workers are not anticipated to drink potable water onsite during construction or maintenance activities. Exposure and risk to offsite receptors will be discussed in the context of the onsite results as onsite concentrations, exposure, or both are expected to be greater. Site visitors and indoor workers will be discussed in the context of residents.
Inhalation Exposure - Indoor Air	Excluded	Excluded	Excluded	**Included**	Qualitative	**Included**	Qualitative	Excluded	Pathway is complete for future onsite buildings. Construction and Utility Workers are not anticipated to spend considerable amounts of time inside future buildings; therefore, this pathway will be assessed through the Resident and onsite Indoor Worker scenarios. The indoor air pathway is potentially complete for offsite exposures and will be discussed qualitatively. Site Visitors will be discussed in the context of the Indoor Worker and Residents' results.
Inhalation Exposure - Outdoor Air (Volatiles)	**Included**	**Included**	**Included**	**Included**	Qualitative	Qualitative	Qualitative	Qualitative	Pathway is complete. Exposure and risk to offsite surface receptors will be evaluated through the onsite receptors. Exposure and risk to offsite Construction and Utility Workers will be evaluated in the context of the onsite results. Inhalation within trenches is considered for subsurface workers.
Inhalation Exposure - Outdoor Fugitive Dust (Derived from Soil)	**Included**	**Included**	**Included**	**Included**	Qualitative	Qualitative	Qualitative	Qualitative	Pathway is complete. Exposure and risk to offsite surface receptors will be evaluated through the onsite receptors. Exposure and risk to offsite Construction and Utility Workers will be evaluated in the context of the onsite results.
Ingestion Exposure - Garden Produce	Excluded	Excluded	Excluded	Qualitative	Excluded	Excluded	Excluded	Excluded	Pathway is potentially complete, and was qualitatively assessed due to the high degree of uncertainty associated with quantifying such exposures. The provision that no gardens for the purposes of growing produce are permitted at the RA Property unless produce is grown in an aboveground container will be included in the RMP.
Dermal Contact Exposure - Vapour Skin Contact	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	While this pathway is considered complete, it is typically insignificant in comparison to other routes of exposure. Therefore, this pathway was assessed qualitatively.

Notes:

Shaded cells indicate those receptor and pathway scenarios that will be evaluated quantitatively (calculations and modelling); all other scenarios will be assessed qualitatively based on the quantitative results unless indicated otherwise (for example, pathways are excluded if they are

HHRA = Human Health Risk Assessment

Table 4-14. Relative Absorption Factors Used in the Risk Assessment

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Soil				Groundwater			
	GIAF	Reference	DAF	Reference	GIAF	Reference	DAF	Reference
Acenaphthene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Antimony	1	MECP (2011)	0.1	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Arsenic	0.5	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzene	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(a)anthracene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(a)pyrene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(b)fluoranthene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(b&j)fluoranthene [a.]	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(g,h,i)perylene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Benzo(k)fluoranthene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Cadmium	1	MECP (2011)	0.01	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Chrysene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Cobalt	1	MECP (2011)	0.01	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Copper	1	MECP (2011)	0.06	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Dibenzo(a,h)anthracene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Dichloroethane 1 1-	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Dichloroethylene 1 2-trans-	1	MECP (2011)	0.03	MECP (2011)	1	MOE (2011)	1	MECP (2011)
Dichloroethylene 1 1-	1	MECP (2011)	0.03	MECP (2011)	1	MOE (2011)	1	MECP (2011)
Dichloroethylene 1 2-cis-	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Ethylbenzene	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Fluoranthene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Hexane (n)	1	MECP (2011)	1	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Indeno(1,2,3-Cd)Pyrene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Iron	1	Assumed [b]	0.2	Assumed [c]	1	Assumed [b]	1	Assumed [b]
Lead	1	MECP (2011)	1	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Methylnaphthalene 2-(1-)	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
PHC F2	1	MECP (2011)	0.2	MECP (2011)	1	MECP (2011)	1	MECP (2011)
PHC F3	1	MECP (2011)	0.2	MECP (2011)	1	MECP (2011)	1	MECP (2011)
PHC F4	1	MECP (2011)	0.2	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Phenanthrene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
PCBs	1	MECP (2011)	0.14	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Pyrene	1	MECP (2011)	0.13	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Thallium	1	MECP (2011)	0.01	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Trichloroethylene	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Vanadium	1	MECP (2011)	0.1	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Vinyl Chloride	1	MECP (2011)	0.03	MECP (2011)	1	MECP (2011)	1	MECP (2011)
Zinc	1	MECP (2011)	0.1	MECP (2011)	1	MECP (2011)	1	MECP (2011)

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

[a.] Properties for benzo(b)fluroanthene are applied to benzo(b&j)fluoranthene.

[b.] In the absence of published relative absorption factor (RAF) values, it was assumed that absorption is the same as that in the critical study (that is, 100 percent or a RAF of 1.0), as indicated in MECP (2011).

[c.] In the absence of published dermal absorption factor (DAF) values, a default of 20% absolute dermal absorption from soil was applied for inorganics, consistent with other values for inorganic compounds presented in MECP (2011).

Notes:

DAF = dermal absorption factor

F = fraction

GIAF = gastrointestinal absorption factor

MECP = Ontario Ministry of the Environment, Conservation and Parks

PCB = polychlorinated biphenyl

PHC = petroleum hydrocarbon

Table 4-15. Predicted Dermal Exposure to Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)	Teen Resident (12 – 19 y)	Adult Resident (20+ y)	Pregnant Female adult Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor/ Construction/ Utility Worker
Parameter/Dose	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{ca} (mg/kg/day	DAD_{nc} (mg/kg/day	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{nc} (mg/kg/d)
Acenaphthene	1.E-04	1.E-05	2.E-04	2.E-04	5.E-05	5.E-05	6.E-05	7.E-05	7.E-05	7.E-05	4.E-06	4.E-06	2.E-06	7.E-05	1.E-04
Antimony	2.E-05	2.E-06	3.E-05	3.E-05	7.E-06	7.E-06	1.E-05	1.E-05	1.E-05	1.E-05	6.E-07	6.E-07	3.E-07	1.E-05	2.E-05
Arsenic	6.E-06	8.E-07	1.E-05	1.E-05	3.E-06	3.E-06	4.E-06	4.E-06	4.E-06	4.E-06	2.E-07	2.E-07	1.E-07	4.E-06	8.E-06
Benzo(a)anthracene	2.E-04	3.E-05	5.E-04	4.E-04	1.E-04	1.E-04	1.E-04	2.E-04	2.E-04	2.E-04	8.E-06	8.E-06	4.E-06	2.E-04	3.E-04
Benzo(a)pyrene	1.E-04	2.E-05	3.E-04	3.E-04	7.E-05	6.E-05	9.E-05	1.E-04	1.E-04	1.E-04	5.E-06	5.E-06	3.E-06	1.E-04	2.E-04
Benzo(b)fluoranthene	2.E-04	3.E-05	5.E-04	4.E-04	1.E-04	9.E-05	1.E-04	1.E-04	1.E-04	1.E-04	8.E-06	8.E-06	4.E-06	1.E-04	3.E-04
Benzo(g,h,i)perylene	8.E-05	1.E-05	2.E-04	1.E-04	4.E-05	4.E-05	5.E-05	5.E-05	6.E-05	6.E-05	3.E-06	3.E-06	2.E-06	6.E-05	1.E-04
Benzo(k)fluoranthene	7.E-05	1.E-05	2.E-04	1.E-04	3.E-05	3.E-05	5.E-05	5.E-05	5.E-05	5.E-05	3.E-06	3.E-06	1.E-06	5.E-05	1.E-04
Cadmium	7.E-06	9.E-07	2.E-05	1.E-05	3.E-06	3.E-06	4.E-06	5.E-06	5.E-06	5.E-06	3.E-07	3.E-07	1.E-07	5.E-06	1.E-05
Chrysene	2.E-04	3.E-05	4.E-04	4.E-04	9.E-05	9.E-05	1.E-04	1.E-04	1.E-04	1.E-04	7.E-06	7.E-06	4.E-06	1.E-04	3.E-04
Cobalt	3.E-05	4.E-06	7.E-05	6.E-05	2.E-05	2.E-05	2.E-05	2.E-05	2.E-05	2.E-05	1.E-06	1.E-06	6.E-07	2.E-05	5.E-05
Copper	1.E-03	2.E-04	3.E-03	2.E-03	6.E-04	6.E-04	8.E-04	9.E-04	9.E-04	9.E-04	5.E-05	5.E-05	2.E-05	9.E-04	2.E-03
Dibenzo(a,h)anthracene	3.E-05	4.E-06	6.E-05	5.E-05	1.E-05	1.E-05	2.E-05	2.E-05	2.E-05	2.E-05	1.E-06	1.E-06	6.E-07	2.E-05	4.E-05
Fluoranthene	7.E-04	1.E-04	2.E-03	1.E-03	3.E-04	3.E-04	5.E-04	5.E-04	5.E-04	5.E-04	3.E-05	3.E-05	1.E-05	5.E-04	1.E-03
Indeno(1,2,3-Cd)Pyrene	9.E-05	1.E-05	2.E-04	2.E-04	4.E-05	4.E-05	6.E-05	6.E-05	6.E-05	6.E-05	3.E-06	3.E-06	2.E-06	6.E-05	1.E-04
Iron	2.E-01	3.E-02	5.E-01	4.E-01	1.E-01	1.E-01	1.E-01	1.E-01	2.E-01	2.E-01	8.E-03	8.E-03	4.E-03	2.E-01	3.E-01
PCB, Total	2.E-06	2.E-07	4.E-06	3.E-06	9.E-07	9.E-07	1.E-06	1.E-06	1.E-06	1.E-06	7.E-08	7.E-08	4.E-08	1.E-06	3.E-06
Phenanthrene	9.E-04	1.E-04	2.E-03	2.E-03	4.E-04	4.E-04	6.E-04	6.E-04	7.E-04	7.E-04	3.E-05	3.E-05	2.E-05	7.E-04	1.E-03
Pyrene	5.E-04	7.E-05	1.E-03	9.E-04	2.E-04	2.E-04	3.E-04	4.E-04	4.E-04	4.E-04	2.E-05	2.E-05	1.E-05	4.E-04	7.E-04
Thallium	5.E-07	7.E-08	1.E-06	9.E-07	2.E-07	2.E-07	3.E-07	4.E-07	4.E-07	4.E-07	2.E-08	2.E-08	1.E-08	4.E-07	7.E-07
Trichloroethylene	9.E-06	1.E-06	2.E-05	2.E-05	4.E-06	4.E-06	6.E-06	6.E-06	6.E-06	6.E-06	3.E-07	3.E-07	2.E-07	6.E-06	1.E-05
Vanadium	8.E-05	1.E-05	2.E-04	2.E-04	4.E-05	4.E-05	5.E-05	6.E-05	6.E-05	6.E-05	3.E-06	3.E-06	2.E-06	6.E-05	1.E-04
Zinc	6.E-02	7.E-03	1.E-01	1.E-01	3.E-02	3.E-02	4.E-02	4.E-02	4.E-02	4.E-02	2.E-03	2.E-03	1.E-03	4.E-02	8.E-02
B(a)PE	--	3.E-05	--	--	--	--	--	2.E-04	2.E-04	--	1.E-05	--	5.E-06	--	--
PHC F2	6.E-03	8.E-04	1.E-02	1.E-02	3.E-03	3.E-03	4.E-03	4.E-03	4.E-03	4.E-03	2.E-04	2.E-04	1.E-04	4.E-03	8.E-03
PHC F3	4.E-02	5.E-03	9.E-02	7.E-02	2.E-02	2.E-02	2.E-02	3.E-02	3.E-02	3.E-02	1.E-03	1.E-03	7.E-04	3.E-02	5.E-02
PHC F4	1.E-02	2.E-03	3.E-02	2.E-02	6.E-03	6.E-03	8.E-03	9.E-03	9.E-03	9.E-03	5.E-04	5.E-04	2.E-04	9.E-03	2.E-02

Notes:

-- = not applicable

B(a)PE = benzo(a)pyrene equivalent

DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects

DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects

F = fraction

mg/kg/d = milligram per kilogram per day

mo = month

PCB = polychlorinated biphenyl

PHC = petroleum hydrocarbon

y = year

Table 4-16a. Predicted Dermal Exposure to Potable Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)		Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)		Teen Resident (12-19y)		Adult Resident (20+ y)		Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)
1,1-Dichloroethane	9.E-07	1.E-04	6.E-06	1.E-04	1.E-05	1.E-04	1.E-05	9.E-05	5.E-05	7.E-05	8.E-05	8.E-05
1,1-Dichloroethene	3.E-06	5.E-04	2.E-05	4.E-04	4.E-05	4.E-04	4.E-05	3.E-04	2.E-04	3.E-04	3.E-04	3.E-04
2-(1-)Methylnaphthalene	2.E-04	2.E-02	1.E-03	2.E-02	2.E-03	2.E-02	2.E-03	2.E-02	9.E-03	1.E-02	1.E-02	1.E-02
Acenaphthene	2.E-05	4.E-03	2.E-04	3.E-03	3.E-04	3.E-03	2.E-04	2.E-03	1.E-03	2.E-03	2.E-03	2.E-03
Arsenic	8.E-08	1.E-05	4.E-07	8.E-06	1.E-06	1.E-05	9.E-07	9.E-06	4.E-06	5.E-06	6.E-06	6.E-06
Benzene	4.E-06	6.E-04	3.E-05	5.E-04	4.E-05	5.E-04	4.E-05	4.E-04	2.E-04	3.E-04	3.E-04	3.E-04
Benzo(a)anthracene	1.E-04	2.E-02	8.E-04	1.E-02	1.E-03	1.E-02	1.E-03	1.E-02	7.E-03	9.E-03	1.E-02	1.E-02
Benzo(a)pyrene	2.E-05	3.E-03	1.E-04	2.E-03	2.E-04	2.E-03	2.E-04	2.E-03	1.E-03	2.E-03	2.E-03	2.E-03
Benzo(b&j)fluoranthene	4.E-05	7.E-03	3.E-04	5.E-03	5.E-04	5.E-03	5.E-04	4.E-03	2.E-03	3.E-03	4.E-03	4.E-03
Benzo(k)fluoranthene	7.E-05	1.E-02	5.E-04	8.E-03	8.E-04	9.E-03	8.E-04	7.E-03	4.E-03	5.E-03	6.E-03	6.E-03
Chrysene	2.E-04	4.E-02	2.E-03	3.E-02	3.E-03	3.E-02	3.E-03	2.E-02	1.E-02	2.E-02	2.E-02	2.E-02
cis-1,2-Dichloroethene	5.E-05	7.E-03	3.E-04	5.E-03	5.E-04	6.E-03	5.E-04	5.E-03	3.E-03	3.E-03	4.E-03	4.E-03
Ethylbenzene	2.E-06	3.E-04	1.E-05	2.E-04	2.E-05	2.E-04	2.E-05	2.E-04	1.E-04	2.E-04	2.E-04	2.E-04
Fluoranthene	7.E-05	1.E-02	4.E-04	7.E-03	7.E-04	8.E-03	7.E-04	7.E-03	4.E-03	5.E-03	5.E-03	6.E-03
n-Hexane	6.E-06	1.E-03	4.E-05	7.E-04	7.E-05	8.E-04	7.E-05	6.E-04	4.E-04	5.E-04	5.E-04	5.E-04
Phenanthrene	1.E-04	2.E-02	8.E-04	1.E-02	1.E-03	1.E-02	1.E-03	1.E-02	7.E-03	9.E-03	1.E-02	1.E-02
Pyrene	1.E-04	2.E-02	7.E-04	1.E-02	1.E-03	1.E-02	1.E-03	1.E-02	6.E-03	8.E-03	9.E-03	9.E-03
trans-1,2-Dichloroethene	4.E-06	6.E-04	3.E-05	5.E-04	4.E-05	5.E-04	4.E-05	4.E-04	2.E-04	3.E-04	3.E-04	3.E-04
Trichloroethylene	5.E-04	8.E-02	3.E-03	6.E-02	6.E-03	6.E-02	6.E-03	5.E-02	3.E-02	4.E-02	4.E-02	4.E-02
Zinc	5.E-06	7.E-04	3.E-05	5.E-04	6.E-05	6.E-04	6.E-05	5.E-04	2.E-04	3.E-04	3.E-04	4.E-04
Vinyl Chloride	3.E-05	4.E-03	2.E-04	3.E-03	3.E-04	3.E-03	3.E-04	3.E-03	1.E-03	2.E-03	2.E-03	2.E-03
B(a)PE	8.E-05	--	5.E-04	--	8.E-04	--	8.E-04	--	4.E-03	--	--	6.E-03
PHC F2	1.E-01	2.E+01	7.E-01	1.E+01	1.E+00	1.E+01	1.E+00	1.E+01	6.E+00	8.E+00	9.E+00	9.E+00
PHC F3	7.E-01	1.E+02	4.E+00	7.E+01	7.E+00	8.E+01	7.E+00	7.E+01	4.E+01	5.E+01	6.E+01	6.E+01
PHC F4	1.E-05	2.E-03	7.E-05	1.E-03	1.E-04	1.E-03	1.E-04	1.E-03	6.E-04	8.E-04	9.E-04	9.E-04

Notes:
DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects
DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects
F = fraction
mg/kg/d = milligram per kilogram per day
PHC = petroleum hydrocarbon
B(a)PE = benzo(a)pyrene equivalent

Table 4-16b. Predicted Dermal Exposure to Groundwater (Subsurface Workers)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker	
Parameter/Dose	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day	DAD_{nc} (mg/kg/day)
1,1-Dichloroethane	2.E-07	2.E-07	8.E-08	3.E-06	--	6.E-06
1,1-Dichloroethene	6.E-07	6.E-07	3.E-07	1.E-05	--	2.E-05
2-(1-)Methylnaphthalene	3.E-05	3.E-05	1.E-05	5.E-04	--	1.E-03
Acenaphthene	4.E-06	4.E-06	2.E-06	7.E-05	--	1.E-04
Arsenic	6.E-09	6.E-09	3.E-09	1.E-07	--	2.E-07
Benzene	7.E-07	7.E-07	4.E-07	1.E-05	--	3.E-05
Benzo(a)anthracene	2.E-05	2.E-05	1.E-05	4.E-04	--	8.E-04
Benzo(a)pyrene	3.E-06	3.E-06	2.E-06	7.E-05	--	1.E-04
Benzo(b&j)fluoranthene	7.E-06	7.E-06	4.E-06	1.E-04	--	3.E-04
Benzo(k)fluoranthene	1.E-05	1.E-05	6.E-06	2.E-04	--	4.E-04
Chrysene	4.E-05	4.E-05	2.E-05	8.E-04	--	1.E-03
cis-1,2-Dichloroethene	8.E-06	8.E-06	4.E-06	2.E-04	--	3.E-04
Ethylbenzene	3.E-07	3.E-07	2.E-07	7.E-06	--	1.E-05
Fluoranthene	1.E-05	1.E-05	6.E-06	2.E-04	--	4.E-04
n-Hexane	1.E-06	1.E-06	6.E-07	2.E-05	--	4.E-05
Phenanthrene	2.E-05	2.E-05	1.E-05	4.E-04	--	8.E-04
Pyrene	2.E-05	2.E-05	9.E-06	3.E-04	--	7.E-04
trans-1,2-Dichloroethene	7.E-07	7.E-07	4.E-07	1.E-05	--	3.E-05
Trichloroethylene	9.E-05	9.E-05	5.E-05	2.E-03	--	3.E-03
Zinc	4.E-07	4.E-07	2.E-07	7.E-06	--	1.E-05
Vinyl Chloride	4.E-06	4.E-06	2.E-06	8.E-05	--	2.E-04
B(a)PE	1.E-05	--	7.E-06	--	--	--
PHC F2	2.E-02	2.E-02	1.E-02	4.E-01	--	7.E-01
PHC F3	1.E-01	1.E-01	6.E-02	2.E+00	--	4.E+00
PHC F4	2.E-06	2.E-06	9.E-07	3.E-05	--	7.E-05

Notes:
DAD_{ca} = Daily Absorbed Do

DAD_{nc} = Daily Absorbed Do
F = fraction
mg/kg/d = milligram per kilogram per day
PHC = petroleum hydrocarbon
B(a)PE = benzo(a)pyrene equivalent

Table 4-17. Predicted Ingestion Exposure from Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)		Child Resident (5 – 11 y)	Teen Resident (12 – 19 y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor/Construction/ Utility Worker
Parameter/Dose	DAD_{ca} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day	DAD_{ca} (mg/kg/day	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day	DAD_{ca} (mg/kg/da	DAD_{nc} (mg/kg/da	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{nc} (mg/kg/d)
Acenaphthene	2.E-06	6.E-05	1.E-03	1.E-05	7.E-06	4.E-05	9.E-05	1.E-04	8.E-05	8.E-05	4.E-06	4.E-06	2.E-06	8.E-05	2.E-04
Antimony	4.E-07	1.E-05	2.E-04	2.E-06	1.E-06	9.E-06	2.E-05	2.E-05	2.E-05	2.E-05	9.E-07	9.E-07	4.E-07	2.E-05	3.E-05
Arsenic	2.E-07	7.E-06	1.E-04	1.E-06	9.E-07	5.E-06	1.E-05	2.E-05	1.E-05	1.E-05	5.E-07	5.E-07	3.E-07	1.E-05	2.E-05
Benzo(a)anthracene	4.E-06	1.E-04	2.E-03	3.E-05	2.E-05	9.E-05	2.E-04	3.E-04	2.E-04	2.E-04	9.E-06	9.E-06	5.E-06	2.E-04	4.E-04
Benzo(a)pyrene	3.E-06	8.E-05	1.E-03	2.E-05	1.E-05	6.E-05	1.E-04	2.E-04	1.E-04	1.E-04	6.E-06	6.E-06	3.E-06	1.E-04	2.E-04
Benzo(b)fluoranthene	4.E-06	1.E-04	2.E-03	2.E-05	1.E-05	9.E-05	2.E-04	2.E-04	2.E-04	2.E-04	9.E-06	9.E-06	4.E-06	2.E-04	3.E-04
Benzo(g,h,i)perylene	2.E-06	5.E-05	8.E-04	9.E-06	6.E-06	3.E-05	7.E-05	9.E-05	6.E-05	6.E-05	3.E-06	3.E-06	2.E-06	6.E-05	1.E-04
Benzo(k)fluoranthene	1.E-06	4.E-05	7.E-04	8.E-06	5.E-06	3.E-05	6.E-05	9.E-05	6.E-05	6.E-05	3.E-06	3.E-06	2.E-06	6.E-05	1.E-04
Cadmium	2.E-06	5.E-05	9.E-04	1.E-05	7.E-06	4.E-05	8.E-05	1.E-04	8.E-05	8.E-05	4.E-06	4.E-06	2.E-06	8.E-05	2.E-04
Chrysene	4.E-06	1.E-04	2.E-03	2.E-05	1.E-05	8.E-05	2.E-04	2.E-04	2.E-04	2.E-04	8.E-06	8.E-06	4.E-06	2.E-04	3.E-04
Cobalt	8.E-06	3.E-04	4.E-03	5.E-05	3.E-05	2.E-04	4.E-04	5.E-04	4.E-04	4.E-04	2.E-05	2.E-05	1.E-05	4.E-04	7.E-04
Copper	5.E-05	2.E-03	3.E-02	3.E-04	2.E-04	1.E-03	2.E-03	3.E-03	2.E-03	2.E-03	1.E-04	1.E-04	6.E-05	2.E-03	5.E-03
Dibenzo(a,h)anthracene	6.E-07	2.E-05	3.E-04	3.E-06	2.E-06	1.E-05	2.E-05	3.E-05	2.E-05	2.E-05	1.E-06	1.E-06	6.E-07	2.E-05	5.E-05
Fluoranthene	1.E-05	4.E-04	7.E-03	8.E-05	5.E-05	3.E-04	6.E-04	9.E-04	6.E-04	6.E-04	3.E-05	3.E-05	2.E-05	6.E-04	1.E-03
Indeno(1,2,3-Cd)Pyrene	2.E-06	5.E-05	9.E-04	1.E-05	6.E-06	4.E-05	8.E-05	1.E-04	7.E-05	7.E-05	4.E-06	4.E-06	2.E-06	7.E-05	2.E-04
Iron	3.E-03	8.E-02	1.E+00	2.E-02	1.E-02	6.E-02	1.E-01	2.E-01	1.E-01	1.E-01	6.E-03	6.E-03	3.E-03	1.E-01	2.E-01
PCB, Total	3.E-08	1.E-06	2.E-05	2.E-07	1.E-07	7.E-07	2.E-06	2.E-06	1.E-06	1.E-06	7.E-08	7.E-08	4.E-08	1.E-06	3.E-06
Phenanthrene	2.E-05	5.E-04	9.E-03	1.E-04	7.E-05	4.E-04	8.E-04	1.E-03	8.E-04	8.E-04	4.E-05	4.E-05	2.E-05	8.E-04	2.E-03
Pyrene	1.E-05	3.E-04	5.E-03	6.E-05	4.E-05	2.E-04	4.E-04	6.E-04	4.E-04	4.E-04	2.E-05	2.E-05	1.E-05	4.E-04	9.E-04
Thallium	1.E-07	4.E-06	7.E-05	8.E-07	5.E-07	3.E-06	6.E-06	8.E-06	5.E-06	5.E-06	3.E-07	3.E-07	1.E-07	5.E-06	1.E-05
Trichloroethylene	8.E-07	2.E-05	4.E-04	4.E-06	3.E-06	2.E-05	3.E-05	5.E-05	3.E-05	3.E-05	2.E-06	2.E-06	9.E-07	3.E-05	7.E-05
Vanadium	2.E-06	6.E-05	1.E-03	1.E-05	8.E-06	5.E-05	9.E-05	1.E-04	9.E-05	9.E-05	5.E-06	5.E-06	2.E-06	9.E-05	2.E-04
Zinc	1.E-03	4.E-02	7.E-01	8.E-03	5.E-03	3.E-02	6.E-02	9.E-02	6.E-02	6.E-02	3.E-03	3.E-03	2.E-03	6.E-02	1.E-01
B(a)PE	5.E-06	2.E-04	--	3.E-05	2.E-05	1.E-04	--	3.E-04	2.E-04	--	1.E-05	--	6.E-06	--	--
PHC F2	8.E-05	2.E-03	4.E-02	5.E-04	3.E-04	2.E-03	3.E-03	5.E-03	3.E-03	3.E-03	2.E-04	2.E-04	9.E-05	3.E-03	7.E-03
PHC F3	5.E-04	1.E-02	2.E-01	3.E-03	2.E-03	1.E-02	2.E-02	3.E-02	2.E-02	2.E-02	1.E-03	1.E-03	5.E-04	2.E-02	4.E-02
PHC F4	2.E-04	5.E-03	8.E-02	9.E-04	6.E-04	3.E-03	7.E-03	1.E-02	7.E-03	7.E-03	3.E-04	3.E-04	2.E-04	7.E-03	1.E-02

Notes:

-- = not applicable

B(a)PE = benzo(a)pyrene equivalent

DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects

DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects

F = fraction

mg/kg/d = milligram per kilogram per day

mo = month

PCB = polychlorinated biphenyl

PHC = petroleum hydrocarbon

y = year

Table 4-18a. Predicted Ingestion Exposure from Potable Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)		Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)		Teen Resident (12-19y)		Adult Resident (20+ y)		Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day
1,1-Dichloroethane	2.E-05	2.E-03	1.E-04	2.E-03	1.E-04	1.E-03	1.E-04	1.E-03	8.E-04	1.E-03	1.E-03	1.E-03
1,1-Dichloroethene	5.E-05	7.E-03	4.E-04	7.E-03	3.E-04	4.E-03	3.E-04	3.E-03	2.E-03	3.E-03	3.E-03	3.E-03
2-(1-)Methylnaphthalene	2.E-04	3.E-02	2.E-03	3.E-02	1.E-03	2.E-02	1.E-03	1.E-02	1.E-02	1.E-02	1.E-02	1.E-02
Acenaphthene	3.E-05	4.E-03	3.E-04	4.E-03	2.E-04	2.E-03	2.E-04	2.E-03	1.E-03	2.E-03	2.E-03	2.E-03
Arsenic	3.E-05	5.E-03	3.E-04	5.E-03	2.E-04	3.E-03	2.E-04	2.E-03	2.E-03	2.E-03	2.E-03	2.E-03
Benzene	5.E-05	7.E-03	4.E-04	7.E-03	4.E-04	4.E-03	3.E-04	3.E-03	2.E-03	3.E-03	3.E-03	4.E-03
Benzo(a)anthracene	2.E-05	2.E-03	1.E-04	2.E-03	1.E-04	1.E-03	9.E-05	9.E-04	7.E-04	1.E-03	1.E-03	1.E-03
Benzo(a)pyrene	2.E-06	3.E-04	2.E-05	3.E-04	1.E-05	1.E-04	1.E-05	1.E-04	8.E-05	1.E-04	1.E-04	1.E-04
Benzo(b&j)fluoranthene	6.E-06	9.E-04	5.E-05	9.E-04	5.E-05	5.E-04	4.E-05	4.E-04	3.E-04	4.E-04	4.E-04	4.E-04
Benzo(k)fluoranthene	6.E-06	9.E-04	5.E-05	9.E-04	5.E-05	5.E-04	4.E-05	4.E-04	3.E-04	4.E-04	4.E-04	4.E-04
Chrysene	3.E-05	4.E-03	2.E-04	4.E-03	2.E-04	2.E-03	2.E-04	2.E-03	1.E-03	2.E-03	2.E-03	2.E-03
cis-1,2-Dichloroethene	7.E-04	1.E-01	6.E-03	1.E-01	5.E-03	5.E-02	4.E-03	4.E-02	3.E-02	4.E-02	5.E-02	5.E-02
Ethylbenzene	6.E-06	9.E-04	5.E-05	9.E-04	5.E-05	5.E-04	4.E-05	4.E-04	3.E-04	4.E-04	4.E-04	4.E-04
Fluoranthene	2.E-05	3.E-03	2.E-04	3.E-03	1.E-04	1.E-03	1.E-04	1.E-03	8.E-04	1.E-03	1.E-03	1.E-03
n-Hexane	5.E-06	8.E-04	5.E-05	8.E-04	4.E-05	4.E-04	3.E-05	3.E-04	3.E-04	4.E-04	4.E-04	4.E-04
Phenanthrene	8.E-05	1.E-02	7.E-04	1.E-02	6.E-04	6.E-03	5.E-04	5.E-03	4.E-03	5.E-03	6.E-03	6.E-03
Pyrene	4.E-05	6.E-03	4.E-04	6.E-03	3.E-04	3.E-03	3.E-04	2.E-03	2.E-03	3.E-03	3.E-03	3.E-03
trans-1,2-Dichloroethene	6.E-05	9.E-03	5.E-04	9.E-03	4.E-04	5.E-03	4.E-04	3.E-03	3.E-03	4.E-03	4.E-03	4.E-03
Trichloroethylene	6.E-03	9.E-01	5.E-02	9.E-01	4.E-02	5.E-01	4.E-02	3.E-01	3.E-01	4.E-01	4.E-01	4.E-01
Zinc	3.E-03	5.E-01	3.E-02	5.E-01	2.E-02	3.E-01	2.E-02	2.E-01	2.E-01	2.E-01	2.E-01	2.E-01
Vinyl Chloride	6.E-04	9.E-02	5.E-03	9.E-02	4.E-03	5.E-02	4.E-03	4.E-02	3.E-02	4.E-02	4.E-02	4.E-02
B(a)PE	6.E-06	--	6.E-05	--	5.E-05	--	4.E-05	--	3.E-04	--	--	5.E-04
PHC F2	2.E-01	2.E+01	1.E+00	2.E+01	1.E+00	1.E+01	9.E-01	9.E+00	7.E+00	1.E+01	1.E+01	1.E+01
PHC F3	6.E-01	9.E+01	5.E+00	9.E+01	5.E+00	5.E+01	4.E+00	4.E+01	3.E+01	4.E+01	4.E+01	4.E+01
PHC F4	3.E-02	4.E+00	2.E-01	4.E+00	2.E-01	2.E+00	2.E-01	2.E+00	1.E+00	2.E+00	2.E+00	2.E+00

Notes:
DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects
DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects
F = fraction
mg/kg/d = milligram per kilogram per day
PHC = petroleum hydrocarbon
B(a)PE = benzo(a)pyrene equivalent

Table 4-18b. Predicted Incidental Ingestion Exposure from Groundwater (Subsurface Workers)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker
Parameter/Dose	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{ca} (mg/kg/day)	DAD_{nc} (mg/kg/day)	DAD_{nc} (mg/kg/day)
1,1-Dichloroethane	7.E-07	7.E-07	4.E-07	1.E-05	3.E-05
1,1-Dichloroethene	1.E-06	1.E-06	8.E-07	3.E-05	6.E-05
2-(1-)Methylnaphthalene	6.E-06	6.E-06	3.E-06	1.E-04	3.E-04
Acenaphthene	9.E-07	9.E-07	5.E-07	2.E-05	4.E-05
Arsenic	1.E-06	1.E-06	5.E-07	2.E-05	4.E-05
Benzene	2.E-06	2.E-06	8.E-07	3.E-05	6.E-05
Benzo(a)anthracene	5.E-07	5.E-07	3.E-07	9.E-06	2.E-05
Benzo(a)pyrene	5.E-08	5.E-08	3.E-08	1.E-06	2.E-06
Benzo(b&j)fluoranthene	2.E-07	2.E-07	1.E-07	4.E-06	8.E-06
Benzo(k)fluoranthene	2.E-07	2.E-07	1.E-07	4.E-06	8.E-06
Chrysene	9.E-07	9.E-07	5.E-07	2.E-05	4.E-05
cis-1,2-Dichloroethene	2.E-05	2.E-05	1.E-05	4.E-04	9.E-04
Ethylbenzene	2.E-07	2.E-07	1.E-07	4.E-06	8.E-06
Fluoranthene	5.E-07	5.E-07	3.E-07	1.E-05	2.E-05
n-Hexane	2.E-07	2.E-07	9.E-08	3.E-06	7.E-06
Phenanthrene	3.E-06	3.E-06	1.E-06	5.E-05	1.E-04
Pyrene	1.E-06	1.E-06	7.E-07	3.E-05	6.E-05
trans-1,2-Dichloroethene	2.E-06	2.E-06	1.E-06	4.E-05	8.E-05
Trichloroethylene	2.E-04	2.E-04	1.E-04	4.E-03	7.E-03
Zinc	1.E-04	1.E-04	5.E-05	2.E-03	4.E-03
Vinyl Chloride	2.E-05	2.E-05	1.E-05	4.E-04	8.E-04
B(a)PE	2.E-07	--	1.E-07	--	--
PHC F2	5.E-03	5.E-03	3.E-03	9.E-02	2.E-01
PHC F3	2.E-02	2.E-02	1.E-02	4.E-01	8.E-01
PHC F4	9.E-04	9.E-04	4.E-04	2.E-02	3.E-02

Notes:

DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects
DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects
F = fraction
mg/kg/d = milligram per kilogram per day
PHC = petroleum hydrocarbon
B(a)PE = benzo(a)pyrene equivalent

Table 4-19. Predicted Inhalation Exposure from Fugitive Dust Derived from Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)		Child Resident (5 – 11 y)	Teen Resident (12 – 19 y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor Worker	Pregnant Female Construction/ Utility Worker
Parameter/Dose	DAD_{ca} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{nc} (mg/kg/d)	DAD_{ca} (mg/kg/d)	DAD_{ca} (mg/kg/d	DAD_{nc} (mg/kg/d	DAD_{ca} (mg/kg/d	DAD_{nc} (mg/kg/d	DAD_{ca} (mg/kg/d	DAD_{nc} (mg/kg/d	DAD_{nc} (mg/kg/d)	DAD_{nc} (mg/kg/d)
Acenaphthene	6.E-12	9.E-11	2.E-09	3.E-10	2.E-10	5.E-10	1.E-08	1.E-09	6.E-09	6.E-09	4.E-08	4.E-08	2.E-08	7.E-07	3.E-08	4.E-06
Antimony	1.E-12	2.E-11	3.E-10	5.E-11	3.E-11	1.E-10	3.E-09	2.E-10	1.E-09	1.E-09	8.E-09	8.E-09	4.E-09	1.E-07	6.E-09	8.E-07
Arsenic	1.E-12	2.E-11	4.E-10	6.E-11	4.E-11	1.E-10	3.E-09	3.E-10	1.E-09	1.E-09	9.E-09	9.E-09	5.E-09	2.E-07	7.E-09	9.E-07
Benzo(a)anthracene	1.E-11	2.E-10	3.E-09	6.E-10	4.E-10	1.E-09	3.E-08	2.E-09	1.E-08	1.E-08	8.E-08	8.E-08	4.E-08	2.E-06	6.E-08	8.E-06
Benzo(a)pyrene	8.E-12	1.E-10	2.E-09	3.E-10	2.E-10	7.E-10	2.E-08	1.E-09	8.E-09	8.E-09	5.E-08	5.E-08	3.E-08	1.E-06	4.E-08	5.E-06
Benzo(b)fluoranthene	1.E-11	2.E-10	3.E-09	5.E-10	3.E-10	1.E-09	3.E-08	2.E-09	1.E-08	1.E-08	8.E-08	8.E-08	4.E-08	1.E-06	6.E-08	8.E-06
Benzo(g,h,i)perylene	4.E-12	7.E-11	1.E-09	2.E-10	1.E-10	4.E-10	1.E-08	8.E-10	4.E-09	4.E-09	3.E-08	3.E-08	1.E-08	6.E-07	2.E-08	3.E-06
Benzo(k)fluoranthene	4.E-12	7.E-11	1.E-09	2.E-10	1.E-10	4.E-10	9.E-09	8.E-10	4.E-09	4.E-09	3.E-08	3.E-08	1.E-08	5.E-07	2.E-08	3.E-06
Cadmium	5.E-12	8.E-11	1.E-09	2.E-10	2.E-10	5.E-10	1.E-08	1.E-09	5.E-09	5.E-09	3.E-08	3.E-08	2.E-08	7.E-07	3.E-08	3.E-06
Chrysene	1.E-11	2.E-10	3.E-09	5.E-10	3.E-10	1.E-09	3.E-08	2.E-09	1.E-08	1.E-08	7.E-08	7.E-08	4.E-08	1.E-06	5.E-08	7.E-06
Cobalt	2.E-11	4.E-10	7.E-09	1.E-09	7.E-10	2.E-09	6.E-08	5.E-09	2.E-08	2.E-08	2.E-07	2.E-07	8.E-08	3.E-06	1.E-07	2.E-05
Copper	1.E-10	2.E-09	4.E-08	7.E-09	5.E-09	1.E-08	3.E-07	3.E-08	1.E-07	1.E-07	1.E-06	1.E-06	5.E-07	2.E-05	8.E-07	1.E-04
Dibenzo(a,h)anthracene	2.E-12	3.E-11	4.E-10	7.E-11	5.E-11	2.E-10	4.E-09	3.E-10	2.E-09	2.E-09	1.E-08	1.E-08	6.E-09	2.E-07	8.E-09	1.E-06
Fluoranthene	4.E-11	7.E-10	1.E-08	2.E-09	1.E-09	4.E-09	9.E-08	8.E-09	4.E-08	4.E-08	3.E-07	3.E-07	1.E-07	5.E-06	2.E-07	3.E-05
Indeno(1,2,3-Cd)Pyrene	5.E-12	8.E-11	1.E-09	2.E-10	2.E-10	5.E-10	1.E-08	9.E-10	5.E-09	5.E-09	3.E-08	3.E-08	2.E-08	6.E-07	2.E-08	3.E-06
Iron	8.E-09	1.E-07	2.E-06	3.E-07	2.E-07	7.E-07	2.E-05	1.E-06	8.E-06	8.E-06	5.E-05	5.E-05	3.E-05	1.E-03	4.E-05	5.E-03
PCB, Total	1.E-13	2.E-12	3.E-11	4.E-12	3.E-12	9.E-12	2.E-10	2.E-11	1.E-10	1.E-10	6.E-10	6.E-10	3.E-10	1.E-08	5.E-10	6.E-08
Phenanthrene	5.E-11	8.E-10	1.E-08	2.E-09	2.E-09	5.E-09	1.E-07	1.E-08	5.E-08	5.E-08	3.E-07	3.E-07	2.E-07	7.E-06	3.E-07	3.E-05
Pyrene	3.E-11	5.E-10	8.E-09	1.E-09	9.E-10	3.E-09	7.E-08	5.E-09	3.E-08	3.E-08	2.E-07	2.E-07	1.E-07	4.E-06	1.E-07	2.E-05
Thallium	4.E-13	6.E-12	1.E-10	2.E-11	1.E-11	4.E-11	9.E-10	7.E-11	4.E-10	4.E-10	2.E-09	2.E-09	1.E-09	5.E-08	2.E-09	2.E-07
Trichloroethylene	2.E-12	4.E-11	6.E-10	1.E-10	7.E-11	2.E-10	5.E-09	4.E-10	2.E-09	2.E-09	1.E-08	1.E-08	7.E-09	3.E-07	1.E-08	1.E-06
Vanadium	6.E-12	1.E-10	2.E-09	3.E-10	2.E-10	6.E-10	1.E-08	1.E-09	6.E-09	6.E-09	4.E-08	4.E-08	2.E-08	8.E-07	3.E-08	4.E-06
Zinc	4.E-09	7.E-08	1.E-06	2.E-07	1.E-07	4.E-07	1.E-05	8.E-07	4.E-06	4.E-06	3.E-05	3.E-05	1.E-05	5.E-04	2.E-05	3.E-03
B(a)PE	1.E-11	2.E-10	4.E-09	7.E-10	4.E-10	1.E-09	3.E-08	3.E-09	1.E-08	1.E-08	1.E-07	1.E-07	5.E-08	2.E-06	7.E-08	1.E-05
PHC F2	2.E-10	4.E-09	6.E-08	1.E-08	7.E-09	2.E-08	5.E-07	4.E-08	2.E-07	2.E-07	1.E-06	1.E-06	8.E-07	3.E-05	1.E-06	1.E-04
PHC F3	1.E-09	2.E-08	4.E-07	6.E-08	4.E-08	1.E-07	3.E-06	3.E-07	1.E-06	1.E-06	9.E-06	9.E-06	5.E-06	2.E-04	7.E-06	9.E-04
PHC F4	4.E-10	7.E-09	1.E-07	2.E-08	1.E-08	4.E-08	1.E-06	8.E-08	4.E-07	4.E-07	3.E-06	3.E-06	2.E-06	6.E-05	2.E-06	3.E-04

Notes:

B(a)PE = benzo(a)pyrene equivalent

DAD_{ca} = Daily Absorbed Dose for Carcinogenic Effects

DAD_{nc} = Daily Absorbed Dose for Noncarcinogenic Effects

F = fraction

mg/kg/d = milligram per kilogram per day

mo = month

PCB = polychlorinated biphenyl

PHC = petroleum hydrocarbon

y = year

Table 4-20. Predicted Indoor Air Volatile Concentrations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Media	Predicted Indoor Air Concentration (mg/m^3)	
		General Commercial Building	Generic Residential Building
Acenaphthene	Soil	3.08E-03	1.43E-02
Acenaphthylene	Soil	3.94E-05	1.82E-04
Anthracene	Soil	4.13E-04	1.90E-03
Benzene	Soil	1.62E-02	7.55E-02
Benzo(a)anthracene	Soil	8.08E-06	3.75E-05
Ethylbenzene	Soil	1.04E-01	4.86E-01
Fluorene	Soil	1.41E-03	6.50E-03
Mercury	Soil	6.24E-06	2.87E-05
Methylnaphthalenes, 2-(1-)	Soil	1.11E-03	5.16E-03
Naphthalene	Soil	7.34E-02	3.42E-01
Phenanthrene	Soil	1.67E-03	7.69E-03
Trichloroethylene	Soil	8.52E+00	3.98E+01
Xylenes, total	Soil	9.50E-02	4.43E-01
PHC F2			
Aliphatic C>10-C12	Soil	2.24E+01	1.04E+02
Aliphatic C>12-C16	Soil	5.60E+00	2.60E+01
Aromatic C>10-C12	Soil	6.55E-01	3.04E+00
Aromatic C>12-C16	Soil	1.43E-01	6.62E-01
Acenaphthene	Groundwater	5.77E-04	2.88E-03
Anthracene	Groundwater	1.19E-04	5.96E-04
Benzene	Groundwater	4.69E-02	2.34E-01
Benzo(a)anthracene	Groundwater	1.33E-05	6.65E-05
Dichloroethane, 1,1-	Groundwater	2.16E-02	1.08E-01
Dichloroethene, 1,1-	Groundwater	2.32E-01	1.16E+00
Dichloroethene, 1,2-cis-	Groundwater	4.83E-01	2.42E+00
Dichloroethene, 1,2-trans-	Groundwater	1.00E-01	5.01E-01
n-Hexane	Groundwater	1.73E+00	8.66E+00
Methylnaphthalenes, 2-(1-)	Groundwater	1.28E-02	6.39E-02
Naphthalene	Groundwater	1.12E-03	5.61E-03
Phenanthrene	Groundwater	3.24E-04	1.62E-03
Tetrachloroethene	Groundwater	2.23E-03	1.12E-02
Trichloroethane, 1,1,1-	Groundwater	8.09E-02	4.05E-01
Trichloroethylene	Groundwater	9.53E+00	4.77E+01
Vinyl Chloride	Groundwater	3.50E+00	1.75E+01
PHC F1			
Aliphatic C6-C8	Groundwater	5.13E+01	2.56E+02
Aliphatic C>8-C10	Groundwater	7.61E+00	3.81E+01
Aromatic C>8-C10	Groundwater	2.41E-01	1.20E+00
PHC F2			
Aliphatic C>10-C12	Groundwater	1.50E+03	7.51E+03
Aliphatic C>12-C16	Groundwater	5.09E+02	2.54E+03
Aromatic C>10-C12	Groundwater	4.41E+01	2.20E+02
Aromatic C>12-C16	Groundwater	9.62E+00	4.81E+01

Notes:

F = fraction

mg/m^3 = milligrams per cubic metre

PHC = petroleum hydrocarbon

Table 4-21a. Predicted Exposure from Inhalation of Vapours in Indoor Air from Soil (Generic Commercial Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Indoor Worker		Pregnant Female Indoor Worker
Parameter/Dose	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{nc} (mg/m^3)
Acenaphthene	9.E-04	9.E-04	3.E-03
Acenaphthylene	1.E-05	1.E-05	4.E-05
Anthracene	1.E-04	1.E-04	4.E-04
Benzene	5.E-03	5.E-03	2.E-02
Benzo(a)anthracene	2.E-06	2.E-06	8.E-06
Ethylbenzene	3.E-02	3.E-02	1.E-01
Fluorene	4.E-04	4.E-04	1.E-03
Mercury	2.E-06	2.E-06	6.E-06
2-(1-)Methylnaphthalene	3.E-04	3.E-04	1.E-03
Naphthalene	2.E-02	2.E-02	7.E-02
Phenanthrene	5.E-04	5.E-04	2.E-03
Trichloroethylene	2.E+00	2.E+00	8.E+00
Xylenes, total	3.E-02	3.E-02	9.E-02
PHC F2	8.E+00	8.E+00	3.E+01

Notes:

EC_{ca} = Exposure Concentration for Carcinogenic Effects
EC_{nc} = Exposure Concentration for Noncarcinogenic Effects
F = fraction
mg/m^3 = milligram per cubic metre
PHC = petroleum hydrocarbon

Table 4-21b. Predicted Exposure from Inhalation of Vapours in Indoor Air from Soil (Generic Residential Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)		Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)		Teen Resident (12-19y)		Adult Resident (20+ y)		Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**
Acenaphthene	9.E-05	1.E-02	8.E-04	1.E-02	1.E-03	1.E-02	1.E-03	1.E-02	9.E-03	1.E-02	1.E-02	1.E-02
Acenaphthylene	1.E-06	2.E-04	1.E-05	2.E-04	1.E-05	2.E-04	2.E-05	2.E-04	1.E-04	2.E-04	2.E-04	2.E-04
Anthracene	1.E-05	2.E-03	1.E-04	2.E-03	2.E-04	2.E-03	2.E-04	2.E-03	1.E-03	2.E-03	2.E-03	2.E-03
Benzene	5.E-04	7.E-02	4.E-03	7.E-02	6.E-03	7.E-02	7.E-03	7.E-02	5.E-02	7.E-02	8.E-02	7.E-02
Benzo(a)anthracene	2.E-07	4.E-05	2.E-06	4.E-05	3.E-06	3.E-05	3.E-06	3.E-05	2.E-05	3.E-05	4.E-05	3.E-05
Ethylbenzene	3.E-03	5.E-01	3.E-02	5.E-01	4.E-02	4.E-01	4.E-02	4.E-01	3.E-01	4.E-01	5.E-01	4.E-01
Fluorene	4.E-05	6.E-03	4.E-04	6.E-03	5.E-04	6.E-03	6.E-04	6.E-03	4.E-03	6.E-03	6.E-03	6.E-03
Mercury	2.E-07	3.E-05	2.E-06	3.E-05	2.E-06	3.E-05	3.E-06	3.E-05	2.E-05	3.E-05	3.E-05	3.E-05
2-(1-)Methylnaphthalene	3.E-05	5.E-03	3.E-04	5.E-03	4.E-04	5.E-03	5.E-04	5.E-03	3.E-03	5.E-03	5.E-03	5.E-03
Naphthalene	2.E-03	3.E-01	2.E-02	3.E-01	3.E-02	3.E-01	3.E-02	3.E-01	2.E-01	3.E-01	3.E-01	3.E-01
Phenanthrene	5.E-05	7.E-03	4.E-04	7.E-03	6.E-04	7.E-03	7.E-04	7.E-03	5.E-03	7.E-03	8.E-03	7.E-03
Trichloroethylene	3.E-01	4.E+01	2.E+00	4.E+01	3.E+00	4.E+01	4.E+00	3.E+01	3.E+01	3.E+01	4.E+01	3.E+01
Xylenes, total	3.E-03	4.E-01	3.E-02	4.E-01	4.E-02	4.E-01	4.E-02	4.E-01	3.E-01	4.E-01	4.E-01	4.E-01
PHC F2	8.E-01	1.E+02	8.E+00	1.E+02	1.E+01	1.E+02	1.E+01	1.E+02	9.E+01	1.E+02	1.E+02	1.E+02

Notes:

EC_{ca} = Exposure Concentration for Carcinogenic Effects

EC_{nc} = Exposure Concentration for Noncarcinogenic Effects

F = fraction

mg/m^3 = milligram per cubic metre

PHC = petroleum hydrocarbon

Table 4-22a. Predicted Exposure from Inhalation of Vapours in Indoor Air from Groundwater (Generic Commercial Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Indoor Worker		Female Indoor Worker
Parameter and Dose	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{nc} (mg/m^3)
Acenaphthene	2.E-04	2.E-04	6.E-04
Anthracene	3.E-05	3.E-05	1.E-04
Benzene	1.E-02	1.E-02	5.E-02
Benzo(a)anthracene	4.E-06	4.E-06	1.E-05
1,1-Dichloroethane	6.E-03	6.E-03	2.E-02
1,1-Dichloroethene	6.E-02	6.E-02	2.E-01
cis-1,2-Dichloroethene	1.E-01	1.E-01	5.E-01
trans-1,2-Dichloroethene	3.E-02	3.E-02	1.E-01
n-Hexane	5.E-01	5.E-01	2.E+00
2-(1-)Methylnaphthalene	4.E-03	4.E-03	1.E-02
Naphthalene	3.E-04	3.E-04	1.E-03
Phenanthrene	9.E-05	9.E-05	3.E-04
Tetrachloroethene	6.E-04	6.E-04	2.E-03
1,1,1-Trichloroethane	2.E-02	2.E-02	8.E-02
Trichloroethylene	3.E+00	3.E+00	1.E+01
Vinyl Chloride	1.E+00	1.E+00	3.E+00
PHC F1	2.E+01	2.E+01	6.E+01
PHC F2	6.E+02	6.E+02	2.E+03

Notes:
EC_{ca} = Exposure Concentration for Carcinogenic Effects
EC_{nc} = Exposure Concentration for Noncarcinogenic Effects
F = fraction
mg/m^3 = milligram(s) per cubic metre
PHC = petroleum hydrocarbon

Table 4-22b. Predicted Exposure from Inhalation of Vapours in Indoor Air from Groundwater (Generic Residential Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)		Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)		Teen Resident (12-19y)		Adult Resident (20+ y)		Pregnant Female Resident (20+ y)
Parameter and Dose	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**EC_{ca} (mg/m^3)**	**EC_{nc} (mg/m^3)**	**DAD_{nc} (mg/kg/day)**
Acenaphthene	2.E-05	3.E-03	2.E-04	3.E-03	2.E-04	3.E-03	3.E-04	3.E-03	2.E-03	3.E-03	3.E-03
Anthracene	4.E-06	6.E-04	3.E-05	6.E-04	5.E-05	5.E-04	5.E-05	5.E-04	4.E-04	5.E-04	6.E-04
Benzene	1.E-03	2.E-01	1.E-02	2.E-01	2.E-02	2.E-01	2.E-02	2.E-01	2.E-01	2.E-01	2.E-01
Benzo(a)anthracene	4.E-07	6.E-05	4.E-06	6.E-05	5.E-06	6.E-05	6.E-06	6.E-05	4.E-05	6.E-05	7.E-05
1,1-Dichloroethane	7.E-04	1.E-01	6.E-03	1.E-01	9.E-03	1.E-01	1.E-02	9.E-02	7.E-02	9.E-02	1.E-01
1,1-Dichloroethene	7.E-03	1.E+00	7.E-02	1.E+00	9.E-02	1.E+00	1.E-01	1.E+00	7.E-01	1.E+00	1.E+00
cis-1,2-Dichloroethene	2.E-02	2.E+00	1.E-01	2.E+00	2.E-01	2.E+00	2.E-01	2.E+00	2.E+00	2.E+00	2.E+00
trans-1,2-Dichloroethene	3.E-03	5.E-01	3.E-02	5.E-01	4.E-02	4.E-01	5.E-02	4.E-01	3.E-01	4.E-01	5.E-01
n-Hexane	5.E-02	8.E+00	5.E-01	8.E+00	7.E-01	8.E+00	8.E-01	8.E+00	6.E+00	8.E+00	9.E+00
2-(1-)Methylnaphthalene	4.E-04	6.E-02	4.E-03	6.E-02	5.E-03	6.E-02	6.E-03	6.E-02	4.E-02	6.E-02	6.E-02
Naphthalene	4.E-05	5.E-03	3.E-04	5.E-03	5.E-04	5.E-03	5.E-04	5.E-03	4.E-03	5.E-03	6.E-03
Phenanthrene	1.E-05	2.E-03	9.E-05	2.E-03	1.E-04	1.E-03	1.E-04	1.E-03	1.E-03	1.E-03	2.E-03
Tetrachloroethene	7.E-05	1.E-02	6.E-04	1.E-02	9.E-04	1.E-02	1.E-03	1.E-02	7.E-03	1.E-02	1.E-02
1,1,1-Trichloroethane	3.E-03	4.E-01	2.E-02	4.E-01	3.E-02	4.E-01	4.E-02	4.E-01	3.E-01	4.E-01	4.E-01
Trichloroethylene	3.E-01	5.E+01	3.E+00	5.E+01	4.E+00	4.E+01	4.E+00	4.E+01	3.E+01	4.E+01	5.E+01
Vinyl Chloride	1.E-01	2.E+01	1.E+00	2.E+01	1.E+00	2.E+01	2.E+00	2.E+01	1.E+01	2.E+01	2.E+01
PHC F1	1.86E+00	2.83E+02	1.68E+01	2.83E+02	2.42E+01	2.62E+02	2.71E+01	2.58E+02	1.90E+02	2.58E+02	2.95E+02
PHC F2	7.E+01	1.E+04	6.E+02	1.E+04	8.E+02	9.E+03	9.E+02	9.E+03	7.E+03	9.E+03	1.E+04

Notes:

EC_{ca} = Exposure Concentration for Carcinogenic Effects

EC_{nc} = Exposure Concentration for Noncarcinogenic Effects

F = fraction

mg/m^3 = milligram(s) per cubic metre

PHC = petroleum hydrocarbon

Table 4-23. Predicted Outdoor Air Volatile Concentrations (Based on Soil and Groundwater Concentrations)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Predicted Outdoor Air Concentration (mg/m^3) [a]	
	Above Ground Surface	In Trench
Acenaphthene	1.14E-04	1.59E-03
Acenaphthylene	1.68E-06	2.34E-05
Anthracene	2.51E-05	3.49E-04
Benzene	4.37E-06	1.23E-04
Benzo(a)anthracene	5.68E-10	7.91E-09
1,1-Dichloroethane	7.34E-07	2.18E-05
1,1-Dichloroethene	7.51E-07	2.30E-05
cis-1,2-Dichloroethene	8.02E-06	2.35E-04
trans-1,2-Dichloroethene	7.81E-07	2.34E-05
Ethylbenzene	6.55E-05	1.72E-03
Fluorene	7.22E-05	1.01E-03
n-Hexane	1.52E-05	4.74E-04
Mercury	2.27E-07	3.16E-06
2-(1-)Methylnaphthalene	3.04E-05	4.24E-04
Naphthalene	1.07E-03	1.49E-02
Phenanthrene	1.03E-04	1.43E-03
Tetrachloroethene	7.35E-07	2.19E-05
1,1,1-Trichloroethane	7.44E-07	2.26E-05
Trichloroethylene	6.17E-04	1.84E-02
Vinyl Chloride	7.43E-06	2.29E-04
Xylenes, Total	6.12E-05	1.59E-03
PHC F1		
Aliphatic C6-C8	3.49E-04	1.05E-02
Aliphatic C>8-C10	2.19E-04	6.18E-03
Aromatic C>8-C10	4.62E-05	1.04E-03
PHC F2		
Aliphatic C>10-C12	1.92E-01	4.63E+00
Aromatic C>10-C12	3.12E-02	4.93E-01
Aliphatic C>12-C16	2.46E-01	4.42E+00
Aromatic C>12-C16	1.82E-02	2.54E-01

Notes:

[a.] Estimated from measured soil and groundwater concentrations.

F = fraction

mg/m^3 = milligrams per cubic metre

PHC = petroleum hydrocarbon

Table 4-24. Predicted Inhalation Exposure from Volatiles in Outdoor Air (Above Ground)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter and Dose	Infant Resident (0 – 5 mo.)		Toddler Resident (6 mo. – 4 y)		Child Resident (5-11 y)		Teen Resident (12-19 y)		Adult Resident (20+ y)		Pregnant Female Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Construction, Outdoor, Resident, and Utility Worker
	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{nc} (mg/m^3)
Acenaphthene	5.E-08	7.E-06	4.E-07	7.E-06	1.E-06	1.E-05	1.E-06	1.E-05	5.E-06	7.E-06	1.E-04	9.E-06	2.E-05	2.E-05	1.E-06	1.E-06	7.E-07	2.E-05	1.E-04
Acenaphthylene	7.E-10	1.E-07	6.E-09	1.E-07	2.E-08	2.E-07	2.E-08	2.E-07	8.E-08	1.E-07	2.E-06	1.E-07	4.E-07	4.E-07	2.E-08	2.E-08	1.E-08	4.E-07	2.E-06
Anthracene	1.E-08	2.E-06	9.E-08	2.E-06	3.E-07	3.E-06	3.E-07	3.E-06	1.E-06	2.E-06	3.E-05	2.E-06	5.E-06	5.E-06	3.E-07	3.E-07	1.E-07	5.E-06	3.E-05
Benzene	2.E-09	3.E-07	2.E-08	3.E-07	5.E-08	5.E-07	6.E-08	5.E-07	2.E-07	3.E-07	4.E-06	3.E-07	1.E-06	1.E-06	5.E-08	5.E-08	3.E-08	1.E-06	4.E-06
Benzo(a)anthracene	2.E-13	4.E-11	2.E-12	4.E-11	7.E-12	7.E-11	7.E-12	7.E-11	3.E-11	4.E-11	6.E-10	4.E-11	1.E-10	1.E-10	6.E-12	6.E-12	3.E-12	1.E-10	6.E-10
1,1-Dichloroethane	3.E-10	5.E-08	3.E-09	5.E-08	8.E-09	9.E-08	1.E-08	9.E-08	3.E-08	5.E-08	7.E-07	5.E-08	2.E-07	2.E-07	8.E-09	8.E-09	4.E-09	2.E-07	7.E-07
1,1-Dichloroethene	3.E-10	5.E-08	3.E-09	5.E-08	9.E-09	9.E-08	1.E-08	9.E-08	3.E-08	5.E-08	7.E-07	6.E-08	2.E-07	2.E-07	8.E-09	8.E-09	4.E-09	2.E-07	7.E-07
cis-1,2-Dichloroethene	3.E-09	5.E-07	3.E-08	5.E-07	9.E-08	1.E-06	1.E-07	1.E-06	4.E-07	5.E-07	8.E-06	6.E-07	2.E-06	2.E-06	9.E-08	9.E-08	5.E-08	2.E-06	8.E-06
trans-1,2-Dichloroethene	3.E-10	5.E-08	3.E-09	5.E-08	9.E-09	1.E-07	1.E-08	1.E-07	4.E-08	5.E-08	8.E-07	6.E-08	2.E-07	2.E-07	9.E-09	9.E-09	5.E-09	2.E-07	8.E-07
Ethylbenzene	3.E-08	4.E-06	2.E-07	4.E-06	8.E-07	8.E-06	9.E-07	8.E-06	3.E-06	4.E-06	7.E-05	5.E-06	1.E-05	1.E-05	7.E-07	7.E-07	4.E-07	1.E-05	7.E-05
Fluorene	3.E-08	5.E-06	3.E-07	5.E-06	8.E-07	9.E-06	9.E-07	9.E-06	3.E-06	5.E-06	7.E-05	5.E-06	2.E-05	2.E-05	8.E-07	8.E-07	4.E-07	2.E-05	7.E-05
n-Hexane	6.E-09	9.E-07	6.E-08	9.E-07	2.E-07	2.E-06	2.E-07	2.E-06	7.E-07	9.E-07	2.E-05	1.E-06	3.E-06	3.E-06	2.E-07	2.E-07	9.E-08	3.E-06	2.E-05
Mercury	9.E-11	1.E-08	8.E-10	1.E-08	3.E-09	3.E-08	3.E-09	3.E-08	1.E-08	1.E-08	2.E-07	2.E-08	5.E-08	5.E-08	3.E-09	3.E-09	1.E-09	5.E-08	2.E-07
2-(1-)Methylnaphthalene	1.E-08	2.E-06	1.E-07	2.E-06	3.E-07	4.E-06	4.E-07	4.E-06	1.E-06	2.E-06	3.E-05	2.E-06	7.E-06	7.E-06	3.E-07	3.E-07	2.E-07	7.E-06	3.E-05
Naphthalene	4.E-07	7.E-05	4.E-06	7.E-05	1.E-05	1.E-04	1.E-05	1.E-04	5.E-05	7.E-05	1.E-03	8.E-05	2.E-04	2.E-04	1.E-05	1.E-05	6.E-06	2.E-04	1.E-03
Phenanthrene	4.E-08	6.E-06	4.E-07	6.E-06	1.E-06	1.E-05	1.E-06	1.E-05	5.E-06	6.E-06	1.E-04	8.E-06	2.E-05	2.E-05	1.E-06	1.E-06	6.E-07	2.E-05	1.E-04
Tetrachloroethene	3.E-10	5.E-08	3.E-09	5.E-08	8.E-09	9.E-08	1.E-08	9.E-08	3.E-08	5.E-08	7.E-07	5.E-08	2.E-07	2.E-07	8.E-09	8.E-09	4.E-09	2.E-07	7.E-07
1,1,1-Trichloroethane	3.E-10	5.E-08	3.E-09	5.E-08	9.E-09	9.E-08	1.E-08	9.E-08	3.E-08	5.E-08	7.E-07	6.E-08	2.E-07	2.E-07	8.E-09	8.E-09	4.E-09	2.E-07	7.E-07
Trichloroethylene	3.E-07	4.E-05	2.E-06	4.E-05	7.E-06	8.E-05	8.E-06	8.E-05	3.E-05	4.E-05	6.E-04	5.E-05	1.E-04	1.E-04	7.E-06	7.E-06	4.E-06	1.E-04	6.E-04
Xylenes, Total	3.E-08	4.E-06	2.E-07	4.E-06	7.E-07	8.E-06	8.E-07	8.E-06	3.E-06	4.E-06	6.E-05	5.E-06	1.E-05	1.E-05	7.E-07	7.E-07	4.E-07	1.E-05	6.E-05
Vinyl Chloride	3.E-09	5.E-07	3.E-08	5.E-07	9.E-08	9.E-07	1.E-07	9.E-07	3.E-07	5.E-07	7.E-06	6.E-07	2.E-06	2.E-06	8.E-08	8.E-08	4.E-08	2.E-06	7.E-06
PHC F1	3.E-07	4.E-05	2.E-06	4.E-05	7.E-06	8.E-05	8.E-06	8.E-05	3.E-05	4.E-05	6.E-04	5.E-05	1.E-04	1.E-04	7.E-06	7.E-06	4.E-06	1.E-04	6.E-04
PHC F2	2.E-04	3.E-02	2.E-03	3.E-02	6.E-03	6.E-02	6.E-03	6.E-02	2.E-02	3.E-02	5.E-01	4.E-02	1.E-01	1.E-01	5.E-03	5.E-03	3.E-03	1.E-01	5.E-01

Notes:

EC_{ca} = Exposure Concentration for Carcinogenic Effects
EC_{nc} = Exposure Concentration for Noncarcinogenic Effects
F = fraction
mo. = month(s)
max = maximum
mg/m^3 = milligram(s) per cubic metre
PHC = petroleum hydrocarbon
y = year(s)

Table 4-25. Predicted Inhalation Exposure from Volatiles in Outdoor Air (Trench)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter and Dose	Utility Worker		Construction Worker		Pregnant Female Construction and Utility Worker
	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{ca} (mg/m^3)	EC_{nc} (mg/m^3)	EC_{nc} (mg/m^3)
Acenaphthene	2.E-05	2.E-05	9.E-06	3.E-04	2.E-03
Acenaphthylene	3.E-07	3.E-07	1.E-07	5.E-06	2.E-05
Anthracene	4.E-06	4.E-06	2.E-06	8.E-05	3.E-04
Benzene	1.E-06	1.E-06	7.E-07	3.E-05	1.E-04
Benzo(a)anthracene	9.E-11	9.E-11	5.E-11	2.E-09	8.E-09
1,1-Dichloroethane	2.E-07	2.E-07	1.E-07	5.E-06	2.E-05
1,1-Dichloroethene	3.E-07	3.E-07	1.E-07	5.E-06	2.E-05
cis-1,2-Dichloroethene	3.E-06	3.E-06	1.E-06	5.E-05	2.E-04
trans-1,2-Dichloroethene	3.E-07	3.E-07	1.E-07	5.E-06	2.E-05
Ethylbenzene	2.E-05	2.E-05	1.E-05	4.E-04	2.E-03
Fluorene	1.E-05	1.E-05	6.E-06	2.E-04	1.E-03
n-Hexane	5.E-06	5.E-06	3.E-06	1.E-04	5.E-04
Mercury	4.E-08	4.E-08	2.E-08	7.E-07	3.E-06
2-(1-)Methylnaphthalene	5.E-06	5.E-06	2.E-06	9.E-05	4.E-04
Naphthalene	2.E-04	2.E-04	9.E-05	3.E-03	1.E-02
Phenanthrene	2.E-05	2.E-05	8.E-06	3.E-04	1.E-03
Tetrachloroethene	2.E-07	2.E-07	1.E-07	5.E-06	2.E-05
1,1,1-Trichloroethane	3.E-07	3.E-07	1.E-07	5.E-06	2.E-05
Trichloroethylene	2.E-04	2.E-04	1.E-04	4.E-03	2.E-02
Xylenes, Total	2.E-05	2.E-05	9.E-06	3.E-04	2.E-03
Vinyl Chloride	3.E-06	3.E-06	1.E-06	5.E-05	2.E-04
PHC F1	2.E-04	2.E-04	1.E-04	4.E-03	2.E-02
PHC F2	1.E-01	1.E-01	6.E-02	2.E+00	5.E+00

Notes:

EC_{ca} = Exposure Concentration for Carcinogenic Effects

EC_{nc} = Exposure Concentration for Noncarcinogenic Effects

F = fraction

mg/m^3 = milligram(s) per cubic metre

PHC = petroleum hydrocarbon

Table 4-26. Human Health Toxicity Reference Values
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [9]
Acenaphthene	RfD	0.06	mg/kg/day	Hepatotoxicity.	Mice	MECP, 2011	EPA IRIS, 1994	No
	RfD Sub-chronic	0.6	mg/kg/day	Increased liver weight.	Mice	MECP, 2011	ATSDR, 1995	No
	SF	0.001	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
	URF	0.0006	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Hamsters	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Acenaphthylene	URF	0.006	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed, see Benzo[a]pyrene.	Hamsters	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Anthracene	RfC [e]	0.05	mg/m^3	Surrogate (C9-C18 aromatic fraction) – hepatic and CNS effects.	Rats	MADEP, 2004	TPHCWG, 1997	Yes
	URF	0.006	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed, see Benzo[a]pyrene.	Hamsters	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Antimony (Sb)	RfD	0.006	mg/kg/day	Decreased body weight and food intake.	Rats	WHO DW, 2003	RIVM, 2009	Yes
Arsenic (As)	RfD	0.0003	mg/kg/day	Hyperpigmentation, keratosis, and possible vascular complications.	Humans	MECP, 2017	EPA IRIS, 1991; ATSDR, 2007	No
	SF	9.5	1/[mg/kg/day]	Lung cancer, multiple internal organ cancers (liver, kidney, lung, and bladder), skin cancer.	Humans	MECP, 2017	CalEPA DW, 2004	No
Benz[a]anthracene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	0.1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
	URF	0.06	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Hamsters	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Benzene	RfC	0.0096	mg/m^3	Decreased lymphocyte count.	Humans	ATSDR, 2007	ATSDR, 2007	Yes
	URF	0.0022	1/[mg/m^3]	Leukemia.	Humans	MECP, 2011	EPA IRIS, 2000	No
Benzo[a]pyrene	RfD [d]	0.0003	mg/kg/day	Neurobehavioural changes (developmental).	Rats	MECP, 2018	EPA IRIS, 2017	No
	RfD Sub-chronic	0.005	mg/kg/day	Kidney abnormalities	Rats	MECP, 2018	CalEPA DW, 2010	No
	SF	1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (1) employed.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Benzo[b]fluoranthene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	0.1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Benzo[g,h,i]perylene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	0.01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Benzo[k]fluoranthene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	0.1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Cadmium	RfD	0.0001	mg/kg/day	Renal toxicity.	Humans	ATSDR, 2012	-	Yes
	SF	NA	1/[mg/kg/day]	-	-	-	-	No
Chrysene	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	0.01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No

Table 4-26. Human Health Toxicity Reference Values
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [9]
Cobalt (Co)	RfD	0.001	mg/kg/day	Polycythemia (proportion of blood volume that is occupied by red blood cells increased).	Humans	MECP, 2011	ATSDR, 2004	No
	RfD Sub-chronic	0.01	mg/kg/day	Polycythemia (proportion of blood volume that is occupied by red blood cells increased).	Humans	MECP, 2011	ATSDR, 2004	No
Copper (Cu)	RfD	0.01	mg/kg/day	Gastrointestinal effects.	Humans	MECP, 2016e	ATSDR, 2004	No
Dibenz[a,h]anthracene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (1) employed; see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Dichloroethane, 1,1-	RfD	0.2	mg/kg/day	Renal toxicity.	Rats	EPA PPRTV, 2006	-	Yes
	RfD Sub-chronic	2	mg/kg/day	Renal toxicity.	Rats	EPA PPRTV, 2006		Yes
	RfC	0.165	mg/m^3	Kidney damage (for example, increased serum creatinine and urea).	Cats	MECP, 2011	EPA HEAST, 1984	No
	SF	0.0057	1/[mg/kg/day]	Mammary gland adenocarcinomas.	Rats	CalEPA DW, 2003	-	Yes
	URF	0.0016	$1/[mg/m^3]$	Mammary gland adenocarcinomas.	Rats	CalEPA DW, 2003	-	Yes
Dichloroethylene, 1,1-	RfD	0.05	mg/kg/day	Hepatic toxicity (fatty change).	Rats	MECP, 2016f	WHO CICAD, 2003; EPA IRIS, 2002	No
	RfC	0.2	mg/m^3	Hepatic toxicity (fatty change).	Rats	MECP, 2016f	WHO CICAD, 2003; EPA IRIS, 2002	No
	RfC Sub-chronic	0.0793	mg/m^3	Hepatic effects (mottled livers).	Guinea Pigs	MECP, 2011	ATSDR, 1994	No
Dichloroethylene, cis-1,2-	RfD	0.002	mg/kg/day	Increased kidney and liver weights; decrease hematocrit.	Rats	MECP, 2016a	EPA IRIS, 2010	No
	RfD Sub-chronic	0.017	mg/kg/day	Increased kidney and liver weights; decrease hematocrit.	Rats	MECP, 2016a	EPA PPRTV, 2011	No
	RfC	NA	mg/m^3	None Selected.	--	MECP, 2016a		No
Dichloroethylene, trans-1,2- [f]	RfD	0.02	mg/kg/day	Decrease in number of antibody forming cells.	Mice	MECP, 2016b	EPA IRIS, 2010	No
	RfD Sub-chronic	0.065	mg/kg/day	Decrease in number of antibody forming cells.	Mice	MECP, 2016b	EPA IRIS, 2010 (modified) [a]	No
	RfC	0.06	mg/m^3	Fatty degeneration of the liver lobules and Kupffer cells, and pulmonary hyperaemia, alveolar septal distension, and pneumonic infiltration.	Rats	MECP, 2016b	RIVM, 2001; MECP, 2011	No
	RfC Sub-chronic	0.793	mg/m^3	Fatty degeneration of the liver.	Rats	MECP, 2011	ATSDR, 1996	No
Ethylbenzene	RfD	0.1	mg/kg/day	Liver and kidney toxicity.	Rats	MECP, 2016f	EPA IRIS, 1987; RIVM, 2001; WHO DW, 2003; HC CSD, 2010	No
	RfD Sub-chronic	0.4	mg/kg/day	Hepatotoxicity	Rats	MECP, 2016f	ATSDR, 2010	No
	RfC	1.9	mg/m^3	Increased severity of nephropathy.	Rats	MECP, 2016f	TCEQ, 2010; CalEPA chREL, 2000	No
Fluoranthene	RfD	0.04	mg/kg/day	Nephropathy, increased liver weights, hematological alterations, and clinical effects.	Mice	MECP, 2011	EPA IRIS, 1993	No
	RfD Sub-chronic	0.4	mg/kg/day	Nephropathy, increased liver weights, hematological alterations, and clinical effects.	Mice	MECP, 2011	EPA IRIS, 1993 (modified) [a]	No
	SF	0.01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Fluorene	RfC	0.05	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2003	-	Yes
Indeno[1,2,3-cd]pyrene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	0.1	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
Iron	RfD	0.7	mg/kg/day	Adverse gastrointestinal effects.	Humans	EPA RSL, 2013	EPA PPRTV, 2006	Yes
Lead	NA	NA	NA	-	-		-	-
Mercury (elemental)	RfC	0.00003	mg/m^3	Impairment of neurobehavioral functions.	Humans	CalEPA, 2014	-	Yes
2-(1-)Methylnaphthalene	RfC	0.05	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2003	-	Yes
Naphthalene	RfC	0.0037	mg/m^3	Nasal effects: hyperplasia and metaplasia of respiratory and olfactory epithelium.	Mice	MECP, 2011	ATSDR, 2005	No

Table 4-26. Human Health Toxicity Reference Values
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [9]
n-Hexane	RfD	0.06	mg/kg/day	Nervous system-neuropathy; Testicular atrophy.	Rats	EPA HEAST, 1997	-	Yes
	RfD Sub-chronic	0.6	mg/kg/day	Nervous system-neuropathy; Testicular atrophy.	Rats	EPA HEAST, 1997	-	Yes
	RfC	0.7	mg/m^3	Neurotoxic effects (functional impairment of the peripheral nervous system).	Rats	EPA IRIS, 2005	-	Yes
PHC F1 (C6-C10)								
Aliphatic (C6 - C8)	RfC	18.4	mg/m^3	Neurotoxicity.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aliphatic (C8 - C10)	RfC	1	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C8 - C10)	RfC	0.2	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
PHC F2 (C10-C16)								
Aliphatic (C>10 - C12)	RfD	0.1	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	1	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aliphatic (C>12 - C16)	RfD	0.1	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	1	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>10 - C12)	RfD	0.04	mg/kg/day	Decreased body weight.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	0.2	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>12 - C16)	RfD	0.04	mg/kg/day	Decreased body weight.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	0.2	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
PHC F3 (C16-C34)								
Aliphatic (C>16 - C21) [b]	RfD	2	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aliphatic (C>21 - C34) [b]	RfD	2	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>16 - C21) [b]	RfD	0.03	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	0.3	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>21 - C34) [b]	RfD	0.03	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	0.3	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
PHC F4 (C34-C50)/F4G-SG (GHH-Silica)								
Aliphatic (C>34) [b]	RfD	20	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>34) [b]	RfD	0.03	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	0.3	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Phenanthrene	RfD	0.04	mg/kg/day	Applicable to the non-carcinogenic C9 to C16 aromatic total petroleum hydrocarbon fraction (or its constituents) and is based on decreased body weight and increased liver and kidney weight.	Mice, Rats	RIVM, 2001	-	Yes
	RfC	0.05	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2004	-	Yes
Polychlorinated Biphenyls	RfD	0.00002	mg/kg/day	Immunological effects.	Monkeys	MECP, 2011	ATSDR, 2000	No
	RfD Sub-chronic	0.00003	mg/kg/day	Neurobehavioral alterations.	Monkeys	MECP, 2011	ATSDR, 2000	No
Pyrene	RfD	0.03	mg/kg/day	Kidney effects (renal tubular pathology, decreased kidney weights).	Mice	MECP, 2011	EPA IRIS, 1993	No
	RfD Sub-chronic	0.3	mg/kg/day	Kidney effects (renal tubular pathology, decreased kidney weights).	Mice	MECP, 2011	EPA IRIS, 1993	No
	SF	0.001	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Mice	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No
	URF	0.0006	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Hamsters	MECP, 2018	EPA IRIS, 2017; Kalberlah et. al., 1995	No

Table 4-26. Human Health Toxicity Reference Values
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [9]
Tetrachloroethylene	RfC	0.04	mg/m^3	Neurotoxicity - occupational exposures.	Humans	MECP, 2014a	EPA IRIS, 2012	No
	RfC Sub-chronic	1.36	mg/m^3	Neurotoxicity.	Humans	MECP, 2011	ATSDR, 1997	No
	URF	0.00026	$1/[mg/m^3]$	Hepatocellular adenomas or carcinomas.	Mice	MECP, 2014a	EPA IRIS, 2012	No
Thallium	RfD	0.0000135	mg/kg/day	Alopecia.	Rats	MECP, 2011	CalEPA DW, 1999	No
Trichloroethane, 1,1,1-	RfC	1	mg/m^3	Neuropathic effects	Gerbils	MECP, 2011	-	No
	RfC Sub-chronic	3.82	mg/m^3	Neuropathic effects	Gerbils	MECP, 2011	-	No
Trichloroethylene	RfD [d]	0.0005	mg/kg/day	Multiple: Developmental immunotoxicity, decreased thymus weights in mice, and heart malformations in rats.	Mice, Rats	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	RfC [d]	0.002	mg/m^3	Multiple: Decreased thymus weights in mice and heart malformations in rats.	Mice, Rats	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	SF	0.046	1/[mg/kg/day]	Kidney, non-Hodgkin lymphoma, and liver cancers.	Humans, Mice	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	URF	0.0041	$1/[mg/m^3]$	Kidney, non-Hodgkin lymphoma, and liver cancers.	Humans, Mice	MECP, 2014b	EPA IRIS, 2011	No
Vanadium (V)	RfD [d]	0.0021	mg/kg/day	Developmental effects in offspring.	Rats	MECP, 2011	CalEPA DW, 2000	No
	RfD Sub-chronic [d]	0.0021	mg/kg/day	Developmental effects in offspring.	Rats	MECP, 2011	CalEPA DW, 2000	No
Vinyl Chloride	RfD	0.003	mg/kg/day	Liver cell polymorphism.	Rats	MECP, 2016c	ATSDR, 2006; EPA IRIS, 2000; MECP, 2011	No
	RfC	0.06	mg/m^3	Liver cell polymorphism.	Rats	MECP, 2016c	TCEQ, 2009	No
	SF (continuous lifetime exposure from birth)	1.5	1/[mg/kg/day]	Total of liver angiosarcoma, hepatocellular carcinoma, and neoplastic nodules.	Rats	MECP, 2016c	WHO DW, 2011	No
	SF (continuous lifetime exposure during adulthood)	0.72	1/[mg/kg/day]	Total of liver angiosarcoma, hepatocellular carcinoma, and neoplastic nodules.	Rats	MECP, 2016c	EPA IRIS, 2000	No
	URF (continuous lifetime exposure from birth)	0.0084	$1/[mg/m^3]$	Liver angiosarcomas, angiomas, hepatomas, and neoplastic nodules.	Rats	MECP, 2016c	TCEQ, 2009	No
	URF (continuous lifetime exposure during adulthood)	0.0044	$1/[mg/m^3]$	Liver angiosarcomas, angiomas, hepatomas, and neoplastic nodules.	Rats	MECP, 2016c	EPA IRIS, 2000	No
Xylene Mixture	RfC	0.7	mg/m^3	CNS effects; and irritation of the eyes, nose, and throat.	Humans	MECP, 2011	CalEPA ChREL, 2005	No
	RfC Sub-chronic	2.6	mg/m^3	Neurotoxicity.	Rats	MECP, 2011	ATSDR, 2007	No
Zinc	RfD	0.3	mg/kg/day	Decreases in erythrocyte Cu, Zn-superoxide dismutase (ESOD) activity.	Humans	MECP, 2011	EPA IRIS, 2005	No

[a.] MECP derived toxicity values by modifying the proposed values in the cited source documents.

[b.] Chemical is not considered a concern for inhalation exposure and toxicity.

[c.] Noncancer TRV not available. Consistent with MECP (2011) Rationale Table.

[d.] Additional consideration for developmental effects required for this chemical and route of exposure.

[e.] Proxy or surrogate is chosen based on chemical's structural or functional similarity.

[f.] RfC for trans-1,2-dichloroethylene was used in the risk calculations as a surrogate in the absence of an MECP-selected TRV. RIVM (2009b) indicates that new genotoxicity studies conclude that "there is no clear evidence for differences in toxicity between the cis and the trans-isomer", therefore the use of the trans- isomer is an appropriate surrogate.

[g.] Toxicity Profiles to be provided in the risk assessment specific to the TRVs used in the RA following the secondary screening for human health.

ATSDR online database (http://www.atsdr.cdc.gov/). Reference date reflects the individual profiles which were prepared in different years.
CalEPA ChREL online Chronic Reference Exposure Levels. https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary
CalEPA DW online Public Health Goals (http://www.oehha.org/water/phg/allphgs.html)
CalEPA. 2014. Revised TSD for Noncancer RELs. Appendix D
CCME, 2000. Canada Wide Standards for Petroleum Hydrocarbons.
EPA HEAST, 1997. Health Effects Assessment Summary Tables, FY 1997 Update (http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=2877).
EPA online Regional Screening Level (RSL) (http://www.epa.gov/region9/superfund/prg/). Year is date of RSL table that was last reviewed for the specific parameter.
EPA PPRTV. Provisional Peer Reviewed Toxicity Values for Superfund (http://hhpprtv.ornl.gov/quickview/pprtv_papers.php)
EPA IRIS online database (http://www.epa.gov/IRIS/index.html). Reference date reflects the individual profiles which were prepared in different years.

Table 4-26. Human Health Toxicity Reference Values
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value	Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [9]

HC CSD, 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0. Prepared by: Contaminated Sites Division (CSD), Safe Environments Directorate. September.

Kalberlah F, Frijus-Plessen N, & Hassauer M., 1995. Toxicological Criteria for the Risk Assessment of Polycyclic Aromatic Hydrocarbons (PAH) in Existing Chemicals. Part 1: The Use of Equivalency Factors.

MADEP, 2003. *Updated Petroleum Hydrocarbon Fraction Toxicity Values for the VPH/EPH/APH Methodology* (http://www.mass.gov/eea/docs/dep/cleanup/laws/tphtox03.pdf)

MADEP, 2004. *Revisions to Dose-Response Values used in Human Health Risk Assessment* . Common Wealth of Massachusetts, Executive Office of Environmental Affairs, Department of Environmental Protection.

MECP, 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated sites in Ontario. April.

MECP, 2014a. Toxicity Reference Value (TRV) Selections for Tetrachloroethylene. Agency Review Completion: July 2012.

MECP, 2014b. Toxicity Reference Value (TRV) Selections for Trichloroethylene. Agency Review Completion: February 2013.

MECP, 2016a. Toxicity Reference Value (TRV) Selection Summary Document: cis-1,2-Dichloroethylene. January.

MECP, 2016b. Toxicity Reference Value (TRV) Selection Summary Document: trans-1,2-Dichloroethylene. January.

MECP, 2016c. Toxicity Reference Value (TRV) Selections for Vinyl Chloride. April, 2016.

MECP, 2016d. Toxicity Reference Value (TRV) Selections for Ethylbenzene. March 2016.

MECP, 2016e. Toxicity Reference Value (TRV) Selections for Copper. April 2016.

MECP, 2016f. Toxicity Reference Value (TRV) Selections for 1,1-dichloroethylene. December 2016.

MECP, 2017. Toxicity Reference Value (TRV) Selections for Arsenic. November 2017.

Ministry, 2018. Toxicity Reference Value (TRV) Selections for Benzo(a)pyrene. October.

RIVM, 2001. *Re-Evaluation of Human-Toxicological Maximum Permissible Risk Levels* . March.

TCEQ online *Final Development Support Documents* (http://www.tceq.texas.gov/toxicology/dsd/final.html). Reference date reflects the individual profiles which were prepared in different years.

TPHCWG, 1997. Development of Fraction-Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH) Vol.4.

WHO CICAD. http://www.who.int/ipcs/publications/cicad/en/. Reference date reflects the individual profiles which were prepared in different years.

WHO DW. Chemical hazards in drinking-water (http://www.who.int/water_sanitation_health/dwq/chemicals/en/). Reference date reflects the individual profiles which were prepared in different years.

ATSDR = Agency for Toxic Substances and Disease Register
CalEPA = California Environmental Protection Agency
CalEPA ChREL = California Environmental Protection Agency Chronic Reference Exposure Levels (REL)
CalEPA DW = California Department of Environmental Protection - Public Health Goals
CCME = Canadian Council of Ministers of the Environment
CNS = Central Nervous System
EPA HEAST = United States Environmental Protection Agency Health Effects Assessment Summary Table
EPA IRIS = United States Environmental Protection Agency Integrated Risk Information System
EPA PPRTV = United States Environmental Protection Agency Provisional Peer Reviewed Toxicity Value
EPA RSL = United States Environmental Protection Agency Regional Screening Levels
ESOD = Erythrocyte superoxide dismutase
F = fraction
HC = Health Canada
HC CSD = Health Canada Contaminated Sites Division
kg = kilogram(s)
m^3 = cubic metre(s)
MADEP = Massachusetts Department of Environmental Protection
MECP = Ontario Ministry of Environment, Conservation and Parks
mg/kg/d = milligram(s) per kilogram per day
mg/m^3 = milligram(s) per cubic metre
NA = not applicable
PHC = petroleum hydrocarbon
RA = Risk Assessment
RfC = reference concentration
RfD = reference dose
RIVM = Netherlands National Institute of Public Health and Environmental Protection
SF = slope factor
TCEQ = Texas Commission on Environmental Quality
TEF = toxicity equivalence factor
TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group
TRV = Toxicity Reference Value
URF = unit risk factor
WHO = World Health Organization
WHO CICAD = World Health Organization Concise International Chemical Assessment Document
WHO DW = World Health Organization Drinking Water

Table 4-27. Predicted Risks from Dermal Exposure to Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Toddler Resident (6 mo. – 4 y)	Female adult Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor/ Construction/ Utility Worker
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Parameter/Dose	**HQ**	**HQ**	**ILCR**	**ILCR**	**HQ**	**ILCR**	**HQ**	**ILCR**	**HQ**	**HQ**
Acenaphthene	4.E-03	--	7.E-08	7.E-08	1.E-03	4.E-09	6.E-05	2.E-09	1.E-04	--
Antimony	6.E-03	--	--	--	2.E-03	--	1.E-04	--	2.E-03	--
Arsenic	4.E-02	--	**4.E-05**	**4.E-05**	1.E-02	**2.E-06**	7.E-04	1.E-06	1.E-02	--
Benzo(a)anthracene	--	--	**2.E-06**	**2.E-06**	--	8.E-08	--	4.E-08	--	--
Benzo(a)pyrene	**1.E+00**	**3.E-01**	**1.E-04**	**1.E-04**	**3.E-01**	**5.E-06**	2.E-02	**3.E-06**	2.E-02	4.E-02
Benzo(b)fluoranthene	--	--	**1.E-05**	**1.E-05**	--	8.E-07	--	4.E-07	--	--
Benzo(g,h,i)perylene	--	--	5.E-07	6.E-07	--	3.E-08	--	2.E-08	--	--
Benzo(k)fluoranthene	--	--	**5.E-06**	**5.E-06**	--	3.E-07	--	1.E-07	--	--
Cadmium	2.E-01	--	--	--	5.E-02	--	3.E-03	--	5.E-02	--
Chrysene	--	--	1.E-06	1.E-06	--	7.E-08	--	4.E-08	--	--
Cobalt	7.E-02	--	--	--	2.E-02	--	1.E-03	--	2.E-03	--
Copper	**3.E-01**	--	--	--	9.E-02	--	5.E-03	--	9.E-02	--
Dibenzo(a,h)anthracene	--	--	**2.E-05**	**2.E-05**	--	1.E-06	--	6.E-07	--	--
Fluoranthene	4.E-02	--	**5.E-06**	**5.E-06**	1.E-02	3.E-07	7.E-04	1.E-07	1.E-03	--
Indeno(1,2,3-Cd)Pyrene	--	--	**6.E-06**	**6.E-06**	--	3.E-07	--	2.E-07	--	--
Iron	**7.E-01**	--	--	--	2.E-01	--	1.E-02	--	2.E-01	--
PCB, Total	2.E-01	--	--	--	7.E-02	--	4.E-03	--	5.E-02	--
Phenanthrene	5.E-02	--	--	--	2.E-02	--	9.E-04	--	2.E-02	--
Pyrene	4.E-02	--	4.E-07	4.E-07	1.E-02	2.E-08	6.E-04	1.E-08	1.E-03	--
Thallium	8.E-02	--	--	--	3.E-02	--	1.E-03	--	3.E-03	--
Trichloroethylene	4.E-02	1.E-02	3.E-07	3.E-07	1.E-02	2.E-08	7.E-04	8.E-09	1.E-02	2.E-02
Vanadium	9.E-02	3.E-02	--	--	3.E-02	--	2.E-03	--	3.E-02	6.E-02
Zinc	**4.E-01**	--	--	--	1.E-01	--	7.E-03	--	1.E-01	--
B(a)PE	--	--	**2.E-04**	**2.E-04**	--	**1.E-05**	--	**5.E-06**	--	--
PHC F2	2.E-01	--	--	--	5.E-02	--	3.E-03	--	3.E-02	--
PHC F3	**6.E-01**	--	--	--	1.E-01	--	1.E-02	--	3.E-02	--
PHC F4	2.E-01	--	--	--	6.E-02	--	3.E-03	--	6.E-03	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

> = greater than

B(a)PE = benzo(a)pyrene equivalent

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

mo = month

PCB = polychlorinated biphenyl

PHC - petroleum hydrocarbon

y = year

Table 4-28a. Predicted Risks from Dermal Exposure to Potable Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5-11 y)	Teen Resident (12-19y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated ILCR**
1,1-Dichloroethane	7.E-04	5.E-04	5.E-04	5.E-04	3.E-04	--	4.E-07
1,1-Dichloroethene	1.E-02	8.E-03	8.E-03	7.E-03	5.E-03	--	--
2-(1-)Methylnaphthalene	**6.E+00**	**4.E+00**	**5.E+00**	**4.E+00**	**3.E+00**	--	--
Acenaphthene	6.E-02	4.E-02	5.E-02	4.E-02	3.E-02	--	**2.E-06**
Arsenic	4.E-02	3.E-02	3.E-02	3.E-02	2.E-02	--	**6.E-05**
Benzene	**1.E+00**	**9.E-01**	**1.E+00**	**8.E-01**	**6.E-01**	--	**3.E-05**
Benzo(a)anthracene	--	--	--	--	--	--	**1.E-04**
Benzo(a)pyrene	**1.E+01**	**8.E+00**	**8.E+00**	**7.E+00**	**5.E+00**	**6.E+00**	**2.E-03**
Benzo(b&j)fluoranthene	--	--	--	--	--	--	**4.E-04**
Benzo(k)fluoranthene	--	--	--	--	--	--	**6.E-04**
Chrysene	--	--	--	--	--	--	**2.E-04**
cis-1,2-Dichloroethene	**4.E+00**	**3.E+00**	**3.E+00**	**2.E+00**	**2.E+00**	--	--
Ethylbenzene	3.E-03	2.E-03	2.E-03	2.E-03	2.E-03	--	--
Fluoranthene	**3.E-01**	2.E-01	2.E-01	2.E-01	1.E-01	--	**6.E-05**
n-Hexane	2.E-02	1.E-02	1.E-02	1.E-02	8.E-03	--	--
Phenanthrene	**5.E-01**	**3.E-01**	**4.E-01**	**3.E-01**	2.E-01	--	--
Pyrene	**5.E-01**	**4.E-01**	**4.E-01**	**4.E-01**	**3.E-01**	--	**9.E-06**
trans-1,2-Dichloroethene	3.E-02	2.E-02	2.E-02	2.E-02	2.E-02	--	--
Trichloroethylene	**2.E+02**	**1.E+02**	**1.E+02**	**1.E+02**	**8.E+01**	**9.E+01**	**2.E-03**
Zinc	2.E-03	2.E-03	2.E-03	2.E-03	1.E-03	--	--
Vinyl Chloride	**1.E+00**	**9.E-01**	**1.E+00**	**8.E-01**	**6.E-01**	--	**3.E-03**
B(a)PE	--	--	--	--	--	--	**6.E-03**
PHC F2	**3.E+02**	**2.E+02**	**3.E+02**	**2.E+02**	**2.E+02**	--	--
PHC F3	**3.E+03**	**2.E+03**	**3.E+03**	**2.E+03**	**2.E+03**	--	--
PHC F4	5.E-02	4.E-02	4.E-02	4.E-02	3.E-02	--	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-5}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

B(a)PE = benzo(a)pyrene equivalent

Table 4-28b. Predicted Risks from Dermal Exposure to Groundwater (Subsurface Workers)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker
Parameter/Dose	Estimated ILCR	Estimated HQ	Estimated ILCR	Estimated HQ	Estimated HQ
1,1-Dichloroethane	9.E-10	8.E-07	5.E-10	1.E-06	--
1,1-Dichloroethene	--	1.E-05	--	2.E-04	--
2-(1-)Methylnaphthalene	--	6.E-03	--	1.E-01	--
Acenaphthene	4.E-09	6.E-05	2.E-09	1.E-04	--
Arsenic	6.E-08	2.E-05	3.E-08	4.E-04	--
Benzene	6.E-08	1.E-03	3.E-08	3.E-02	--
Benzo(a)anthracene	2.E-07	--	1.E-07	--	--
Benzo(a)pyrene	**3.E-06**	1.E-02	**2.E-06**	1.E-02	3.E-02
Benzo(b&j)fluoranthene	7.E-07	--	4.E-07	--	--
Benzo(k)fluoranthene	1.E-06	--	6.E-07	--	--
Chrysene	4.E-07	--	2.E-07	--	--
cis-1,2-Dichloroethene	--	4.E-03	--	9.E-03	--
Ethylbenzene	--	3.E-06	--	2.E-05	--
Fluoranthene	1.E-07	3.E-04	6.E-08	5.E-04	--
n-Hexane	--	2.E-05	--	3.E-05	--
Phenanthrene	--	5.E-04	--	1.E-02	--
Pyrene	2.E-08	6.E-04	9.E-09	1.E-03	--
trans-1,2-Dichloroethene	--	3.E-05	--	2.E-04	--
Trichloroethylene	**4.E-06**	2.E-01	**2.E-06**	**3.E+00**	**6.E+00**
Zinc	--	1.E-06	--	2.E-05	--
Vinyl Chloride	**3.E-06**	1.E-03	**2.E-06**	3.E-02	--
B(a)PE	**1.E-05**	--	**7.E-06**	--	--
PHC F2	--	**4.E-01**	--	**6.E+00**	--
PHC F3	--	**4.E+00**	--	**7.E+00**	--
PHC F4	--	6.E-05	--	1.E-04	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

B(a)PE = benzo(a)pyrene equivalent

Table 4-29. Predicted Risks from Incidental Ingestion of Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor/ Construction/ Utility Worker
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Parameter/Dose	**HQ**	**HQ**	**ILCR**	**ILCR**	**HQ**	**ILCR**	**HQ**	**ILCR**	**HQ**	**HQ**
Acenaphthene	2.E-02	--	1.E-07	8.E-08	1.E-03	4.E-09	7.E-05	2.E-09	1.E-04	--
Antimony	3.E-02	--	--	--	3.E-03	--	1.E-04	--	3.E-03	--
Arsenic	**4.E-01**	--	**1.E-04**	**1.E-04**	3.E-02	**5.E-06**	2.E-03	**3.E-06**	3.E-02	--
Benzo(a)anthracene	--	--	**3.E-06**	**2.E-06**	--	9.E-08	--	5.E-08	--	--
Benzo(a)pyrene	**5.E+00**	**4.E-01**	**2.E-04**	**1.E-04**	**4.E-01**	**6.E-06**	2.E-02	**3.E-06**	2.E-02	5.E-02
Benzo(b)fluoranthene	--	--	**2.E-05**	**2.E-05**	--	9.E-07	--	4.E-07	--	--
Benzo(g,h,i)perylene	--	--	9.E-07	6.E-07	--	3.E-08	--	2.E-08	--	--
Benzo(k)fluoranthene	--	--	**9.E-06**	**6.E-06**	--	3.E-07	--	2.E-07	--	--
Cadmium	**9.E+00**	--	--	--	**8.E-01**	--	4.E-02	--	**8.E-01**	--
Chrysene	--	--	**2.E-06**	**2.E-06**	--	8.E-08	--	4.E-08	--	--
Cobalt	**4.E+00**	--	--	--	**4.E-01**	--	2.E-02	--	4.E-02	--
Copper	**3.E+00**	--	--	--	2.E-01	--	1.E-02	--	2.E-01	--
Dibenzo(a,h)anthracene	--	--	**3.E-05**	**2.E-05**	--	1.E-06	--	6.E-07	--	--
Fluoranthene	2.E-01	--	**9.E-06**	**6.E-06**	1.E-02	3.E-07	8.E-04	2.E-07	1.E-03	--
Indeno(1,2,3-Cd)Pyrene	--	--	**1.E-05**	**7.E-06**	--	4.E-07	--	2.E-07	--	--
Iron	**2.E+00**	--	--	--	2.E-01	--	8.E-03	--	2.E-01	--
PCB, Total	**9.E-01**	--	--	--	7.E-02	--	4.E-03	--	5.E-02	--
Phenanthrene	2.E-01	--	--	--	2.E-02	--	1.E-03	--	2.E-02	--
Pyrene	2.E-01	--	6.E-07	4.E-07	1.E-02	2.E-08	7.E-04	1.E-08	1.E-03	--
Thallium	**5.E+00**	--	--	--	**4.E-01**	--	2.E-02	--	4.E-02	--
Trichloroethylene	**8.E-01**	7.E-02	**2.E-06**	1.E-06	6.E-02	7.E-08	3.E-03	4.E-08	6.E-02	1.E-01
Vanadium	**5.E-01**	5.E-02	--	--	4.E-02	--	2.E-03	--	4.E-02	9.E-02
Zinc	**2.E+00**	--	--	--	2.E-01	--	1.E-02	--	2.E-01	--
B(a)PE	--	--	**3.E-04**	**2.E-04**	--	**1.E-05**	--	**6.E-06**	--	--
PHC F2	5.E-01	--	--	--	3.E-02	--	2.E-03	--	2.E-02	--
PHC F3	**2.E+00**	--	--	--	1.E-01	--	7.E-03	--	2.E-02	--
PHC F4	5.E-01	--	--	--	4.E-02	--	2.E-03	--	5.E-03	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- - not applicable

> = greater than

B(a)PE = benzo(a)pyrene equivalent

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

mo = month

PCB = polychlorinated biphenyl

PHC =petroleum hydrocarbon

y = year

Table 4-30a. Predicted Risks from Ingestion of Potable Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5-11 y)	Teen Resident (12-19y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated ILCR**
1,1-Dichloroethane	1.E-02	1.E-02	7.E-03	5.E-03	5.E-03	--	**7.E-06**
1,1-Dichloroethene	1.E-01	1.E-01	7.E-02	5.E-02	6.E-02	--	--
2-(1-)Methylnaphthalene	**8.E+00**	**7.E+00**	**4.E+00**	**3.E+00**	**3.E+00**	--	--
Acenaphthene	7.E-02	7.E-02	4.E-02	3.E-02	3.E-02	--	**2.E-06**
Arsenic	**2.E+01**	**2.E+01**	**9.E+00**	**6.E+00**	**7.E+00**	--	**2.E-02**
Benzene	**1.E+01**	**1.E+01**	**8.E+00**	**6.E+00**	**6.E+00**	--	**3.E-04**
Benzo(a)anthracene	--	--	--	--	--	--	**1.E-05**
Benzo(a)pyrene	**9.E-01**	**8.E-01**	**5.E-01**	**3.E-01**	**4.E-01**	**4.E-01**	**1.E-04**
Benzo(b&j)fluoranthene	--	--	--	--	--	--	**4.E-05**
Benzo(k)fluoranthene	--	--	--	--	--	--	**4.E-05**
Chrysene	--	--	--	--	--	--	**2.E-05**
cis-1,2-Dichloroethene	**5.E+01**	**5.E+01**	**3.E+01**	**2.E+01**	**2.E+01**	--	--
Ethylbenzene	9.E-03	9.E-03	5.E-03	4.E-03	4.E-03	--	--
Fluoranthene	6.E-02	6.E-02	3.E-02	2.E-02	3.E-02	--	**1.E-05**
n-Hexane	1.E-02	1.E-02	7.E-03	5.E-03	6.E-03	--	--
Phenanthrene	**3.E-01**	**3.E-01**	2.E-01	1.E-01	1.E-01	--	--
Pyrene	2.E-01	2.E-01	1.E-01	8.E-02	9.E-02	--	**3.E-06**
trans-1,2-Dichloroethene	**4.E-01**	**4.E-01**	2.E-01	2.E-01	2.E-01	--	--
Trichloroethylene	**2.E+03**	**2.E+03**	**9.E+02**	**7.E+02**	**8.E+02**	**8.E+02**	**2.E-02**
Zinc	**2.E+00**	**2.E+00**	**9.E-01**	**6.E-01**	**7.E-01**	--	--
Vinyl Chloride	**3.E+01**	**3.E+01**	**2.E+01**	**1.E+01**	**1.E+01**	--	**7.E-02**
B(a)PE	--	--	--	--	--	--	**5.E-04**
PHC F2	**6.E+02**	**6.E+02**	**3.E+02**	**2.E+02**	**2.E+02**	--	--
PHC F3	**3.E+03**	**3.E+03**	**2.E+03**	**1.E+03**	**1.E+03**	--	--
PHC F4	**1.E+02**	**1.E+02**	**7.E+01**	**5.E+01**	**6.E+01**	--	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-5}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

B(a)PE = benzo(a)pyrene equivalent

Table 4-30b. Predicted Risks from Incidental Ingestion of Groundwater (Subsurface Workers)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker
Parameter/Dose	Estimated ILCR	Estimated HQ	Estimated ILCR	Estimated HQ	Estimated HQ
1,1-Dichloroethane	4.E-09	3.E-06	2.E-09	7.E-06	--
1,1-Dichloroethene	--	3.E-05	--	6.E-04	--
2-(1-)Methylnaphthalene	--	2.E-03	--	3.E-02	--
Acenaphthene	9.E-10	2.E-05	5.E-10	3.E-05	--
Arsenic	**1.E-05**	3.E-03	**5.E-06**	7.E-02	--
Benzene	1.E-07	3.E-03	7.E-08	6.E-02	--
Benzo(a)anthracene	5.E-09	--	3.E-09	--	--
Benzo(a)pyrene	5.E-08	2.E-04	3.E-08	2.E-04	4.E-04
Benzo(b&j)fluoranthene	2.E-08	--	1.E-08	--	--
Benzo(k)fluoranthene	2.E-08	--	1.E-08	--	--
Chrysene	9.E-09	--	5.E-09	--	--
cis-1,2-Dichloroethene	--	1.E-02	--	2.E-02	--
Ethylbenzene	--	2.E-06	--	9.E-06	--
Fluoranthene	5.E-09	1.E-05	3.E-09	3.E-05	--
n-Hexane	--	3.E-06	--	6.E-06	--
Phenanthrene	--	6.E-05	--	1.E-03	--
Pyrene	1.E-09	5.E-05	7.E-10	9.E-05	--
trans-1,2-Dichloroethene	--	9.E-05	--	6.E-04	--
Trichloroethylene	**8.E-06**	**4.E-01**	**4.E-06**	**7.E+00**	**1.E+01**
Zinc	--	3.E-04	--	7.E-03	--
Vinyl Chloride	**1.E-05**	6.E-03	**7.E-06**	1.E-01	--
B(a)PE	2.E-07	--	1.E-07	--	--
PHC F2	--	1.E-01	--	**2.E+00**	--
PHC F3	--	**6.E-01**	--	**1.E+00**	--
PHC F4	--	3.E-02	--	6.E-02	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

B(a)PE = benzo(a)pyrene equivalent

Table 4-31. Summary of Predicted Direct Contact Risk from Soil (Dermal Contact and Ingestion)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor/ Construction/ Utility Worker
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Parameter/Dose	**HQ**	**HQ**	**ILCR**	**ILCR**	**HQ**	**ILCR**	**HQ**	**ILCR**	**HQ**	**HQ**
Acenaphthene	2.E-02	--	2.E-07	2.E-07	3.E-03	8.E-09	1.E-04	4.E-09	3.E-04	--
Antimony	4.E-02	--	--	--	5.E-03	--	2.E-04	--	5.E-03	--
Arsenic	**5.E-01**	--	**2.E-04**	**1.E-04**	5.E-02	**7.E-06**	2.E-03	**4.E-06**	5.E-02	--
Benzo(a)anthracene	--	--	**4.E-06**	**3.E-06**	--	2.E-07	--	9.E-08	--	--
Benzo(a)pyrene	**6.E+00**	**7.E-01**	**3.E-04**	**2.E-04**	**7.E-01**	**1.E-05**	4.E-02	**6.E-06**	4.E-02	9.E-02
Benzo(b)fluoranthene	--	--	**4.E-05**	**3.E-05**	--	**2.E-06**	--	8.E-07	--	--
Benzo(g,h,i)perylene	--	--	1.E-06	1.E-06	--	6.E-08	--	3.E-08	--	--
Benzo(k)fluoranthene	--	--	**1.E-05**	**1.E-05**	--	6.E-07	--	3.E-07	--	--
Cadmium	**9.E+00**	--	--	--	**8.E-01**	--	4.E-02	--	**8.E-01**	--
Chrysene	--	--	**4.E-06**	**3.E-06**	--	2.E-07	--	8.E-08	--	--
Cobalt	**4.E+00**	--	--	--	**4.E-01**	--	2.E-02	--	4.E-02	--
Copper	**3.E+00**	--	--	--	**3.E-01**	--	2.E-02	--	**3.E-01**	--
Dibenzo(a,h)anthracene	--	--	**5.E-05**	**4.E-05**	--	**2.E-06**	--	1.E-06	--	--
Fluoranthene	2.E-01	--	**1.E-05**	**1.E-05**	3.E-02	6.E-07	1.E-03	3.E-07	3.E-03	--
Indeno(1,2,3-Cd)Pyrene	--	--	**2.E-05**	**1.E-05**	--	7.E-07	--	4.E-07	--	--
Iron	**3.E+00**	--	--	--	**4.E-01**	--	2.E-02	--	**4.E-01**	--
PCB, Total	**1.E+00**	--	--	--	1.E-01	--	7.E-03	--	9.E-02	--
Phenanthrene	**3.E-01**	--	--	--	4.E-02	--	2.E-03	--	4.E-02	--
Pyrene	2.E-01	--	1.E-06	8.E-07	3.E-02	4.E-08	1.E-03	2.E-08	3.E-03	--
Thallium	**5.E+00**	--	--	--	**4.E-01**	--	2.E-02	--	4.E-02	--
Trichloroethylene	**8.E-01**	8.E-02	**2.E-06**	**2.E-06**	8.E-02	9.E-08	4.E-03	5.E-08	8.E-02	2.E-01
Vanadium	**6.E-01**	7.E-02	--	--	7.E-02	--	4.E-03	--	7.E-02	1.E-01
Zinc	**3.E+00**	--	--	--	**3.E-01**	--	2.E-02	--	**3.E-01**	--
B(a)PE	--	--	**5.E-04**	**4.E-04**	--	**2.E-05**	--	**1.E-05**	--	--
PHC F2	**7.E-01**	--	--	--	8.E-02	--	5.E-03	--	4.E-02	--
PHC F3	**2.E+00**	--	--	--	2.E-01	--	2.E-02	--	5.E-02	--
PHC F4	**7.E-01**	--	--	--	1.E-01	--	5.E-03	--	1.E-02	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

> = greater than

B(a)PE = benzo(a)pyrene equivalent

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

mo = month

PCB = polychlorinated biphenyl

PHC = petroleum hydrocarbon

y = year

Table 4-32a. Summary of Predicted Direct Contact Risk from Potable Groundwater (Dermal Contact and Ingestion)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5-11 y)	Teen Resident (12-19y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated ILCR**
1,1-Dichloroethane	1.E-02	1.E-02	7.E-03	5.E-03	6.E-03	--	**7.E-06**
1,1-Dichloroethene	1.E-01	1.E-01	8.E-02	6.E-02	7.E-02	--	--
2-(1-)Methylnaphthalene	**1.E+01**	**1.E+01**	**9.E+00**	**7.E+00**	**6.E+00**	--	--
Acenaphthene	1.E-01	1.E-01	9.E-02	7.E-02	6.E-02	--	**4.E-06**
Arsenic	**2.E+01**	**2.E+01**	**9.E+00**	**6.E+00**	**7.E+00**	--	**2.E-02**
Benzene	**2.E+01**	**2.E+01**	**9.E+00**	**6.E+00**	**7.E+00**	--	**3.E-04**
Benzo(a)anthracene	--	--	--	--	--	--	**1.E-04**
Benzo(a)pyrene	**1.E+01**	**9.E+00**	**9.E+00**	**7.E+00**	**6.E+00**	**6.E+00**	**2.E-03**
Benzo(b&j)fluoranthene	--	--	--	--	--	--	**4.E-04**
Benzo(k)fluoranthene	--	--	--	--	--	--	**7.E-04**
Chrysene	--	--	--	--	--	--	**2.E-04**
cis-1,2-Dichloroethene	**5.E+01**	**5.E+01**	**3.E+01**	**2.E+01**	**2.E+01**	--	--
Ethylbenzene	1.E-02	1.E-02	7.E-03	6.E-03	6.E-03	--	--
Fluoranthene	**3.E-01**	2.E-01	2.E-01	2.E-01	2.E-01	--	**7.E-05**
n-Hexane	3.E-02	3.E-02	2.E-02	2.E-02	1.E-02	--	--
Phenanthrene	**8.E-01**	**6.E-01**	**5.E-01**	**4.E-01**	**4.E-01**	--	--
Pyrene	**8.E-01**	**6.E-01**	**5.E-01**	**4.E-01**	**4.E-01**	--	**1.E-05**
trans-1,2-Dichloroethene	**5.E-01**	**5.E-01**	**3.E-01**	2.E-01	2.E-01	--	--
Trichloroethylene	**2.E+03**	**2.E+03**	**1.E+03**	**8.E+02**	**8.E+02**	**9.E+02**	**2.E-02**
Zinc	**2.E+00**	**2.E+00**	**9.E-01**	**6.E-01**	**7.E-01**	--	--
Vinyl Chloride	**3.E+01**	**3.E+01**	**2.E+01**	**1.E+01**	**1.E+01**	--	**7.E-02**
B(a)PE	--	--	--	--	--	--	**7.E-03**
PHC F2	**9.E+02**	**8.E+02**	**6.E+02**	**4.E+02**	**4.E+02**	--	--
PHC F3	**6.E+03**	**6.E+03**	**4.E+03**	**3.E+03**	**3.E+03**	--	--
PHC F4	**1.E+02**	**1.E+02**	**7.E+01**	**5.E+01**	**6.E+01**	--	--

Notes:
Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-5}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])
-- = not applicable
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
B(a)PE = benzo(a)pyrene equivalent

Table 4-32b. Summary of Predicted Direct Contact Risk from Groundwater (Dermal Contact and Ingestion for Subsurface Workers) *Risk Assessment, 200 Beverley Street, Guelph, Ontario*

Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker
Parameter/Dose	Estimated ILCR	Estimated HQ	Estimated ILCR	Estimated HQ	Estimated HQ
1,1-Dichloroethane	5.E-09	4.E-06	2.E-09	8.E-06	--
1,1-Dichloroethene	--	4.E-05	--	8.E-04	--
2-(1-)Methylnaphthalene	--	8.E-03	--	2.E-01	--
Acenaphthene	5.E-09	8.E-05	2.E-09	2.E-04	--
Arsenic	**1.E-05**	4.E-03	**5.E-06**	7.E-02	--
Benzene	2.E-07	4.E-03	1.E-07	9.E-02	--
Benzo(a)anthracene	2.E-07	--	1.E-07	--	--
Benzo(a)pyrene	**4.E-06**	1.E-02	**2.E-06**	1.E-02	3.E-02
Benzo(b&j)fluoranthene	7.E-07	--	4.E-07	--	--
Benzo(k)fluoranthene	1.E-06	--	6.E-07	--	--
Chrysene	4.E-07	--	2.E-07	--	--
cis-1,2-Dichloroethene	--	1.E-02	--	3.E-02	--
Ethylbenzene	--	5.E-06	--	3.E-05	--
Fluoranthene	1.E-07	3.E-04	6.E-08	6.E-04	--
n-Hexane	--	2.E-05	--	4.E-05	--
Phenanthrene	--	6.E-04	--	1.E-02	--
Pyrene	2.E-08	6.E-04	1.E-08	1.E-03	--
trans-1,2-Dichloroethene	--	1.E-04	--	8.E-04	--
Trichloroethylene	**1.E-05**	**5.E-01**	**6.E-06**	**1.E+01**	**2.E+01**
Zinc	--	3.E-04	--	7.E-03	--
Vinyl Chloride	**2.E-05**	8.E-03	**9.E-06**	2.E-01	--
B(a)PE	**1.E-05**	--	**7.E-06**	--	--
PHC F2	--	**5.E-01**	--	**8.E+00**	--
PHC F3	--	**4.E+00**	--	**9.E+00**	--
PHC F4	--	3.E-02	--	6.E-02	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs] or HQ>0.5 [for PHCs])

-- = not applicable

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

B(a)PE = benzo(a)pyrene equivalent

Table 4-33. Predicted Inhalation Risks from Fugitive Dust Derived from Soil
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Toddler Resident (6 mo. – 4 y)	Female Adult Resident (20+ y)	Composite Resident	Outdoor Worker		Utility Worker		Construction Worker		Pregnant Female Outdoor Worker	Pregnant Female Construction/Utility Worker
	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated	Estimated
Parameter/Dose	HQ	HQ	ILCR	ILCR	HQ	ILCR	HQ	ILCR	HQ	HQ	HQ
Acenaphthene	--	--	2.E-12	1.E-11	--	8.E-11	--	4.E-11	--	--	--
Antimony	6.E-06	--	--	--	2.E-05	--	1.E-04	--	3.E-03	--	--
Arsenic	--	--	1.E-10	7.E-10	--	5.E-09	--	3.E-09	--	--	--
Benzo(a)anthracene	--	--	5.E-11	3.E-10	--	2.E-09	--	9.E-10	--	--	--
Benzo(a)pyrene	4.E-03	3.E-02	3.E-09	2.E-08	1.E-02	1.E-07	9.E-02	6.E-08	**2.E+00**	7.E-02	**9.E+00**
Benzo(b)fluoranthene	--	--	4.E-10	2.E-09	--	2.E-08	--	8.E-09	--	--	--
Benzo(g,h,i)perylene	--	--	2.E-11	9.E-11	--	6.E-10	--	3.E-10	--	--	--
Benzo(k)fluoranthene	--	--	2.E-10	8.E-10	--	6.E-09	--	3.E-09	--	--	--
Cadmium	5.E-04	--	3.E-08	2.E-07	2.E-03	1.E-06	1.E-02	6.E-07	2.E-01	--	--
Chrysene	--	--	4.E-11	2.E-10	--	2.E-09	--	8.E-10	--	--	--
Cobalt	4.E-03	--	2.E-15	9.E-15	1.E-02	6.E-14	9.E-02	3.E-14	**5.E-01**	--	--
Copper	1.E-04	--	--	--	5.E-04	--	3.E-03	--	7.E-02	--	--
Dibenzo(a,h)anthracene	--	--	6.E-10	3.E-09	--	2.E-08	--	1.E-08	--	--	--
Fluoranthene	--	--	2.E-10	8.E-10	--	6.E-09	--	3.E-09	--	--	--
Indeno(1,2,3-Cd)Pyrene	--	--	2.E-10	1.E-09	--	7.E-09	--	4.E-09	--	--	--
Iron	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	2.E-07	--	6.E-12	3.E-11	7.E-07	2.E-10	5.E-06	1.E-10	9.E-05	--	--
Phenanthrene	1.E-06	--	--	--	4.E-06	--	2.E-05	--	5.E-04	--	--
Pyrene	--	--	1.E-11	6.E-11	--	4.E-10	--	2.E-10	--	--	--
Thallium	--	--	--	--	--	--	--	--	--	--	--
Trichloroethylene	1.E-06	9.E-06	6.E-12	3.E-11	4.E-06	2.E-10	3.E-05	1.E-10	5.E-04	2.E-05	3.E-03
Vanadium	6.E-06	--	--	--	2.E-05	--	1.E-04	--	3.E-03	--	--
Zinc	3.E-03	--	--	--	1.E-02	--	7.E-02	--	**1.E+00**	--	--
B(a)PE	--	--	6.E-09	3.E-08	--	2.E-07	--	1.E-07	--	--	--
PHC F2	4.E-07	--	--	--	1.E-06	--	9.E-06	--	2.E-04	--	--
PHC F3	--	--	--	--	--	--	--	--	--	--	--
PHC F4	--	--	--	--	--	--	--	--	--	--	--

Notes:
Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 [for non-PHC COCs) or HQ>0.5 [for PHCs]).
- = not applicable
B(a)PE = benzo(a)pyrene equivalent
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
mo = month
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
y = year

Table 4-34a. Predicted Risk from Inhalation of Vapours in Indoor Air from Soil (Generic Commercial Building)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Indoor Worker		Pregnant Female Indoor Worker
Parameter/Dose	Estimated ILCR	Estimated HQ	Estimated HQ
Acenaphthene	5.E-07	--	--
Acenaphthylene	7.E-08	--	--
Anthracene	--	2.E-03	--
Benzene	**1.E-05**	**5.E-01**	--
Benzo(a)anthracene	1.E-08	--	--
Ethylbenzene	--	2.E-02	--
Fluorene	--	8.E-03	--
Mercury	--	6.E-02	--
2-(1-)Methylnaphthalene	--	6.E-03	--
Naphthalene	--	**6.E+00**	--
Phenanthrene	--	9.E-03	--
Trichloroethylene	**1.E-02**	**1.E+03**	**4.E+03**
Xylenes, total	--	4.E-02	--
PHC F2	--	**9.E+00**	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 for non-PHC COCs; HQ>0.5 for PHCs and TCE)

- = not applicable
> = greater than
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
PHC = petroleum hydrocarbon
MECP = Ontario Ministry of the Environment, Conservation and Parks
TCE = Trichloroethylene

Table 4-34b. Predicted Risk from Inhalation of Vapours in Indoor Air from Soil
(Generic Residential Building)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5-11 y)	Teen Resident (12-19y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident
Parameter/Dose	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated ILCR**
Acenaphthene	--	--	--	--	--	--	**8.E-06**
Acenaphthylene	--	--	--	--	--	--	1.E-06
Anthracene	4.E-02	4.E-02	3.E-02	3.E-02	3.E-02	--	--
Benzene	**8.E+00**	**8.E+00**	**7.E+00**	**7.E+00**	**7.E+00**	--	**1.E-04**
Benzo(a)anthracene	--	--	--	--	--	--	2.E-07
Ethylbenzene	2.E-01	2.E-01	2.E-01	2.E-01	2.E-01	--	--
Fluorene	1.E-01	1.E-01	1.E-01	1.E-01	1.E-01	--	--
Mercury	**9.E-01**	**9.E-01**	**9.E-01**	**8.E-01**	**8.E-01**	--	--
2-(1-)Methylnaphthalene	1.E-01	1.E-01	9.E-02	9.E-02	9.E-02	--	--
Naphthalene	**9.E+01**	**9.E+01**	**8.E+01**	**8.E+01**	**8.E+01**	--	--
Phenanthrene	1.E-01	1.E-01	1.E-01	1.E-01	1.E-01	--	--
Trichloroethylene	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**1.E-01**
Xylenes, total	**6.E-01**	**6.E-01**	**6.E-01**	**6.E-01**	**6.E-01**	--	--
PHC F2	**1.E+02**	**1.E+02**	**1.E+02**	**1.E+02**	**1.E+02**	--	--

Notes:
Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10^{-6}, HQ>0.2 for non-PHC COCs; HQ>0.5 for PHCs and TCE)
- = not applicable
> = greater than
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
PHC = petroleum hydrocarbon
MECP = Ontario Ministry of the Environment, Conservation and Parks
TCE = Trichloroethylene

Table 4-35a. Predicted Risk from Inhalation of Vapours in Indoor Air from Groundwater (Generic Commercial Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Indoor Worker		Female Indoor Worker
Parameter and Dose	**Estimated ILCR**	**Estimated HQ**	**Estimated HQ**
Acenaphthene	1.E-07	--	--
Anthracene	--	7.E-04	--
Benzene	**3.E-05**	**1.E+00**	--
Benzo(a)anthracene	2.E-08	--	--
1,1-Dichloroethane	**1.E-05**	4.E-02	--
1,1-Dichloroethene	--	**3.E-01**	--
cis-1,2-Dichloroethene	--	**2.E+00**	--
trans-1,2-Dichloroethene	--	**5.E-01**	--
n-Hexane	--	**7.E-01**	--
2-(1-)Methylnaphthalene	--	7.E-02	--
Naphthalene	--	8.E-02	--
Phenanthrene	--	2.E-03	--
Tetrachloroethene	2.E-07	2.E-02	--
1,1,1-Trichloroethane	--	2.E-02	--
Trichloroethylene	**1.E-02**	**1.E+03**	**5.E+03**
Vinyl Chloride	**4.E-03**	**2.E+01**	--
PHC F1	--	**3.E+00**	--
PHC F2	--	**6.E+02**	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10-6, HQ>0.2 for non-PHC COCs or HQ>0.5 for PHC and TCE)

- = not applicable

> = greater than

COC = contaminant of concern

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

PHC = petroleum hydrocarbon

MECP = Ontario Ministry of the Environment, Conservation and Parks

TCE = trichloroethylene

Table 4-35b. Predicted Risk from Inhalation of Vapours in Indoor Air from Groundwater (Generic Residential Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5-11 y)	Teen Resident (12-19y)	Adult Resident (20+ y)	Pregnant Female Resident (20+ y)	Composite Resident
Parameter and Dose	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated HQ**	**Estimated ILCR**
Acenaphthene	--	--	--	--	--	--	**2.E-06**
Anthracene	1.E-02	1.E-02	1.E-02	1.E-02	1.E-02	--	--
Benzene	**2.E+01**	**2.E+01**	**2.E+01**	**2.E+01**	**2.E+01**	--	**5.E-04**
Benzo(a)anthracene	--	--	--	--	--	--	4.E-07
1,1-Dichloroethane	**6.E-01**	**6.E-01**	**6.E-01**	**6.E-01**	**6.E-01**	--	**2.E-04**
1,1-Dichloroethene	**6.E+00**	**6.E+00**	**5.E+00**	**5.E+00**	**5.E+00**	--	--
cis-1,2-Dichloroethene	**4.E+01**	**4.E+01**	**4.E+01**	**4.E+01**	**4.E+01**	--	--
trans-1,2-Dichloroethene	**8.E+00**	**8.E+00**	**7.E+00**	**7.E+00**	**7.E+00**	--	--
n-Hexane	**1.E+01**	**1.E+01**	**1.E+01**	**1.E+01**	**1.E+01**	--	--
2-(1-)Methylnaphthalene	**1.E+00**	**1.E+00**	**1.E+00**	**1.E+00**	**1.E+00**	--	--
Naphthalene	**1.E+00**	**1.E+00**	**1.E+00**	**1.E+00**	**1.E+00**	--	--
Phenanthrene	3.E-02	3.E-02	3.E-02	3.E-02	3.E-02	--	--
Tetrachloroethene	**3.E-01**	**3.E-01**	2.E-01	2.E-01	2.E-01	--	**3.E-06**
1,1,1-Trichloroethane	**4.E-01**	**4.E-01**	**4.E-01**	**4.E-01**	**4.E-01**	--	--
Trichloroethylene	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**2.E+04**	**2.E-01**
Vinyl Chloride	**3.E+02**	**3.E+02**	**3.E+02**	**3.E+02**	**3.E+02**	--	**1.E-01**
PHC F1	**6.E+01**	**6.E+01**	**5.E+01**	**5.E+01**	**5.E+01**	--	--
PHC F2	**8.E+03**	**8.E+03**	**8.E+03**	**8.E+03**	**8.E+03**	--	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR>10-6, HQ>0.2 for non-PHC COCs or HQ>0.5 for PHC and TCE)

- = not applicable
> = greater than
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
PHC = petroleum hydrocarbon
MECP = Ontario Ministry of the Environment, Conservation and Parks
TCE = trichloroethylene

Table 4-36. Predicted Risks from Inhalation of Vapour in Outdoor Air (Above Ground)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter and Dose	Infant Resident (0 – 5 mo.) Estimated HQ	Toddler Resident (6 mo. – 4 y) Estimated HQ	Child Resident (5-11 y) Estimated HQ	Teen Resident (12-19y) Estimated HQ	Adult Resident (20+ y) Estimated HQ	Composite Resident Estimated ILCR	Outdoor Worker Estimated ILCR	Outdoor Worker Estimated HQ	Utility Worker Estimated ILCR	Utility Worker Estimated HQ	Construction Worker Estimated ILCR	Construction Worker Estimated HQ	Pregnant Female Construction, Outdoor, Resident, and Utility Worker Estimated HQ
Acenaphthene	--	--	--	--	--	5.E-09	1.E-08	--	8.E-10	--	4.E-10	--	--
Acenaphthylene	--	--	--	--	--	8.E-10	2.E-09	--	1.E-10	--	6.E-11	--	--
Anthracene	3.E-05	3.E-05	6.E-05	6.E-05	3.E-05	--	--	1.E-04	--	6.E-06	--	1.E-04	--
Benzene	3.E-05	3.E-05	6.E-05	6.E-05	3.E-05	7.E-10	2.E-09	1.E-04	1.E-10	5.E-06	6.E-11	1.E-04	--
Benzo(a)anthracene	--	--	--	--	--	3.E-13	7.E-13	--	4.E-14	--	2.E-14	--	--
1,1-Dichloroethane	3.E-07	3.E-07	6.E-07	6.E-07	3.E-07	9.E-11	3.E-10	1.E-06	1.E-11	5.E-08	7.E-12	1.E-06	--
1,1-Dichloroethene	2.E-07	2.E-07	5.E-07	5.E-07	2.E-07	--	--	8.E-07	--	4.E-08	--	2.E-06	--
cis-1,2-Dichloroethene	8.E-06	8.E-06	2.E-05	2.E-05	8.E-06	--	--	3.E-05	--	1.E-06	--	3.E-05	--
trans-1,2-Dichloroethene	8.E-07	8.E-07	2.E-06	2.E-06	8.E-07	--	--	3.E-06	--	1.E-07	--	2.E-07	--
Ethylbenzene	2.E-06	2.E-06	4.E-06	4.E-06	2.E-06	--	--	8.E-06	--	4.E-07	--	8.E-06	--
Fluorene	9.E-05	9.E-05	2.E-04	2.E-04	9.E-05	--	--	3.E-04	--	2.E-05	--	3.E-04	--
n-Hexane	1.E-06	1.E-06	3.E-06	3.E-06	1.E-06	--	--	5.E-06	--	2.E-07	--	5.E-06	--
Mercury	5.E-04	5.E-04	9.E-04	9.E-04	5.E-04	--	--	2.E-03	--	8.E-05	--	2.E-03	--
2-(1-)Methylnaphthalene	4.E-05	4.E-05	8.E-05	8.E-05	4.E-05	--	--	1.E-04	--	7.E-06	--	1.E-04	--
Naphthalene	2.E-02	2.E-02	4.E-02	4.E-02	2.E-02	--	--	6.E-02	--	3.E-03	--	6.E-02	--
Phenanthrene	1.E-04	1.E-04	3.E-04	3.E-04	1.E-04	--	--	4.E-04	--	2.E-05	--	4.E-04	--
Tetrachloroethene	1.E-06	1.E-06	2.E-06	2.E-06	1.E-06	1.E-11	4.E-11	4.E-06	2.E-12	2.E-07	1.E-12	1.E-07	--
1,1,1-Trichloroethane	5.E-08	5.E-08	9.E-08	9.E-08	5.E-08	--	--	2.E-07	--	8.E-09	--	4.E-08	--
Trichloroethylene	2.E-02	2.E-02	4.E-02	4.E-02	2.E-02	2.E-07	6.E-07	7.E-02	3.E-08	3.E-03	1.E-08	7.E-02	3.E-01
Xylenes, Total	5.E-06	5.E-06	1.E-05	1.E-05	5.E-06	--	--	2.E-05	--	1.E-06	--	5.E-06	--
Vinyl Chloride	8.E-06	8.E-06	2.E-05	2.E-05	8.E-06	5.E-09	7.E-09	3.E-05	4.E-10	1.E-06	2.E-10	--	--
PHC F1	3.E-05	3.E-05	6.E-05	6.E-05	3.E-05	--	--	1.E-04	--	5.E-06	--	1.E-04	--
PHC F2	4.E-02	4.E-02	9.E-02	9.E-02	4.E-02	--	--	1.E-01	--	8.E-03	--	1.E-01	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (that is, ILCR>10^{-6} or HQ>0.2 [for non-PHC COCs] or HQ>0.5 for PHCs and TCE)

> = greater than

- = not applicable

COC = contaminant of concern

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

mo. = month(s)

PHC = petroleum hydrocarbon

y = year(s)

TCE = trichloroethylene

Table 4-37. Predicted Risks from Inhalation of Vapour in Outdoor Air (Trench)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Utility Worker		Construction Worker		Pregnant Female Construction and Utility Worker
	Estimated	Estimated	Estimated	Estimated	Estimated
Parameter and Dose	ILCR	HQ	ILCR	HQ	HQ
Acenaphthene	--	--	--	--	--
Acenaphthylene	2.E-09	--	8.E-10	--	--
Anthracene	--	8.E-05	--	2.E-03	--
Benzene	3.E-09	1.E-04	2.E-09	3.E-03	--
Benzo(a)anthracene	5.E-13	--	3.E-13	--	--
1,1-Dichloroethane	4.E-10	1.E-06	2.E-10	3.E-05	--
1,1-Dichloroethene	--	1.E-06	--	6.E-05	--
cis-1,2-Dichloroethene	--	4.E-05	--	9.E-04	--
trans-1,2-Dichloroethene	--	4.E-06	--	6.E-06	--
Ethylbenzene	--	1.E-05	--	2.E-04	--
Fluorene	--	2.E-04	--	4.E-03	--
n-Hexane	--	8.E-06	--	1.E-04	--
Mercury	--	1.E-03	--	2.E-02	--
2-(1-)Methylnaphthalene	--	9.E-05	--	2.E-03	--
Naphthalene	--	4.E-02	--	**9.E-01**	--
Phenanthrene	--	3.E-04	--	6.E-03	--
Tetrachloroethene	6.E-11	6.E-06	3.E-11	4.E-06	--
1,1,1-Trichloroethane	--	3.E-07	--	1.E-06	--
Trichloroethylene	8.E-07	1.E-01	4.E-07	**2.E+00**	**9.E+00**
Xylenes, Total	--	3.E-05	--	1.E-04	--
Vinyl Chloride	1.E-08	4.E-05	6.E-09	8.E-04	--
PHC F1	--	1.E-04	--	3.E-03	--
PHC F2	--	1.E-01	--	**3.E+00**	--

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (that is, ILCR>10^{-6} or HQ>0.2 [for non-PHC COCs] or HQ>0.5 for PHCs and TCE)

- = not applicable

> = greater than

COC = contaminant of concern

F = fraction

HQ = hazard quotient

ILCR = Incremental Lifetime Cancer Risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

TCE = trichloroethylene

Table 4-38. Predicted Risks from Inhalation of Vapour in Outdoor Air (Above Ground and in a Trench)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter and Dose	Utility Worker		Construction Worker		Adult Female Construction and Utility Worker
	Estimated ILCR	Estimated HQ	Estimated ILCR	Estimated HQ	Estimated HQ
Acenaphthene	8.E-10	--	4.E-10	--	--
Acenaphthylene	2.E-09	--	9.E-10	--	--
Anthracene	--	8.E-05	--	2.E-03	--
Benzene	3.E-09	1.E-04	2.E-09	3.E-03	--
Benzo(a)anthracene	6.E-13	--	3.E-13	--	--
1,1-Dichloroethane	4.E-10	2.E-06	2.E-10	3.E-05	--
1,1-Dichloroethene	--	1.E-06	--	7.E-05	--
cis-1,2-Dichloroethene	--	5.E-05	--	9.E-04	--
trans-1,2-Dichloroethene	--	5.E-06	--	7.E-06	--
Ethylbenzene	--	1.E-05	--	2.E-04	--
Fluorene	--	2.E-04	--	5.E-03	--
n-Hexane	--	8.E-06	--	2.E-04	--
Mercury	--	1.E-03	--	2.E-02	--
2-(1-)Methylnaphthalene	--	1.E-04	--	2.E-03	--
Naphthalene	--	5.E-02	--	**9.E-01**	--
Phenanthrene	--	3.E-04	--	7.E-03	--
Tetrachloroethene	7.E-11	6.E-06	3.E-11	4.E-06	--
1,1,1-Trichloroethane	--	3.E-07	--	1.E-06	--
Trichloroethylene	9.E-07	1.E-01	5.E-07	**2.E+00**	**9.E+00**
Xylenes, Total	--	3.E-05	--	1.E-04	--
Vinyl Chloride	1.E-08	4.E-05	6.E-09	8.E-04	--
PHC F1	--	1.E-04	--	3.E-03	--
PHC F2	--	2.E-01	--	**3.E+00**	

Notes:

Bold and shaded values indicate a predicted risk exceeding MECP target risk values (that is, ILCR>10^{-6} or HQ>0.2 [for non-PHC COCs] or HQ>0.5 for PHCs and TCE)

- = not applicable
> = greater than
COC = constituent of concern
F = fraction
HQ = hazard quotient
ILCR = Incremental Lifetime Cancer Risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
TCE = trichloroethylene

Table 4-39. Determination of Toxicity from Nutritionally Essential Elements in RA Property Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Element	RDA/AI [a]	UL [a, b]	Exposure Point Concentration - Soil	Soil Intake [c]	Site Intake/ RDA = >1?	Site Intake/ UL = >1?
	mg/day	mg/day	(mg/kg)	(mg/day)		
Calcium	700	2500	260000	52	0.07	0.02
Magnesium	80	65	140000	28	0.35	0.43

[a.] Obtained from Health Canada, Dietary Reference Intake Tables. Values for children aged 1-3 selected. https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/fn-an/alt_formats/hpfb-dgpsa/pdf/nutrition/dri_tables-eng.pdf

[b.] The "UL for magnesium represents intake from a pharmacological agent only and does not include intake from food and water."

[c.] Soil intake is conservatively calculated based on a maximum soil ingestion rate of 200 mg/day, consistent with a toddlers ingestion exposure to soil.

Notes:

= = equals

> = greater than

AI = adequate intake

L/d = litre(s) per day

mg/day = milligram(s) per day

mg/kg = milligram(s) per kilogram

mg/L = milligram(s) per litre

NA = not applicable

RDA = recommended daily allowance

UL = tolerable upper intake level

Table 4-~~39~~40. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS Source HH	HH Risk Management Required [c]
Soil (Full Depth)	2-(1-)Methylnaphthalene	µg/g	4.93	0.5	0.99	5.9	Est Max	None
Soil (Full Depth)	Acenaphthene	µg/g	94	0.63	7.9	110	Est Max	Yes, Vapour Protection
Soil (Full Depth)	Acenaphthylene	µg/g	1	2	0.15	2	Est Max	None
Soil (Full Depth)	Anthracene	µg/g	160	0.5	0.67	190	Est Max	None
Soil (Full Depth)	Antimony	µg/g	18.6	2	7.5	22	Est Max	None
Soil (Full Depth)	Arsenic	µg/g	23	--	18	27	Est Max	Yes, Surface Cover for Site Users; PPE for Subsurface Workers
Soil (Full Depth)	Benzene	µg/g	0.26	0.1	0.21	0.31	Est Max	Yes, Vapour Protection
Soil (Full Depth)	Benzo(a)anthracene	µg/g	200	0.5	0.5	240	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Benzo(a)pyrene	µg/g	130	0.5	0.3	150	Est Max	Yes, Surface Cover for Site Users; Dust Suppression during Construction Activities; PPE for Subsurface Workers
Soil (Full Depth)	Benzo(b)fluoranthene	µg/g	190	0.5	0.78	220	Est Max	Yes, Surface Cover for Site Users; PPE for Subsurface Workers
Soil (Full Depth)	Benzo(g,h,i)perylene	µg/g	70	0.5	6.6	84	Est Max	None
Soil (Full Depth)	Benzo(k)fluoranthene	µg/g	66	0.5	0.78	79	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Bismuth	µg/g	150	1	--	180	Est Max	None
Soil (Full Depth)	Cadmium	µg/g	83.4	0.5	1.2	100	Est Max	Yes, Surface Cover for Site Users; PPE for Subsurface Workers
Soil (Full Depth)	Calcium	µg/g	220000	--	--	260000	Est Max	None
Soil (Full Depth)	Chrysene	µg/g	180	0.5	7	210	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Cobalt	µg/g	393	2	22	470	Est Max	Yes, Surface Cover for Site Users; Dust Suppression during Construction Activities
Soil (Full Depth)	Copper	µg/g	2460	--	140	2900	Est Max	Yes, Surface Cover for Site Users; PPE for Subsurface Workers
Soil (Full Depth)	Dibenzo(a,h)anthracene	µg/g	26	0.5	0.1	31	Est Max	Yes, Surface Cover for Site Users; PPE for Subsurface Workers
Soil (Full Depth)	Electrical Conductivity	mS/cm	2.19	--	0.7	2.6	Est Max	None
Soil (Full Depth)	Ethylbenzene	µg/g	4.1	0.05	1.1	4.9	Est Max	None
Soil (Full Depth)	Fluoranthene	µg/g	660	0.5	0.69	790	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Fluorene	µg/g	150	0.63	62	180	Est Max	None
Soil (Full Depth)	Indeno(1,2,3-Cd)Pyrene	µg/g	80	0.5	0.38	96	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Iron	µg/g	128000	--	--	150000	Est Max	Yes, Surface Cover for Site Users; Dust Suppression During Construction Activities; PPE for Subsurface Workers
Soil (Full Depth)	Lead	µg/g	10100	--	120	12000	Est Max	Yes, Surface Cover for Site Users; Dust Suppression During Construction Activities
Soil (Full Depth)	Magnesium	µg/g	120000	--	--	140000	Est Max	None
Soil (Full Depth)	Mercury	µg/g	0.319	0.05	0.27	0.38	Est Max	Yes, Vapour Protection
Soil (Full Depth)	Molybdenum	µg/g	35	3	6.9	42	Est Max	None
Soil (Full Depth)	Naphthalene	µg/g	220	0.25	0.6	260	Est Max	Yes, Vapour Protection; Trench Air Monitoring
Soil (Full Depth)	Nickel	µg/g	117	2	100	140	Est Max	None
Soil (Full Depth)	PCB, Total	µg/g	1.65	0.05	0.35	1.9	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	PHC F2	µg/g	3600	50	98	4300	Est Max	Yes, Surface Cover for Site Users; Vapour Protection; Trench Air Monitoring

Table 4-~~39~~40. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS Source HH	HH Risk Management Required [c]
Soil (Full Depth)	PHC F3	µg/g	23000	50	300	27000	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	PHC F4	µg/g	7300	50	2800	8700	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Phenanthrene	µg/g	900	0.46	6.2	1000	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Pyrene	µg/g	470	0.5	78	560	Est Max	None
Soil (Full Depth)	Thallium	µg/g	6	2	1	7.2	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Trichloroethylene	µg/g	35.4	0.05	0.061	42	Est Max	Yes, Surface Cover for Site Users; Vapour Protection; Trench Air Monitoring
Soil (Full Depth)	Vanadium	µg/g	100	0.3	86	120	Est Max	Yes, Surface Cover for Site Users
Soil (Full Depth)	Xylenes, Total	µg/g	3.9	0.07	3.1	4.6	Est Max	Yes, Vapour Protection
Soil (Full Depth)	Zinc	µg/g	67200	--	340	80000	Est Max	Yes, Surface Cover for Site Users; Dust Suppression during Construction Activities; PPE for Subsurface Workers
Groundwater	1,1,1-Trichloroethane	µg/L	37.1	20	23	44	Est Max	Yes, Vapour Protection
Groundwater	1,1-Dichloroethane	µg/L	29.5	5	5	35	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	1,1,1-Trichloroethane	µg/L	37.1	20	23	44	Est Max	Yes, Vapour Protection
Groundwater	1,1-Dichloroethane	µg/L	29.5	5	5	35	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	1,1-Dichloroethene	µg/L	64	25	0.5	76	Est Max	Yes, Vapour Protection
Groundwater	2-(1-)Methylnaphthalene	µg/L	280	14	3.2	330	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Acenaphthene	µg/L	40	10	4.1	48	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Anthracene	µg/L	31	20	1	37	Est Max	None
Groundwater	Arsenic	µg/L	45.7	1	25	54	Est Max	Yes, PPE for Subsurface Workers; Prohibition of Groundwater for Potable Uses
Groundwater	Benzene	µg/L	66.8	5	0.5	80	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Benzo(a)anthracene	µg/L	21	5	1	25	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Benzo(a)pyrene	µg/L	2.4	2	0.01	2.8	Est Max	Yes, PPE for Subsurface Workers; Prohibition of Groundwater for Potable Uses
Groundwater	Benzo(b&j)fluoranthene	µg/L	6.1	10	0.1	10	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Benzo(k)fluoranthene	µg/L	0.06	10	0.1	10	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Chrysene	µg/L	38	10	0.1	45	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	cis-1,2-Dichloroethene	µg/L	960	5	1.6	1100	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Ethylbenzene	µg/L	8.46	5	2.4	10	Est Max	None
Groundwater	Fluoranthene	µg/L	24	20	0.41	28	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Lead	µg/L	17	0.5	10	20	Est Max	Yes, Prohibition of Groundwater for Potable Uses

Table 4-~~39~~40. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS Source HH	HH Risk Management Required [c]
Groundwater	Naphthalene	µg/L	27	15	7	32	Est Max	Yes, Vapour Protection; Trench Air Monitoring
Groundwater	n-Hexane	µg/L	7.46	5	5	8.9	Est Max	Yes, Vapour Protection
Groundwater	PHC F1	µg/L	550	100	420	660	Est Max	Yes, Vapour Protection
Groundwater	PHC F2	µg/L	210000	100	150	250000	Est Max	Yes, PPE for Subsurface Workers; Prohibition of Groundwater for Potable Uses; Vapour Protection; Trench Air Monitoring
Groundwater	PHC F3	µg/L	850000	500	500	1000000	Est Max	Yes, PPE for Subsurface Workers; Prohibition of Groundwater for Potable Uses
Groundwater	PHC F4	µg/L	37000	500	500	44000	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Phenanthrene	µg/L	110	1.4	1	130	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Trench Air Monitoring
Groundwater	Pyrene	µg/L	59	0.05	4.1	70	Est Max	Yes, Prohibition of Groundwater for Potable Uses
Groundwater	Tetrachloroethene	µg/L	1.14	0.5	0.5	1.3	Est Max	Yes, Vapour Protection
Groundwater	trans-1,2-Dichloroethene	µg/L	81	5	1.6	97	Est Max	Yes, Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Trichloroethylene	µg/L	7900	5	0.5	9400	Est Max	Yes, PPE for Subsurface Workers; Trench Monitoring; Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Vinyl Chloride	µg/L	86	100	0.5	990	Theoretical Max	Yes, PPE for Subsurface Workers; Prohibition of Groundwater for Potable Uses; Vapour Protection
Groundwater	Zinc	µg/L	4500	10	890	5400	Est Max	Yes, Prohibition of Groundwater for Potable Uses

Source:
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

[a.] Maximum concentration detected onsite; all quantitatively assessed COCs were modelled using the estimated site maximums.

[b.] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for Residential Land Use with Coarse Textured Soils (MECP, 2011).

[c.] Risk management required when estimated site maximum results in risks exceeding target levels.

Notes:
- = no value
µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
COC = contaminant of concern
Est Max = estimated maximum
F = fraction
GW = groundwater
HH = human health
max = maximum
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
ND = nondetect
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
PPE = personal protective equipment
PSS = Property-specific standards
RA Property = 200 Beverley Street, Guelph, Ontario
SCS = site condition standard

Table 4-~~40~~41. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Groundwater COCs	Proposed Human Health PSS [a] (µg/L)	Inferred Standard for Nearest Offsite Location (µg/L) [b]	Potential for Offsite Exceedance of Table 6 Standard	Comment	Nearest Offsite Receptor or Location
1,1,1-Trichloroethane	44	23	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
1,1-Dichloroethane	35	5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
1,1-Dichloroethene	76	0.5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
2-(1-)Methylnaphthalene	330	3.2	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Acenaphthene	48	4.1	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Anthracene	37	1	✓	Potentially mobile parameter	-
Arsenic	54	25	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors and Utility/Construction Workers at properties hydraulically downgradient of the RA Property.
Benzene	80	0.5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Benzo(a)anthracene	25	1	×	Mobility not anticipated	-
Benzo(a)pyrene	2.8	0.01	×	Mobility not anticipated	-
Benzo(b&j)fluoranthene	10	0.1	×	Mobility not anticipated	-

Table 4-~~40~~41. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Groundwater COCs	Proposed Human Health PSS [a] (µg/L)	Inferred Standard for Nearest Offsite Location (µg/L) [b]	Potential for Offsite Exceedance of Table 6 Standard	Comment	Nearest Offsite Receptor or Location
Benzo(k)fluoranthene	10	0.1	×	Mobility not anticipated	-
Chrysene	45	0.1	×	Mobility not anticipated	-
cis-1,2-Dichloroethene	1100	1.6	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Ethylbenzene	10	2.4	✓	Potentially mobile parameter	- [c]
Fluoranthene	28	0.41	×	Mobility not anticipated	-
Lead	20	10	×	Mobility not anticipated	-
Naphthalene	32	7	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
n-Hexane	8.9	5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
PHC F1	660	420	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
PHC F2	250000	150	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors and Utility/Construction Workers at properties hydraulically downgradient of the RA Property.
PHC F3	1000000	500	×	Mobility not anticipated	-
PHC F4	44000	500	×	Mobility not anticipated	-
Phenanthrene	130	1	×	Mobility not anticipated	- [c]

Table 4-~~40~~41. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Groundwater COCs	Proposed Human Health PSS [a] (µg/L)	Inferred Standard for Nearest Offsite Location (µg/L) [b]	Potential for Offsite Exceedance of Table 6 Standard	Comment	Nearest Offsite Receptor or Location
Pyrene	70	4.1	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Tetrachloroethene	1.3	0.5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
trans-1,2-Dichloroethene	97	1.6	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.
Trichloroethylene	9400	0.5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors and Utility/Construction Workers at properties hydraulically downgradient of the RA Property.
Vinyl Chloride	100	0.5	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors and Utility/Construction Workers at properties hydraulically downgradient of the RA Property.
Zinc	5400	890	✓	Potentially mobile parameter	Offsite Residents/Surface Receptors at properties hydraulically downgradient of the RA Property.

[a.] The proposed PSS apply to the RA Property only.

[b.] Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition (MECP, 2011)

[c.] Risks greater than MECP targets are not anticipated for onsite receptors for the residential indoor air inhalation (Table 4-35b), direct contact with potable water for residents (Appendix F1, Table F1-4 or Table 4-32a), or incidental direct contact with groundwater for workers (Table 4-32b).

Notes:

Table 4-~~40~~41. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Groundwater COCs	Proposed Human Health PSS [a] (µg/L)	Inferred Standard for Nearest Offsite Location (µg/L) [b]	Potential for Offsite Exceedance of Table 6 Standard	Comment	Nearest Offsite Receptor or Location

- = not applicable
µg/L = microgram(s) per litre
× = No
✓ = Yes
COC = contaminant of concern
F = fraction
MECP = Ontario Ministry of the Environment, Conservation and Parks
PSS = Property-specific Standards
RA Property = 200 Beverley Street, Guelph, Ontario
SCS = Site Condition Standards
PHC = petroleum hydrocarbons

Table 4-~~41a~~42a. Derivation of Soil RBCs Based on Direct Contact (Dermal and Ingestion) - Residential Land Use

Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident		
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated HQ [b]	Estimated HQ [b]	Estimated ILCR [b]	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{C} [c] (µg/g)	Direct Contact [d] (S1)	Overall RBC_{DC} [e] (µg/g)
2-(1-)Methylnaphthalene	5.9	--	--	--	--	--	--	7.2E+01	7.2E+01
Acenaphthene	110	2.E-02	--	2.E-07	1.E+03	--	6.E+02	NA	5.7E+02
Acenaphthylene	2	--	--	--	--	--	--	7.8E+00	7.8E+00
Anthracene	190	--	--	--	--	--	--	5.4E+03	5.4E+03
Antimony	22	4.E-02	--	--	1.E+02	--	--	NA	1.1E+02
Arsenic	27	5.E-01	--	2.E-04	1.E+01	--	1.E-01	NA	1.5E-01
Benzene	0.31	--	--	--	--	--	--	9.3E+00	9.3E+00
Benzo(a)anthracene	240	--	--	4.E-06	--	--	6.E+01	NA	5.7E+01
Benzo(a)pyrene	150	6.E+00	7.E-01	3.E-04	5.E+00	4.E+01	6.E-01	NA	5.7E-01
Benzo(b)fluoranthene	220	--	--	4.E-05	--	--	6.E+00	NA	5.7E+00
Benzo(g,h,i)perylene	84	--	--	1.E-06	--	--	6.E+01	NA	5.7E+01
Benzo(k)fluoranthene	79	--	--	1.E-05	--	--	6.E+00	NA	5.7E+00
Bismuth	180	--	--	--	--	--	--	NA	1.8E+02
Cadmium	100	9.E+00	--	--	2.E+00	--	--	NA	2.2E+00
Calcium	260000	--	--	--	--	--	--	NA	2.6E+05
Chrysene	210	--	--	4.E-06	--	--	6.E+01	NA	5.7E+01
Cobalt	470	4.E+00	--	--	2.E+01	--	--	NA	2.2E+01
Copper	2900	3.E+00	--	--	2.E+02	--	--	NA	2.0E+02
Dibenzo(a,h)anthracene	31	--	--	5.E-05	--	--	6.E-01	NA	5.7E-01
Electrical Conductivity	2.6	--	--	--	--	--	--	NA	3.E+00
Ethylbenzene	4.9	--	--	--	--	--	--	2.1E+03	2.1E+03
Fluoranthene	790	2.E-01	--	1.E-05	7.E+02	--	6.E+01	NA	5.7E+01
Fluorene	180	--	--	--	--	--	--	7.2E+02	7.2E+02
Indeno(1,2,3-Cd)Pyrene	96	--	--	2.E-05	--	--	6.E+00	NA	5.7E+00
Iron	150000	3.E+00	--	--	1.E+04	--	--	NA	1.1E+04
Lead	12000	--	--	--	--	--	--	2.0E+02	1.2E+02
Magnesium	140000	--	--	--	--	--	--	NA	1.4E+05
Mercury	0.38	--	--	--	--	--	--	9.8E+00	9.8E+00
Molybdenum	42	--	--	--	--	--	--	1.1E+02	1.1E+02
Naphthalene	260	--	--	--	--	--	--	3.6E+02	3.6E+02
Nickel	140	--	--	--	--	--	--	3.3E+02	3.3E+02
PCB, Total	1.9	1.E+00	--	--	4.E-01	--	--	NA	3.5E-01
PHC F2	4300	7.E-01	--	--	3.E+03	--	--	NA	3.1E+03
PHC F3	27000	2.E+00	--	--	6.E+03	--	--	NA	5.8E+03
PHC F4	8700	7.E-01	--	--	6.E+03	--	--	NA	6.1E+03
Phenanthrene	1000	3.E-01	--	--	7.E+02	--	--	NA	7.2E+02
Pyrene	560	2.E-01	--	1.E-06	5.E+02	--	6.E+02	NA	5.4E+02
Thallium	7.2	5.E+00	--	--	3.E-01	--	--	NA	2.9E-01
Trichloroethylene	42	8.E-01	8.E-02	2.E-06	1.E+01	1.E+02	2.E+01	NA	1.0E+01

Table 4-~~41a~~42a. Derivation of Soil RBCs Based on Direct Contact (Dermal and Ingestion) - Residential Land Use
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident	Toddler Resident (6 mo. – 4 y)	Pregnant Female Resident (20+ y)	Composite Resident		
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated HQ [b]	Estimated HQ [b]	Estimated ILCR [b]	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{C} [c] (µg/g)	Direct Contact [d] (S1)	Overall RBC_{DC} [e] (µg/g)
Vanadium	120	6.E-01	7.E-02	--	4.E+01	3.E+02	--	NA	3.9E+01
Xylenes, Total	4.6	--	--	--	--	--	--	4.2E+03	4.2E+03
Zinc	80000	3.E+00	--	--	6.E+03	--	--	NA	5.6E+03

[a] Concentration used in risk calculations in Section 4, as presented in Table 4-1.

[b] Refer to Table 4-31. Risks only shown for quantitatively assessed COCs.

[c] RBC calculated using RBC=TR*Cs/Risk, where TR is the MECP Target Risk of either 10^{-6} (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHC COCs), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d] The direct contact (S1) value or equivalent alternate value was applied as the RBC for parameters not retained for quantitative assessment of the direct contact pathway through the secondary screening. Refer to Table F-3.

[e] RBC_{DC} is the lowest of the calculated RBCs for all receptors, with the exception of conductivity, bismuth, calcium, and magnesium, where the estimated maximum concentrations were selected (as no risks predicted at the estimate maximums via the qualitative assessment in Section 4.4.3); and lead, where the Table 1 Standard was selected. Values are rounded down to two significant digits.

Notes:
The RBCs for COCs not applicable to human health (for this RA, conductivity) are set to the estimated maximum concentration in soil.
The RBC for lead is set to the Ontario soil background concentration.
These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

µg/g = microgram(s) per gram
-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
F = fraction
HH = human health
HQ = hazard quotient
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
PCB = polychlorinated biphenyls
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_{C} = RBC cancer
RBC_{DC} = RBC direct contact
RBC_{NC} = RBC noncancer
S1 = direct contact component value

Table 4-~~41b~~42b. Derivation of Soil RBCs Based on Direct Contact (Dermal and Ingestion) - Subsurface Workers
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Utility Worker		Construction Worker		Adult Female Construction/ Utility Worker	Utility Worker		Construction Worker		Female Outdoor/ Utility/ Construction Worker	Direct Contact [d] (S3)	Overall RBC_{DC} [e] (µg/g)
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated ILCR [b]	Estimated HQ [b]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)		
2-(1-)Methylnaphthalene	5.9	--	--	--	--	--	--	--	--	--	--	5.6E+02	5.6E+02
Acenaphthene	110	8.E-09	1.E-04	4.E-09	3.E-04	--	1.E+04	2.E+05	3.E+04	8.E+04	--	NA	1.4E+04
Acenaphthylene	2	--	--	--	--	--	--	--	--	--	--	3.6E+02	3.6E+02
Anthracene	190	--	--	--	--	--	--	--	--	--	--	4.2E+05	4.2E+05
Antimony	22	--	2.E-04	--	5.E-03	--	--	2.E+04	--	9.E+02	--	NA	9.5E+02
Arsenic	27	7.E-06	2.E-03	4.E-06	5.E-02	--	4.E+00	2.E+03	7.E+00	1.E+02	--	NA	3.9E+00
Benzene	0.31	--	--	--	--	--	--	--	--	--	--	4.8E+02	4.8E+02
Benzo(a)anthracene	240	2.E-07	--	9.E-08	--	--	1.E+03	--	3.E+03	--	--	NA	1.4E+03
Benzo(a)pyrene	150	1.E-05	4.E-02	6.E-06	4.E-02	9.E-02	1.E+01	8.E+02	3.E+01	7.E+02	4.E+02	NA	1.4E+01
Benzo(b)fluoranthene	220	2.E-06	--	8.E-07	--	--	1.E+02	--	3.E+02	--	--	NA	1.4E+02
Benzo(g,h,i)perylene	84	6.E-08	--	3.E-08	--	--	1.E+03	--	3.E+03	--	--	NA	1.4E+03
Benzo(k)fluoranthene	79	6.E-07	--	3.E-07	--	--	1.E+02	--	3.E+02	--	--	NA	1.4E+02
Bismuth	180	--	--	--	--	--	--	--	--	--	--	NA	1.8E+02
Cadmium	100	--	4.E-02	--	8.E-01	--	--	5.E+02	--	2.E+01	--	NA	2.5E+01
Calcium	260000	--	--	--	--	--	--	--	--	--	--	NA	2.6E+05
Chrysene	210	2.E-07	--	8.E-08	--	--	1.E+03	--	3.E+03	--	--	NA	1.4E+03
Cobalt	470	--	2.E-02	--	4.E-02	--	--	5.E+03	--	2.E+03	--	NA	2.5E+03
Copper	2900	--	2.E-02	--	3.E-01	--	--	4.E+04	--	2.E+03	--	NA	1.9E+03
Dibenzo(a,h)anthracene	31	2.E-06	--	1.E-06	--	--	1.E+01	--	3.E+01	--	--	NA	1.4E+01
Electrical Conductivity	2.6	--	--	--	--	--	--	--	--	--	--	NA	2.6E+00
Ethylbenzene	4.9	--	--	--	--	--	--	--	--	--	--	2.2E+04	2.2E+04
Fluoranthene	790	6.E-07	1.E-03	3.E-07	3.E-03	--	1.E+03	1.E+05	3.E+03	6.E+04	--	NA	1.4E+03
Fluorene	180	--	--	--	--	--	--	--	--	--	--	5.6E+04	5.6E+04
Indeno(1,2,3-Cd)Pyrene	96	7.E-07	--	4.E-07	--	--	1.E+02	--	3.E+02	--	--	NA	1.4E+02
Iron	150000	--	2.E-02	--	4.E-01	--	--	2.E+06	--	8.E+04	--	NA	7.9E+04
Lead	12000	--	--	--	--	--	--	--	--	--	--	1.0E+03	1.2E+02
Magnesium	140000	--	--	--	--	--	--	--	--	--	--	NA	1.7E+04
Mercury	0.38	--	--	--	--	--	--	--	--	--	--	6.7E+02	6.7E+02
Molybdenum	42	--	--	--	--	--	--	--	--	--	--	1.2E+03	1.2E+03
Naphthalene	260	--	--	--	--	--	--	--	--	--	--	2.8E+04	2.8E+04
Nickel	140	--	--	--	--	--	--	--	--	--	--	5.1E+02	5.1E+02
PCB, Total	1.9	--	7.E-03	--	9.E-02	--	--	5.E+01	--	4.E+00	--	NA	4.1E+00
PHC F2	4300	--	5.E-03	--	4.E-02	--	--	4.E+05	--	5.E+04	--	NA	4.8E+04
PHC F3	27000	--	2.E-02	--	5.E-02	--	--	8.E+05	--	3.E+05	--	NA	2.6E+05
PHC F4	8700	--	5.E-03	--	1.E-02	--	--	8.E+05	--	4.E+05	--	NA	4.0E+05
Phenanthrene	1000	--	2.E-03	--	4.E-02	--	--	1.E+05	--	6.E+03	--	NA	5.6E+03
Pyrene	560	4.E-08	1.E-03	2.E-08	3.E-03	--	1.E+04	8.E+04	3.E+04	4.E+04	--	NA	1.4E+04
Thallium	7.2	--	2.E-02	--	4.E-02	--	--	7.E+01	--	3.E+01	--	NA	3.3E+01
Trichloroethylene	42	9.E-08	4.E-03	5.E-08	8.E-02	2.E-01	5.E+02	2.E+03	9.E+02	1.E+02	5.E+01	NA	5.3E+01
Vanadium	120	--	4.E-03	--	7.E-02	1.E-01	--	6.E+03	--	3.E+02	2.E+02	NA	1.6E+02
Xylenes, Total	4.6	--	--	--	--	--	--	--	--	--	--	8.8E+04	8.8E+04
Zinc	80000	--	2.E-02	--	3.E-01	--	--	9.E+05	--	5.E+04	--	NA	4.7E+04

[a] Concentration used in risk calculations in Section 4, as presented in Table 4-1.

[b] Refer to Table 4-31. Risks only shown for quantitatively assessed COCs.

[c] RBC calculated using RBC=TR*Cs/Risk, where TR is the MECP Target Risk of either 10^{-6} (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHC COCs), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d] The Table 2 direct contact (S3) value (specific to subsurface workers for an industrial/commercial land use) was applied as the RBC for parameters not retained for quantitative assessment of the direct contact pathway through the secondary screening (using the more conservative S1 values for residents). The S3 values are most applicable to subsurface workers as the RBC; therefore, these values instead of the S1 values were adopted as the RBCs for qualitatively assessed COCs.

Table 4-~~41b~~42b. Derivation of Soil RBCs Based on Direct Contact (Dermal and Ingestion) - Subsurface Workers
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Receptor	Utility Worker		Construction Worker		Adult Female Construction/ Utility Worker	Utility Worker		Construction Worker		Female Outdoor/ Utility/ Construction Worker	Direct Contact [d] (S3)	Overall RBC_{DC} [e] (µg/g)
	Estimated Maximum Concentration [a] (µg/g)	Estimated ILCR [b]	Estimated HQ [b]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)		

[e] RBC_{DC} is the lowest of the calculated RBCs for all receptors, with the exception of conductivity, bismuth, calcium, and magnesium, where the estimated maximum concentrations were selected (as no risks predicted at the estimate maximums via the qualitative assessment in Section 4.4.3); and lead, where the Table 1 Standard was selected. Values are rounded down to two significant digits.

Notes:
The RBCs for COCs not applicable to human health (for this RA, conductivity) are set to the estimated maximum concentration in soil.
The RBC for lead is set to the Ontario soil background concentration.
These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

µg/g = microgram(s) per gram
-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
F = fraction
HH = human health
HQ = hazard quotient
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
PCB = polychlorinated biphenyls
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_C = RBC cancer
RBC_{DC} = RBC direct contact
RBC_{NC} = RBC noncancer
S3 = direct contact component value (subsurface workers)

Table 4-~~42a~~43a. Derivation of Soil RBCs Based on Inhalation in Indoor Air - Residential Building
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Receptor Maximum Concentration [a] (µg/g)	Infant Resident (0 – 5 mo.) Estimated HQ [b]	Toddler Resident (6 mo. – 4 y) Estimated HQ [b]	Child Resident (5 – 11 y) Estimated HQ [b]	Teen Resident (12 – 19 y) Estimated HQ [b]	Adult Resident (20+ y) Estimated HQ [b]	Pregnant Female Resident (20+ y) Estimated HQ [b]	Composite Resident Estimated ILCR [b]	Infant Resident (0 – 5 mo.) RBC_{NC} [c] (µg/g)	Toddler Resident (6 mo. – 4 y) RBC_{NC} [c] (µg/g)	Child Resident (5 – 11 y) RBC_{NC} [c] (µg/g)	Teen Resident (12 – 19 y) RBC_{NC} [c] (µg/g)	Adult Resident (20+ y) RBC_{NC} [c] (µg/g)	Female Resident (20+ y) RBC_{NC} [c] (µg/g)	Composite Resident RBC_{C} [c] (µg/g)	Indoor Air Inhalation (S-IA)	Overall Residential RBC_{S-IA} [d] (µg/g)
2-(1-)Methylnaphthalene	5.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Acenaphthene	110	--	--	--	--	--	--	8.E-06	--	--	--	--	--	--	1.E+01	NA	1.5E+01
Acenaphthylene	2	--	--	--	--	--	--	1.E-06	--	--	--	--	--	--	2.E+00	NA	2.1E+00
Anthracene	190	4.E-02	4.E-02	3.E-02	3.E-02	3.E-02	--	--	1.E+03	1.E+03	1.E+03	1.E+03	1.E+03	1.E+03	--	NA	1.0E+03
Antimony	22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Arsenic	27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Benzene	0.31	8.E+00	8.E+00	7.E+00	7.E+00	7.E+00	--	1.E-04	8.E-03	8.E-03	8.E-03	8.E-03	8.E-03	8.E-03	2.E-03	NA	2.1E-03
Benzo(a)anthracene	240	--	--	--	--	--	--	2.E-07	--	--	--	--	--	--	1.E+03	NA	1.2E+03
Benzo(a)pyrene	150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Benzo(b)fluoranthene	220	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Benzo(g,h,i)perylene	84	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Benzo(k)fluoranthene	79	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Bismuth	180	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Cadmium	100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Calcium	260000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Chrysene	210	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Cobalt	470	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Copper	2900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Dibenzo(a,h)anthracene	31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Electrical Conductivity	2.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Ethylbenzene	4.9	2.E-01	2.E-01	2.E-01	2.E-01	2.E-01	--	--	4.E+00	4.E+00	4.E+00	4.E+00	4.E+00	4.E+00	--	NA	4.0E+00
Fluoranthene	790	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Fluorene	180	1.E-01	1.E-01	1.E-01	1.E-01	1.E-01	--	--	3.E+02	3.E+02	3.E+02	3.E+02	3.E+02	3.E+02	--	NA	2.9E+02
Indeno(1,2,3-Cd)Pyrene	96	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Iron	150000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Lead	12000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Magnesium	140000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Mercury	0.38	9.E-01	9.E-01	9.E-01	8.E-01	8.E-01	--	--	8.E-02	8.E-02	8.E-02	8.E-02	8.E-02	8.E-02	--	NA	8.3E-02
Molybdenum	42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Naphthalene	260	9.E+01	9.E+01	8.E+01	8.E+01	8.E+01	--	--	6.E-01	6.E-01	6.E-01	6.E-01	6.E-01	6.E-01	--	NA	5.9E-01
Nickel	140	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
PCB, Total	1.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.10E+00	3.1E+00
PHC F2	4300	1.E+02	1.E+02	1.E+02	1.E+02	1.E+02	--	--	2.E+01	2.E+01	2.E+01	2.E+01	2.E+01	--	--	NA	1.5E+01
PHC F3	27000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
PHC F4	8700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Phenanthrene	1000	1.E-01	1.E-01	1.E-01	1.E-01	1.E-01	--	--	1.E+03	1.E+03	1.E+03	1.E+03	1.E+03	1.E+03	--	NA	1.4E+03
Pyrene	560	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.90E+03	1.9E+03
Thallium	7.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Trichloroethylene	42	2.E+04	2.E+04	2.E+04	2.E+04	2.E+04	2.E+04	1.E-01	1.E-03	1.E-03	1.E-03	1.E-03	1.E-03	1.E-03	3.E-04	NA	2.9E-04
Vanadium	120	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA
Xylenes, Total	4.6	6.E-01	6.E-01	6.E-01	6.E-01	6.E-01	--	--	2.E+00	2.E+00	2.E+00	2.E+00	2.E+00	2.E+00	--	NA	1.5E+00
Zinc	80000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA	NA

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-1.

[b.] Refer to Table 4-34b. Risks only shown for quantitatively assessed COCs.

[c.] RBC calculated using RBC=TR*Cs/Risk, where TR is the MECP Target Risk of either 10-6 (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHCs and TCE), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d.] An RBC_{S-IA} is not provided for nonvolatile COCs or COCs without S-IA component values (shown as "NA").

Notes:

These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

-- = no value (COC is considered volatile but no value is available)
µg/g = microgram(s) per gram
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable (COC is not considered volatile)
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_{C} = RBC cancer
RBC_{NC} = RBC noncancer
RBC_{S-IA} = RBC soil to indoor air
TCE = trichloroethylene

Table 4-~~42b~~43b. Derivation of Soil RBCs Based on Inhalation in Indoor Air - Commercial Building
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Receptor	Indoor Worker		Female Indoor Worker	Indoor Worker		Female Indoor Worker	Indoor Air Inhalation (S-IA) [d]	Overall Commercial RBC_{S-IA} [e] (µg/g)
	Estimated Maximum Concentration [a]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)		
2-(1-)Methylnaphthalene	5.9	--	--	--	--	--	--	NA	NA
Acenaphthene	110	5.E-07	--	--	2.E+02	--	--	NA	2.1E+02
Acenaphthylene	2	7.E-08	--	--	3.E+01	--	--	NA	3.0E+01
Anthracene	190	--	2.E-03	--	--	2.E+04	--	NA	1.6E+04
Antimony	22	--	--	--	--	--	--	NA	NA
Arsenic	27	--	--	--	--	--	--	NA	NA
Benzene	0.31	1.E-05	5.E-01	--	3.E-02	1.E-01	--	NA	3.1E-02
Benzo(a)anthracene	240	1.E-08	--	--	2.E+04	--	--	NA	1.8E+04
Benzo(a)pyrene	150	--	--	--	--	--	--	NA	NA
Benzo(b)fluoranthene	220	--	--	--	--	--	--	NA	NA
Benzo(g,h,i)perylene	84	--	--	--	--	--	--	NA	NA
Benzo(k)fluoranthene	79	--	--	--	--	--	--	NA	NA
Bismuth	180	--	--	--	--	--	--	NA	NA
Cadmium	100	--	--	--	--	--	--	NA	NA
Calcium	260000	--	--	--	--	--	--	NA	NA
Chrysene	210	--	--	--	--	--	--	NA	NA
Cobalt	470	--	--	--	--	--	--	NA	NA
Copper	2900	--	--	--	--	--	--	NA	NA
Dibenzo(a,h)anthracene	31	--	--	--	--	--	--	NA	NA
Electrical Conductivity	2.6	--	--	--	--	--	--	NA	NA
Ethylbenzene	4.9	--	2.E-02	--	--	6.E+01	--	NA	6.4E+01
Fluoranthene	790	--	--	--	--	--	--	NA	NA
Fluorene	180	--	8.E-03	--	--	5.E+03	--	NA	4.6E+03
Indeno(1,2,3-Cd)Pyrene	96	--	--	--	--	--	--	NA	NA
Iron	150000	--	--	--	--	--	--	NA	NA
Lead	12000	--	--	--	--	--	--	NA	NA
Magnesium	140000	--	--	--	--	--	--	NA	NA
Mercury	0.38	--	6.E-02	--	--	1.E+00	--	NA	1.3E+00
Molybdenum	42	--	--	--	--	--	--	NA	NA
Naphthalene	260	--	6.E+00	--	--	9.E+00	--	NA	9.4E+00
Nickel	140	--	--	--	--	--	--	NA	NA
PCB, Total	1.9	--	--	--	--	--	--	4.50E+01	4.5E+01
PHC F2	4300	--	9.E+00	--	--	2.E+02	--	NA	2.4E+02
PHC F3	27000	--	--	--	--	--	--	NA	NA
PHC F4	8700	--	--	--	--	--	--	NA	NA

Table 4-~~42b~~43b. Derivation of Soil RBCs Based on Inhalation in Indoor Air - Commercial Building
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Receptor	Indoor Worker		Female Indoor Worker	Indoor Worker		Female Indoor Worker	Indoor Air Inhalation (S-IA) [d]	Overall Commercial RBC_{S-IA} [e] (µg/g)
	Estimated Maximum Concentration [a]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)		
Phenanthrene	1000	--	9.E-03	--	--	2.E+04	--	NA	2.1E+04
Pyrene	560	--	--	--	--	--	--	2.80E+04	2.8E+04
Thallium	7.2	--	--	--	--	--	--	NA	NA
Trichloroethylene	42	1.E-02	1.E+03	4.E+03	4.E-03	2.E-02	5.E-03	NA	4.3E-03
Vanadium	120	--	--	--	--	--	--	NA	NA
Xylenes, Total	4.6	--	4.E-02	--	--	2.E+01	--	NA	2.4E+01
Zinc	80000	--	--	--	--	--	--	NA	NA

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-1.

[b.] Refer to Table 4-34a. Risks only shown for quantitatively assessed COCs.

[c.] RBC calculated using RBC=TR*Cs/Risk, where TR is the MECP Target Risk of either 10-6 (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHCs and TCE), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d.] S-IA component values from table entitled Soil Components for Table 2 - Full Depth Potable Water Scenario (Coarse-textured soil, industrial/commercial Land Use) (MECP, 2011b) selected.

[e.] An RBC_{S-IA} is not provided for nonvolatile COCs or COCs without S-IA component values (shown as "NA").

Notes:

These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

-- = no value (COC is considered volatile but no value is available)
µg/g = microgram(s) per gram
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable (COC is not considered volatile)
PCB = polychlorinated biphenyls
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_C = RBC cancer
RBC_{NC} = RBC noncancer
RBC_{S-IA} = RBC soil to indoor air
TCE = trichloroethylene

Table 4-~~43~~44. Overall Human Health Risk Based Concentrations - Residential
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Table 6 SCS [a]	RBC Soil - Direct Contact [b]	RBC Soil - Residential Indoor Air Inhalation [c]	HH Residential RBC [d]	HH Residential RBC Driver
	(µg/g)	(µg/g)	(µg/g)	(µg/g)	
2-(1-)Methylnaphthalene	9.9E-01	7.2E+01	NA	7.2E+01	Direct Contact
Acenaphthene	7.9E+00	5.7E+02	1.5E+01	1.5E+01	Inhalation
Acenaphthylene	1.5E-01	7.8E+00	2.1E+00	2.1E+00	Inhalation
Anthracene	6.7E-01	5.4E+03	1.0E+03	1.0E+03	Inhalation
Antimony	7.5E+00	1.1E+02	NA	1.1E+02	Direct Contact
Arsenic	1.8E+01	1.5E-01	NA	1.8E+01	Table 6 SCS
Benzene	2.1E-01	9.3E+00	2.1E-03	2.1E-01	Table 6 SCS
Benzo(a)anthracene	5.0E-01	5.7E+01	1.2E+03	5.7E+01	Direct Contact
Benzo(a)pyrene	3.0E-01	5.7E-01	NA	5.7E-01	Direct Contact
Benzo(b)fluoranthene	7.8E-01	5.7E+00	NA	5.7E+00	Direct Contact
Benzo(g,h,i)perylene	6.6E+00	5.7E+01	NA	5.7E+01	Direct Contact
Benzo(k)fluoranthene	7.8E-01	5.7E+00	NA	5.7E+00	Direct Contact
Bismuth	--	1.8E+02	NA	1.8E+02	Direct Contact
Cadmium	1.2E+00	2.2E+00	NA	2.2E+00	Direct Contact
Calcium	--	2.6E+05	NA	2.6E+05	Direct Contact
Chrysene	7.0E+00	5.7E+01	NA	5.7E+01	Direct Contact
Cobalt	2.2E+01	2.2E+01	NA	2.2E+01	Table 6 SCS
Copper	1.4E+02	2.0E+02	NA	2.0E+02	Direct Contact
Dibenzo(a,h)anthracene	1.0E-01	5.7E-01	NA	5.7E-01	Direct Contact
Electrical Conductivity	7.0E-01	2.6E+00	NA	2.6E+00	Direct Contact
Ethylbenzene	1.1E+00	2.1E+03	4.0E+00	4.0E+00	Inhalation
Fluoranthene	6.9E-01	5.7E+01	NA	5.7E+01	Direct Contact
Fluorene	6.2E+01	7.2E+02	2.9E+02	2.9E+02	Inhalation
Indeno(1,2,3-Cd)Pyrene	3.8E-01	5.7E+00	NA	5.7E+00	Direct Contact
Iron	--	1.1E+04	NA	1.1E+04	Direct Contact
Lead	1.2E+02	1.2E+02	NA	1.2E+02	Direct Contact
Magnesium	--	1.4E+05	NA	1.4E+05	Direct Contact
Mercury	2.7E-01	9.8E+00	8.3E-02	2.7E-01	Table 6 SCS
Molybdenum	6.9E+00	1.1E+02	NA	1.1E+02	Direct Contact
Naphthalene	6.0E-01	3.6E+02	5.9E-01	6.0E-01	Table 6 SCS
Nickel	1.0E+02	3.3E+02	NA	3.3E+02	Direct Contact
PCB, Total	3.5E-01	3.5E-01	3.1E+00	3.5E-01	Direct Contact
PHC F2	9.8E+01	3.1E+03	1.5E+01	9.8E+01	Table 6 SCS
PHC F3	3.0E+02	5.8E+03	NA	5.8E+03	Direct Contact
PHC F4	2.8E+03	6.1E+03	NA	6.1E+03	Direct Contact
Phenanthrene	6.2E+00	7.2E+02	1.4E+03	7.2E+02	Direct Contact
Pyrene	7.8E+01	5.4E+02	1.9E+03	5.4E+02	Direct Contact
Thallium	1.0E+00	2.9E-01	NA	1.0E+00	Table 6 SCS
Trichloroethylene	6.1E-02	1.0E+01	2.9E-04	6.1E-02	Table 6 SCS
Vanadium	8.6E+01	3.9E+01	NA	8.6E+01	Table 6 SCS
Xylenes, Total	3.1E+00	4.2E+03	1.5E+00	3.1E+00	Table 6 SCS
Zinc	3.4E+02	5.6E+03	NA	5.6E+03	Direct Contact

[a] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils (MECP, 2011).
[b] Obtained from Table 4-~~41~~42 of this RA report.
[c] Obtained from Table 4-~~42a~~43a of this RA report.
[d] RBC for fill cap is equal to the lowest of the Direct Contact RBC or Inhalation RBC for each COC, except when the calculated RBC is less than the Table 6 Standard or where an inhalation RBC is applicable, but there is no value selected. In these cases, the Table 6 Standard is selected. The RBCs for COCs not applicable to human health (for this RA, conductivity) are set to the estimated maximum in soil. Further discussion is provided in Section 6.

µg/g = microgram(s) per gram
COC = contaminant of concern
F = fraction
HH = human health
Max = maximum
MECP = Ministry of the Environment, Conservation and Parks
NA = not applicable
PCB = polychlorinated biphenyls
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RMM = risk management measure
SCS = Site Condition Standard
VI = vapour intrusion

Table 4-~~44a~~45a. Derivation of Groundwater RBCs Based on Direct Contact (Dermal and Ingestion) with Potable Groundwater
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5 – 11 y)	Teen Resident (12 – 19 y)	Adult Resident (20+ y)	Composite Resident	Pregant Female Resident (20+y)	Infant Resident (0 – 5 mo.)	Toddler Resident (6 mo. – 4 y)	Child Resident (5 – 11 y)	Teen Resident (12 – 19 y)	Adult Resident (20+ y)	Composite Resident	Pregant Female Resident (20+y)		
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated HQ [b]	Estimated HQ [b]	Estimated HQ [b]	Estimated HQ [b]	Estimated HQ [b]	Estimated ILCR [b]	Estimated HQ [b]	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{C} [c] (µg/g)	RBC_{NC} [c] (µg/g)	Direct Contact [d] (GW1)	Overall RBC_{DC-GW} [e] (µg/g)
1,1,1-Trichloroethane	44	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0E+02	2.0E+02
1,1-Dichloroethane	35	1.E-02	1.E-02	7.E-03	5.E-03	6.E-03	7.E-06	--	5.4E+02	5.5E+02	9.8E+02	1.3E+03	1.2E+03	4.9E+00	--	NA	4.9E+00
1,1-Dichloroethene	76	1.E-01	1.E-01	8.E-02	6.E-02	7.E-02	--	--	1.0E+02	1.0E+02	1.8E+02	2.5E+02	2.3E+02	--	--	NA	1.0E+02
2-(1-)Methylnaphthalene	330	1.E+01	1.E+01	9.E+00	7.E+00	6.E+00	--	--	4.9E+00	5.6E+00	7.6E+00	9.7E+00	1.1E+01	--	--	NA	4.9E+00
Acenaphthene	48	1.E-01	1.E-01	9.E-02	7.E-02	6.E-02	4.E-06	--	7.3E+01	8.3E+01	1.1E+02	1.4E+02	1.6E+02	1.2E+01	--	NA	1.2E+01
Anthracene	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.9E+02	8.9E+02
Arsenic	54	2.E+01	2.E+01	9.E+00	6.E+00	7.E+00	2.E-02	--	6.6E-01	6.6E-01	1.2E+00	1.7E+00	1.5E+00	2.4E-03	--	NA	2.4E-03
Benzene	80	2.E+01	2.E+01	9.E+00	6.E+00	7.E+00	3.E-04	--	1.0E+00	1.0E+00	1.8E+00	2.5E+00	2.3E+00	2.5E-01	--	NA	2.5E-01
Benzo(a)anthracene	25	--	--	--	--	--	1.E-04	--	--	--	--	--	--	2.2E-01	--	NA	2.2E-01
Benzo(a)pyrene	2.8	1.E+01	9.E+00	9.E+00	7.E+00	6.E+00	2.E-03	6.E+00	4.9E-02	6.5E-02	6.4E-02	7.6E-02	1.0E-01	1.5E-03	4.5E-07	NA	4.5E-07
Benzo(b&j)fluoranthene	10	--	--	--	--	--	4.E-04	--	--	--	--	--	--	2.4E-02	--	NA	2.4E-02
Benzo(k)fluoranthene	10	--	--	--	--	--	7.E-04	--	--	--	--	--	--	1.5E-02	--	NA	1.5E-02
Chrysene	45	--	--	--	--	--	2.E-04	--	--	--	--	--	--	2.0E-01	--	NA	2.0E-01
cis-1,2-Dichloroethene	1100	5.E+01	5.E+01	3.E+01	2.E+01	2.E+01	--	--	4.1E+00	4.2E+00	7.4E+00	1.0E+01	9.2E+00	--	--	NA	4.1E+00
Ethylbenzene	10	1.E-02	1.E-02	7.E-03	6.E-03	6.E-03	--	--	1.6E+02	1.8E+02	2.7E+02	3.6E+02	3.6E+02	--	--	NA	1.6E+02
Fluoranthene	28	3.E-01	2.E-01	2.E-01	2.E-01	2.E-01	7.E-05	--	1.8E+01	2.3E+01	2.4E+01	3.0E+01	3.7E+01	4.1E-01	--	NA	4.1E-01
Lead	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0E+01	1.0E+01
Naphthalene	32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.9E+01	5.9E+01
n-Hexane	8.9	3.E-02	3.E-02	2.E-02	2.E-02	1.E-02	--	--	6.0E+01	7.0E+01	8.9E+01	1.1E+02	1.3E+02	--	--	NA	6.0E+01
PHC F1	660	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2E+02	8.2E+02
PHC F2	250000	9.E+02	8.E+02	6.E+02	4.E+02	4.E+02	--	--	1.4E+02	1.6E+02	2.2E+02	2.9E+02	3.0E+02	--	--	NA	1.4E+02
PHC F3	1000000	6.E+03	6.E+03	4.E+03	3.E+03	3.E+03	--	--	7.7E+01	9.1E+01	1.2E+02	1.5E+02	1.7E+02	--	--	NA	7.7E+01
PHC F4	44000	1.E+02	1.E+02	7.E+01	5.E+01	6.E+01	--	--	1.6E+02	1.7E+02	3.0E+02	4.2E+02	3.7E+02	--	--	NA	1.6E+02
Phenanthrene	130	8.E-01	6.E-01	5.E-01	4.E-01	4.E-01	--	--	3.4E+01	4.1E+01	5.0E+01	6.2E+01	7.2E+01	--	--	NA	3.4E+01
Pyrene	70	8.E-01	6.E-01	5.E-01	4.E-01	4.E-01	1.E-05	--	1.9E+01	2.3E+01	2.6E+01	3.2E+01	3.9E+01	5.8E+00	--	NA	5.8E+00
Tetrachloroethene	1.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0E+01	2.0E+01
trans-1,2-Dichloroethene	97	5.E-01	5.E-01	3.E-01	2.E-01	2.E-01	--	--	4.1E+01	4.2E+01	7.4E+01	1.0E+02	9.2E+01	--	--	NA	4.1E+01
Trichloroethylene	9400	2.E+03	2.E+03	1.E+03	8.E+02	8.E+02	2.E-02	9.E+02	1.0E+00	1.0E+00	1.8E+00	2.4E+00	2.2E+00	4.5E-01	1.0E-05	NA	1.0E-05
Vinyl Chloride	100	3.E+01	3.E+01	2.E+01	1.E+01	1.E+01	7.E-02	--	6.4E-01	6.5E-01	1.2E+00	1.6E+00	1.4E+00	1.5E-03	--	NA	1.5E-03
Zinc	5400	2.E+00	2.E+00	9.E-01	6.E-01	7.E-01	--	--	6.6E+02	6.6E+02	1.2E+03	1.7E+03	1.5E+03	--	--	NA	6.6E+02

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-2.
[b.] Refer to Table 4-32a. Risks only shown for quantitatively assessed COCs.
[c.] RBC calculated using RBC=TR*Cs/Risk, where TR is the Ministry Target Risk of either 10-6 (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHC COCs), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.
[d.] The direct contact (GW1) value or equivalent alternate value was applied as the RBC for parameters not retained for quantitative assessment of the direct contact pathway through the secondary screening. Refer to Table F-4.
[e.] RBC_{DC} is the lowest of the calculated RBCs for all receptors, with the exception of lead. Values are rounded down to two significant digits.

Notes:
The RBC for lead is set to the Ontario soil background concentration.
These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

µg/g = microgram(s) per gram
-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
EPA = U.S. Environmental Protection Agency
F = fraction
HH = human health
HQ = hazard quotient
HWE = hot water extractable
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_{C} = RBC cancer
RBC_{DC} = RBC direct contact
RBC_{NC} = RBC noncancer
GW1 = direct contact component value

Table 4-44b45b. Derivation of Groundwater RBCs Based on Direct Contact (Dermal and Ingestion) with Incidental Groundwater
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Utility Worker		Construction Worker		Pregnant Female Construction/ Utility Worker	Utility Worker		Construction Worker		Pregnant Female Outdoor/ Utility/ Construction Worker		
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated ILCR [b]	Estimated HQ [b]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	Direct Contact [d] (GW1)	Overall RBC_{DC-GW} [e] (µg/g)
1,1,1-Trichloroethane	44	--	--	--	--	--	--	--	--	--	--	2.0E+02	2.0E+02
1,1-Dichloroethane	35	5.E-09	4.E-06	2.E-09	8.E-06	--	7.4E+03	1.7E+06	1.4E+04	8.6E+05	--	NA	1.4E+04
1,1-Dichloroethene	76	--	4.E-05	--	8.E-04	--	--	3.7E+05	--	1.9E+04	--	NA	1.9E+04
2-(1-)Methylnaphthalene	330	--	8.E-03	--	2.E-01	--	--	8.2E+03	--	4.2E+02	--	NA	4.2E+02
Acenaphthene	48	5.E-09	8.E-05	2.E-09	2.E-04	--	1.0E+04	1.2E+05	1.9E+04	6.2E+04	--	NA	1.9E+04
Anthracene	37	--	--	--	--	--	--	--	--	--	--	8.9E+02	8.9E+02
Arsenic	54	1.E-05	4.E-03	5.E-06	7.E-02	--	5.4E+00	3.1E+03	1.0E+01	1.6E+02	--	NA	1.0E+01
Benzene	80	2.E-07	4.E-03	1.E-07	9.E-02	--	4.3E+02	3.6E+03	8.3E+02	1.8E+02	--	NA	1.8E+02
Benzo(a)anthracene	25	2.E-07	--	1.E-07	--	--	1.2E+02	--	2.3E+02	--	--	NA	2.3E+02
Benzo(a)pyrene	2.8	4.E-06	1.E-02	2.E-06	1.E-02	3.E-02	7.9E-01	4.7E+01	1.5E+00	4.0E+01	2.1E+01	NA	1.5E+00
Benzo(b&j)fluoranthene	10	7.E-07	--	4.E-07	--	--	1.3E+01	--	2.6E+01	--	--	NA	2.6E+01
Benzo(k)fluoranthene	10	1.E-06	--	6.E-07	--	--	8.1E+00	--	1.6E+01	--	--	NA	1.6E+01
Chrysene	45	4.E-07	--	2.E-07	--	--	1.1E+02	--	2.1E+02	--	--	NA	2.1E+02
cis-1,2-Dichloroethene	1100	--	1.E-02	--	3.E-02	--	--	1.5E+04	--	6.6E+03	--	NA	6.6E+03
Ethylbenzene	10	--	5.E-06	--	3.E-05	--	--	3.8E+05	--	7.8E+04	--	NA	7.8E+04
Fluoranthene	28	1.E-07	3.E-04	6.E-08	6.E-04	--	2.4E+02	2.0E+04	4.7E+02	1.0E+04	--	NA	4.7E+02
Lead	20	--	--	--	--	--	--	--	--	--	--	1.0E+01	1.0E+01
Naphthalene	32	--	--	--	--	--	--	--	--	--	--	5.9E+01	5.9E+01
n-Hexane	8.9	--	2.E-05	--	4.E-05	--	--	8.6E+04	--	4.4E+04	--	NA	4.4E+04
PHC F1	660	--	--	--	--	--	--	--	--	--	--	8.2E+02	8.2E+02
PHC F2	250000	--	5.E-01	--	8.E+00	--	--	2.6E+05	--	1.5E+04	--	NA	1.5E+04
PHC F3	1000000	--	4.E+00	--	9.E+00	--	--	1.1E+05	--	5.9E+04	--	NA	5.9E+04
PHC F4	44000	--	3.E-02	--	6.E-02	--	--	7.7E+05	--	4.0E+05	--	NA	4.0E+05
Phenanthrene	130	--	6.E-04	--	1.E-02	--	--	4.6E+04	--	2.3E+03	--	NA	2.3E+03
Pyrene	70	2.E-08	6.E-04	1.E-08	1.E-03	--	3.7E+03	2.2E+04	7.0E+03	1.1E+04	--	NA	7.0E+03
Tetrachloroethene	1.3	--	--	--	--	--	--	--	--	--	--	2.0E+01	2.0E+01
trans-1,2-Dichloroethene	97	--	1.E-04	--	8.E-04	--	--	1.5E+05	--	2.5E+04	--	NA	2.5E+04
Trichloroethylene	9400	1.E-05	5.E-01	6.E-06	1.E+01	2.E+01	7.6E+02	3.5E+03	1.5E+03	1.8E+02	8.8E+01	NA	8.8E+01
Vinyl Chloride	100	2.E-05	8.E-03	9.E-06	2.E-01	--	5.9E+00	2.6E+03	1.1E+01	1.3E+02	--	NA	1.1E+01
Zinc	5400	--	3.E-04	--	7.E-03	--	--	3.1E+06	--	1.6E+05	--	NA	1.6E+05

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-2.

[b.] Refer to Table 4-32b. Risks only shown for quantitatively assessed COCs.

[c.] RBC calculated using RBC=TR*Cs/Risk, where TR is the Ministry Target Risk of either 10-6 (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHC COCs), Cs is the soil concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d.] The direct contact (GW1) value or equivalent alternate value was applied as the RBC for parameters not retained for quantitative assessment of the direct contact pathway through the secondary screening. Refer to Table F-4.

[e.] RBC_{DC} is the lowest of the calculated RBCs for all receptors, with the exception of lead. Values are rounded down to two significant digits.

Notes:
The RBC for lead is set to the Ontario soil background concentration.
These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

µg/g = microgram(s) per gram
-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
EPA = U.S. Environmental Protection Agency
F = fraction
HH = human health
HQ = hazard quotient
HWE = hot water extractable
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks

Table 4-~~45a~~46a. Derivation of Groundwater RBCs Based on Inhalation in Indoor Air - Residential Building
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Receptor Estimated Maximum Concentration [a] (µg/L)	Infant Resident (0 – 5 mo.) Estimated HQ [b]	Toddler Resident (6 mo. – 4 y) Estimated HQ [b]	Child Resident (5 – 11 y) Estimated HQ [b]	Teen Resident (12 – 19 y) Estimated HQ [b]	Adult Resident (20+ y) Estimated HQ [b]	Composite Resident Estimated ILCR [b]	Pregnant Female Resident (20+y) Estimated HQ [b]	Infant Resident (0 – 5 mo.) RBC_{NC} [c] (µg/g)	Toddler Resident (6 mo. – 4 y) RBC_{NC} [c] (µg/g)	Child Resident (5 – 11 y) RBC_{NC} [c] (µg/g)	Teen Resident (12 – 19 y) RBC_{NC} [c] (µg/g)	Adult Resident (20+ y) RBC_{NC} [c] (µg/g)	Composite Resident RBC_{C} [c] (µg/g)	Pregnant Female Resident (20+y) RBC_{NC} [c] (µg/L)	Overall RBC_{GW-IA} [d] (µg/L)
1,1,1-Trichloroethane	44	4.E-01	4.E-01	4.E-01	4.E-01	4.E-01	--	--	2.E+01	2.E+01	2.E+01	2.E+01	2.E+01	--	--	2.3E+01
1,1-Dichloroethane	35	6.E-01	6.E-01	6.E-01	6.E-01	6.E-01	2.E-04	--	1.E+01	1.E+01	1.E+01	1.E+01	1.E+01	2.E-01	--	2.3E-01
1,1-Dichloroethene	76	6.E+00	6.E+00	5.E+00	5.E+00	5.E+00	--	--	3.E+00	3.E+00	3.E+00	3.E+00	3.E+00	--	--	2.7E+00
2-(1-)Methylnaphthalene	330	1.E+00	1.E+00	1.E+00	1.E+00	1.E+00	--	--	5.E+01	5.E+01	6.E+01	6.E+01	6.E+01	--	--	5.4E+01
Acenaphthene	48	--	--	--	--	--	2.E-06	--	--	--	--	--	--	3.E+01	--	3.2E+01
Anthracene	37	1.E-02	1.E-02	1.E-02	1.E-02	1.E-02	--	--	6.E+02	6.E+02	7.E+02	7.E+02	7.E+02	--	--	6.5E+02
Arsenic	54	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Benzene	80	2.E+01	2.E+01	2.E+01	2.E+01	2.E+01	5.E-04	--	7.E-01	7.E-01	7.E-01	8.E-01	8.E-01	2.E-01	--	1.8E-01
Benzo(a)anthracene	25	--	--	--	--	--	4.E-07	--	--	--	--	--	--	7.E+01	--	7.1E+01
Benzo(a)pyrene	2.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Benzo(b&j)fluoranthene	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Benzo(k)fluoranthene	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Chrysene	45	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
cis-1,2-Dichloroethene	1100	4.E+01	4.E+01	4.E+01	4.E+01	4.E+01	--	--	6.E+00	6.E+00	6.E+00	6.E+00	6.E+00	--	--	5.7E+00
Ethylbenzene	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Fluoranthene	28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Lead	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Naphthalene	32	1.E+00	1.E+00	1.E+00	1.E+00	1.E+00	--	--	4.E+00	4.E+00	5.E+00	5.E+00	5.E+00	--	--	4.4E+00
n-Hexane	8.9	1.E+01	1.E+01	1.E+01	1.E+01	1.E+01	--	--	2.E-01	2.E-01	2.E-01	2.E-01	2.E-01	--	--	1.5E-01
PHC F1	660	6.E+01	6.E+01	5.E+01	5.E+01	5.E+01	--	--	6.E+00	6.E+00	6.E+00	7.E+00	7.E+00	--	--	5.9E+00
PHC F2	250000	8.E+03	8.E+03	8.E+03	8.E+03	8.E+03	--	--	2.E+01	2.E+01	2.E+01	2.E+01	2.E+01	--	--	1.5E+01
PHC F3	1000000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
PHC F4	44000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Phenanthrene	130	3.E-02	3.E-02	3.E-02	3.E-02	3.E-02	--	--	8.E+02	8.E+02	9.E+02	9.E+02	9.E+02	--	--	8.4E+02
Pyrene	70	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA
Tetrachloroethene	1.3	3.E-01	3.E-01	2.E-01	2.E-01	2.E-01	3.E-06	--	1.E+00	1.E+00	1.E+00	1.E+00	1.E+00	5.E-01	--	5.1E-01
trans-1,2-Dichloroethene	97	8.E+00	8.E+00	7.E+00	7.E+00	7.E+00	--	--	2.E+00	2.E+00	3.E+00	3.E+00	3.E+00	--	--	2.4E+00
Trichloroethylene	9400	2.E+04	2.E+04	2.E+04	2.E+04	2.E+04	2.E-01	2.E+04	2.E-01	2.E-01	2.E-01	2.E-01	2.E-01	5.E-02	2.E-01	5.5E-02
Vinyl Chloride	100	3.E+02	3.E+02	3.E+02	3.E+02	3.E+02	1.E-01	--	7.E-02	7.E-02	8.E-02	8.E-02	8.E-02	8.E-04	--	7.7E-04
Zinc	5400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	NA

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-2.
[b.] Refer to Table 4-35b. Risks only shown for quantitatively assessed COCs.
[c.] RBC calculated using RBC=TR*Cgw/Risk, where TR is the MECP Target Risk of either 10^{-6} (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHCs and TCE), Cgw is the groundwater concentration used in the RA, and Risk is the estimated risk calculated in the RA.
[d.] RBC is the lowest of the calculated RBCs for all receptors. An RBC is not calculated for nonvolatile COCs and COCs not retained for inhalation analysis, refer to Appendix F2 (shown as "NA").
Notes:

-- = no value
µg/L = microgram(s) per litre
COC = contaminant of concern
F = fraction
HQ = hazard quotient
ILCR = incremental lifetime cancer risk
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
PHC = petroleum hydrocarbon
RA = Risk Assessment
RBC = risk-based back-calculation concentration
RBC_{C} = RBC cancer
RBC_{NC} = RBC noncancer
RBC_{S-IA} = RBC soil to indoor air
TCE = trichloroethylene

Table 4-~~45b~~46b. Derivation of Groundwater RBCs Based on Inhalation in Indoor Air - Commercial Building
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Indoor Worker		Pregnant Female Indoor Worker	Indoor Worker		Pregnant Female Indoor Worker	Overall
COCs	Estimated Maximum Concentration [a]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/L)	RBC_{GW-IA} [d] (µg/L)
1,1,1-Trichloroethane	44	--	2.E-02	--	--	4.E+02	--	3.9E+02
1,1-Dichloroethane	35	1.E-05	4.E-02	--	4.E+00	2.E+02	--	3.6E+00
1,1-Dichloroethene	76	--	3.E-01	--	--	5.E+01	--	4.7E+01
2-(1-)Methylnaphthalene	330	--	7.E-02	--	--	9.E+02	--	9.2E+02
Acenaphthene	48	1.E-07	--	--	5.E+02	--	--	5.0E+02
Anthracene	37	--	7.E-04	--	--	1.E+04	--	1.1E+04
Arsenic	54	--	--	--	--	--	--	NA
Benzene	80	3.E-05	1.E+00	--	3.E+00	1.E+01	--	2.8E+00
Benzo(a)anthracene	25	2.E-08	--	--	1.E+03	--	--	1.1E+03
Benzo(a)pyrene	2.8	--	--	--	--	--	--	NA
Benzo(b&j)fluoranthene	10	--	--	--	--	--	--	NA
Benzo(k)fluoranthene	10	--	--	--	--	--	--	NA
Chrysene	45	--	--	--	--	--	--	NA
cis-1,2-Dichloroethene	1100	--	2.E+00	--	--	1.E+02	--	9.8E+01
Ethylbenzene	10	--	--	--	--	--	--	NA
Fluoranthene	28	--	--	--	--	--	--	NA
Lead	20	--	--	--	--	--	--	NA
Naphthalene	32	--	8.E-02	--	--	8.E+01	--	7.5E+01
n-Hexane	8.9	--	7.E-01	--	--	3.E+00	--	2.6E+00
PHC F1	660	--	3.E+00	--	--	1.E+02	--	1.0E+02
PHC F2	250000	--	6.E+02	--	--	2.E+02	--	2.0E+02
PHC F3	1000000	--	--	--	--	--	--	NA
PHC F4	44000	--	--	--	--	--	--	NA
Phenanthrene	130	--	2.E-03	--	--	1.E+04	--	1.4E+04
Pyrene	70	--	--	--	--	--	--	NA
Tetrachloroethene	1.3	2.E-07	2.E-02	--	8.E+00	2.E+01	--	8.0E+00
trans-1,2-Dichloroethene	97	--	5.E-01	--	--	4.E+01	--	4.2E+01
Trichloroethylene	9400	1.E-02	1.E+03	5.E+03	9.E-01	4.E+00	1.E+00	8.6E-01
Vinyl Chloride	100	4.E-03	2.E+01	--	2.E-02	1.E+00	--	2.3E-02
Zinc	5400	--	--	--	--	--	--	NA

[a.] Concentration used in risk calculations in Section 4, as presented in Table 4-2.

[b.] Refer to Table 4-35a. Risks only shown for quantitatively assessed COCs.

[c.] RBC calculated using RBC=TR*Cgw/Risk, where TR is the MECP Target Risk of either 10^{-6} (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for PHC and TCE), Cgw is the groundwater concentration used in the RA, and Risk is the estimated risk calculated in the RA.

[d.] RBC is the lowest of the calculated RBCs for all receptors. An RBC is not calculated for nonvolatile COCs and COCs not retained for inhalation analysis, refer to Appendix F2 (shown as "NA").

Notes:

-- = no value

µg/L = microgram(s) per litre

COC = contaminant of concern

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

NA = not applicable

Table 4-~~46~~47. Derivation of Soil (and Groundwater) RBCs Based on Inhalation in Outdoor Air (Trench)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

	Receptor	Utility Worker		Construction Worker		Pregnant Female Construction or Utility Worker	Utility Worker		Construction Worker		Pregnant Female Construction or Utility Worker	Overall RBC_{OA} [d] (µg/g)
COCs	Estimated Maximum Concentration [a] (µg/g)	Estimated ILCR [b]	Estimated HQ [b]	Estimated ILCR [b]	Estimated HQ [b]	Estimated HQ [b]	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_C [c] (µg/g)	RBC_{NC} [c] (µg/g)	RBC_{NC} [c] (µg/g)	
1,1,1-Trichloroethane	5.00E-02	--	3.E-07	--	1.E-06	--	--	4.E+04	--	8.E+03	--	7.8E+03
1,1-Dichloroethane	5.00E-02	4.E-10	1.E-06	2.E-10	3.E-05	--	1.E+02	7.E+03	2.E+02	3.E+02	--	1.3E+02
1,1-Dichloroethene	5.00E-02	--	1.E-06	--	6.E-05	--	--	8.E+03	--	2.E+02	--	1.6E+02
2-(1-)Methylnaphthalene	3.30E+02	--	9.E-05	--	2.E-03	--	--	7.E+05	--	4.E+04	--	3.3E+04
Acenaphthene	1.10E+02	--	--	--	--	--	--	--	--	--	--	NA
Acenaphthylene	2.00E+00	2.E-09	--	8.E-10	--	--	1.E+03	--	2.E+03	--	--	1.3E+03
Anthracene	1.90E+02	--	8.E-05	--	2.E-03	--	--	5.E+05	--	2.E+04	--	2.5E+04
Benzene	3.10E-01	3.E-09	1.E-04	2.E-09	3.E-03	--	1.E+02	4.E+02	2.E+02	2.E+01	--	2.2E+01
Benzo(a)anthracene	2.40E+02	5.E-13	--	3.E-13	--	--	5.E+08	--	9.E+08	--	--	4.5E+08
cis-1,2-Dichloroethene	1.10E+03	--	4.E-05	--	9.E-04	--	--	5.E+06	--	3.E+05	--	2.6E+05
Ethylbenzene	4.90E+00	--	1.E-05	--	2.E-04	--	--	1.E+05	--	5.E+03	--	5.0E+03
Fluorene	1.80E+02	--	2.E-04	--	4.E-03	--	--	2.E+05	--	8.E+03	--	8.2E+03
n-hexane	1.00E+00	--	8.E-06	--	1.E-04	--	--	3.E+04	--	1.E+03	--	1.4E+03
Mercury	3.80E-01	--	1.E-03	--	2.E-02	--	--	6.E+01	--	3.E+00	--	3.3E+00
Naphthalene	2.60E+02	--	4.E-02	--	9.E-01	--	--	1.E+03	--	6.E+01	--	5.9E+01
PHC F1	3.66E+01	--	1.E-04	--	3.E-03	--	--	1.E+05	--	7.E+03	--	7.0E+03
PHC F2	2.50E+05	--	1.E-01	--	3.E+00	--	--	9.E+05	--	4.E+04	--	4.2E+04
Phenanthrene	1.00E+03	--	3.E-04	--	6.E-03	--	--	6.E+05	--	3.E+04	--	3.2E+04
Tetrachloroethene	5.00E-02	6.E-11	6.E-06	3.E-11	4.E-06	--	8.E+02	2.E+03	2.E+03	3.E+03	--	7.8E+02
trans-1,2-Dichloroethene	9.70E+01	--	4.E-06	--	6.E-06	--	--	4.E+06	--	3.E+06	--	3.2E+06
Trichloroethylene	4.20E+01	8.E-07	1.E-01	4.E-07	2.E+00	9.E+00	5.E+01	8.E+01	1.E+02	4.E+00	2.E+00	2.3E+00
Vinyl Chloride	9.90E+02	1.E-08	4.E-05	6.E-09	8.E-04	--	9.E+04	5.E+06	2.E+05	2.E+05	--	2.0E+06
Xylenes, Total	4.60E+00	--	3.E-05	--	1.E-04	--	--	4.E+04	--	7.E+03	--	6.9E+03

[a] Estimated maximum concentrations are presented based on the higher contribution to volatiles in outdoor air from soil (Table G3-3). Soil concentrations used in risk calculations in Section 4, as presented in Table 4-1.

[b] Refer to Table 4-29. Risks only shown for quantitatively assessed COCs.

[c] RBC calculated using RBC=TR*Cs/Risk, where TR is the MECP Target Risk of either 10^{-6} (ILCR), 0.2 (HQ for non-PHC COCs), or 0.5 (HQ for TCE and PHC COCs), Cs is the soil concentration used in the RA, and Risk is the estimated

[d] RBC_{OA} is the lowest of the calculated RBCs for all receptors. An RBC_{OA} is not calculated for nonvolatile COCs (shown as "NA").

These RBCs would be appropriate for soil that falls in the appropriate pH range (5-9). For development of fill cap target concentrations, see Section 6.

Notes:

Shaded values are groundwater concentrations (that is, not soil). Units are µg/L. Risk was driven by groundwater for the outdoor air pathway. Cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride were only retained as COCs in groundwater [not soil]). Soil RBCs for 2-(1-)Methylnaphthalene and PHC F2 are 1,100 µg/g and 8,300 µg/g, respectively.

-- = no value

µg/g = microgram(s) per gram

µg/L = microgram(s) per litre

COC = contaminant of concern

F = fraction

HQ = hazard quotient

ILCR = incremental lifetime cancer risk

MECP = Ontario Ministry of the Environment, Conservation and Parks

NA = not applicable

PHC = petroleum hydrocarbon

Table 5-1. Species at Risk Occurrences within 1 km^2 of the RA Property

Risk Assessment, 200 Beverly Street, Guelph, Ontario

Species (Common Name)	Species (*Latin Name*)	Preferred Habitat [a]	Ontario (S-Rank)	COSEWIC	MNRF Status/ SARO	Likelihood and Last Observation [b]
Birds						
Eastern Wood-Pewee	Contopus virens	Lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. Most abundant in intermediate-age mature forest stands with little understory vegetation.	S4B	SC	SC	None, habitat not present. Last observed date not provided.
Barn Swallow	*Hirundo rustica*	Live in close proximity of humans. Build their nests in open barns, under bridges, and in culverts.	S4B	THR	THR	None, habitat not present. Last observed date not provided.
Wood Thrush	*Hylocichla mustelina*	Lives in mature deciduous and mixed forests. Seek moist stands of trees with well developed undergrowth.	S4B	THR	SC	None, habitat not present. Last observed date not provided.
Invertebrates						
Speckled Giant Lacewing	*Polystoechotes punctatus*	Streamside vegetation, especially in woods.	SH	-	-	None, habitat not present. Last observed in August 1948.
American burying beetle	Nicrophorus americanus	Prefers undisturbed deciduous forest but have been found in many kinds of habitat.	SH	EXP	EXP	None, habitat not present. Has not been present in Ontario since 1972. Last observed September 1930.
Insects						
Painted Skimmer	*Libellula semifasciata*	Ponds and other still bodies of water, especially boggy ones with emergent plants, and often within forest.	S2	-	-	None, habitat not present. Last observed on May 26, 1913.
Yellow-Banded Bumble Bee	*Bombus terricola*	Prefers mixed woodlands, but have been found in native grasslands, farmlands, and urban areas. Abandoned rodent burrows or decomposing logs are used as nest sites.	S3/ S5	SC	SC	None, habitat not present. Last observed date not provided.

Table 5-1. Species at Risk Occurrences within 1 km^2 of the RA Property

Risk Assessment, 200 Beverly Street, Guelph, Ontario

Species (Common Name)	Species (*Latin Name*)	Preferred Habitat [a]	Ontario (S-Rank)	COSEWIC	MNRF Status/ SARO	Likelihood and Last Observation [b]
Reptiles						
Northern Map Turtle	*Graptemys geographica*	Areas of medium to large open water in lakes with emerging woody debris and abundant molluscs.	S3	SC	SC	None, habitat not present. Last observed in July 1924.
Eastern Milksnake	*Lampropeltis triangulum*	Open habitats such as rocky outcrops, fields and forest edge. The milksnake hibernates underground, in rotting logs or in the foundations of old buildings.	S3	SC	SC	None, while concrete foundations are present at the RA Property, other habitat requirements are not present. Last observed on September 28, 1978.

Notes:

[a.] Information obtained from the following sources accessed on May 20, 2020:

- Ontario Ministry of Natural Resources and Forestry Website: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list
- The International Union for Conservation of Nature and Natural Resources Red List Website: http://www.iucnredlist.org/
- University of Maryland Biodiversity Project catalogue website: https://www.marylandbiodiversity.com/

[b.] Likelihood of species being present on RA Property. Last observation obtained from the MNRF (2020) NHIC database.

Notes:

- = not applicable

B = breeding

COSEWIC = Committee on the Status of Endangered Wildlife in Canada

END = Endangered

EXP = Extirpated

km^2 = square kilometre(s)

m = metre(s)

MNRF = Ontario Ministry of Natural Resources and Forestry

NHIC = Natural Heritage Information Centre

RA = Risk Assessment

S-Rank = Subnational Rank

S1 = Critically Imperiled (often 5 or fewer occurrences)

S2 = Imperiled (often 20 or fewer occurrences)

S3 = Vulnerable (restricted range with relatively few populations - often 80 or fewer)

S4 = Uncommon but not rare; some cause for long-term concern due to declines or other factors

SARO = Species at Risk in Ontario

SH= Possibly extirpated (historically) but may be rediscovered.

SC = Special Concern

THR =Threatened

Table 5-2. Ecological Receptors and VECs for the RA Property

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Ecological Receptors	VECs
Terrestrial Receptors	
Soil organisms	Earthworms
Terrestrial vegetation	Grasses Manitoba Maple (*Acer negundo*)
Birds	American Woodcock (*Scolopax minor*) Red-winged Blackbird (*Agelarius phoeniceus*) Red-tailed Hawk (*Buteo jamaicensis*)
Mammals	Meadow Vole (*Microtus pennsylvanicus*) Short-tailed Shrew (*Blarina brevicauda*) Red Fox (*Vulpes vulpes*)
Aquatic Receptors	
Pelagic invertebrates	Water fleas (*Daphnia sp.*)
Fish	Common Shiner (*Luxilus cornutus*)
	Northern Pike (*Esox lucius*)
Amphibians	Green Frog (*Rana clamitans*)
Reptiles	Midland painted turtle (*Chrysemys picta marginata*)
Aquatic vegetation	Sedges (*Carex spp*)

Notes:

RA = Risk Assessment

VEC = valued ecological component

Table 5-3. Exposure Pathway Analysis

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Potential Exposure Route	Pathway Potentially Complete	Pathway Quantitatively Assessed in ERA	Rationale
Terrestrial Receptors				
Soil Organisms	Ingestion or dermal contact with soil	Yes	Yes	Ingestion of soil is considered the primary route of exposure. Soil organisms often come into direct contact with COCs that can be readily transmitted through moist dermal layers.
	Vapour (volatiles) and soil inhalation (particulates)	Yes	No (qualitative)	Vapour and soil inhalation of COCs is considered a minor exposure pathway. Little or no toxicity information is available on inhalation of COCs.
	Dermal contact with groundwater	Yes	No	Dermal contact with groundwater is considered a minor exposure route, as these receptors avoid saturated ground conditions, there is a lack of data to adequately evaluate these effects, and risks to these ecological receptors are better assessed through the evaluation of other exposure pathways (that is, soil).
Terrestrial Plants	Root uptake from soil	Yes	Yes	Root uptake from soil by plants is a primary route of exposure.
	Root uptake from groundwater	Yes	Yes	Minimum depth to groundwater is 0.94 mbgs, which is potentially within the rooting depths of some plants present or expected to be present.
	Stem or foliar uptake from ambient air	Yes	No (qualitative)	These are secondary routes of exposure. Limited toxicological information is available to evaluate these pathways.
Birds and Mammals	Ingestion of soil	Yes	Yes	Ingestion of soil is a route of exposure to COCs at the RA Property.
	Ingestion of surface water	Yes	No	Surface water is not present onsite, and ingestion of offsite surface water is considered a minor exposure pathway to COCs for birds and mammals.
	Dermal contact with groundwater	Yes	No	Dermal contact with groundwater was considered a minor exposure route, as these receptors avoid saturated ground conditions, there is a lack of data to adequately evaluate these effects, and risks to these ecological receptors are better assessed through the evaluation of other exposure pathways (that is, soil).

Table 5-3. Exposure Pathway Analysis

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Receptor	Potential Exposure Route	Pathway Potentially Complete	Pathway Quantitatively Assessed in ERA	Rationale
	Vapour (volatiles) and soil inhalation (particulates)	Yes	No (qualitative)	Inhalation of COCs is not considered a major exposure pathway. Little or no toxicity information is available on inhalation of COCs.
	Dermal contact with soil	Yes	No (qualitative)	Dermal contact with soil could be a route of exposure; however, little toxicity information exists on dermal contact with COCs, and the presence of fur on mammals and feathers on birds limits exposure.
	Ingestion of prey or food	Yes	Yes	Food-chain transport is a route of exposure for birds and mammals at the RA Property.
Aquatic Receptors				
Pelagic Invertebrates, Fish, Reptiles, and Amphibians	Dermal contact and ingestion of surface water (influenced by RA Property groundwater)	Yes	No (qualitative)	Dermal contact and ingestion of surface water is considered the primary route of exposure to COCs. Effects on these receptors are best assessed through use of the APVs based on the objectives of those values.
Aquatic Plants	Uptake of surface water through roots, leaves, and stems (influenced by RA Property groundwater)	Yes	No (qualitative)	Uptake of surface water through roots, leaves, and stems is considered the primary route of exposure to COCs and is best assessed through use of the APVs based on the objectives of those values.
Benthic Invertebrates	Dermal contact and ingestion of soil from the RA Property migrating to a water body via erosion	No	No	No water bodies are located within 30 m of the RA Property; therefore, soil erosion to a water body is not possible.

Notes:

APV = aquatic protection values

COC = contaminant of concern

ERA = Ecological Risk Assessment

mbgs = metre(s) below ground surface

RA = Risk Assessment

Table 5-4. Exposure Point Concentrations for Soil

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Maximum Concentration [a]	Estimated Maximum Concentration [b]
2-(1-)Methylnaphthalene	µg/g	4.93	5.9
Acenaphthene	µg/g	94	110
Acenaphthylene	µg/g	2	2
Anthracene	µg/g	160	190
Antimony	µg/g	18.6	22
Arsenic	µg/g	23	27
Benzene	µg/g	0.26	0.31
Benzo(a)anthracene	µg/g	200	240
Benzo(a)pyrene	µg/g	130	150
Benzo(b)fluoranthene	µg/g	190	220
Benzo(g,h,i)perylene	µg/g	70	84
Benzo(k)fluoranthene	µg/g	66	79
Cadmium	µg/g	83.4	100
Chrysene	µg/g	180	210
Cobalt	µg/g	393	470
Copper	µg/g	2460	2900
Dibenzo(a,h)anthracene	µg/g	26	31
Electrical Conductivity	mS/cm	2.19	2.6
Ethylbenzene	µg/g	4.1	4.9
Fluoranthene	µg/g	660	790
Fluorene	µg/g	150	180
Indeno(1,2,3-Cd)Pyrene	µg/g	80	96
Lead	µg/g	10100	12000
Mercury	µg/g	0.319	0.38
Molybdenum	µg/g	35	42
Naphthalene	µg/g	220	260
Nickel	µg/g	117	140
PCB, Total	µg/g	1.65	1.9
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	3600	4300
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	23000	27000
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	7300	8700
Phenanthrene	µg/g	900	1000
Pyrene	µg/g	470	560
Thallium	µg/g	6	7.2
Trichloroethylene	µg/g	35.4	42
Vanadium	µg/g	100	120
Xylenes, Total	µg/g	3.9	4.6
Zinc	µg/g	67200	80000
Bismuth	µg/g	150	180
Calcium	µg/g	220000	260000
Iron	µg/g	128000	150000
Magnesium	µg/g	120000	140000

Source: Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. Modified Generic Risk Assessment Model. Excel Spreadsheet. Ministry of the Environment. November 1.

[a.] The maximum concentration is the greater of the maximum detected concentration and the maximum detection limit of each parameter.

[b.] Estimated maximum concentration is the maximum detected concentration plus 20 percent (according to MECP, 2016).

Notes:

µg/g = microgram(s) per gram

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen per centimetre

PCB = polychorinated biphenyl

Table 5-5. Exposure Point Concentrations for Groundwater

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Maximum Concentration [a]	Estimated Maximum Concentration [b]
1,1,1-Trichloroethane	µg/L	37.1	44
1,1-Dichloroethane	µg/L	29.5	35
1,1-Dichloroethene	µg/L	64	76
2-(1-)Methylnaphthalene	µg/L	280	330
Acenaphthene	µg/L	40	48
Anthracene	µg/L	31	37
Arsenic	µg/L	45.7	54
Benzene	µg/L	66.8	80
Benzo(a)anthracene	µg/L	21	25
Benzo(a)pyrene	µg/L	2.4	2.8
Benzo(b&j)fluoranthene	µg/L	10	10
Benzo(k)fluoranthene	µg/L	10	10
Chrysene	µg/L	38	45
cis-1,2-Dichloroethene	µg/L	960	1100
Ethylbenzene	µg/L	8.46	10
Fluoranthene	µg/L	24	28
Lead	µg/L	17	20
Naphthalene	µg/L	27	32
n-Hexane	µg/L	7.46	8.9
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	550	660
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	210000	250000
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	850000	1000000
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	37000	44000
Phenanthrene	µg/L	110	130
Pyrene	µg/L	59	70
Tetrachloroethene	µg/L	1.14	1.3
trans-1,2-Dichloroethene	µg/L	81	97
Trichloroethylene	µg/L	7900	9400
Vinyl Chloride	µg/L	100	990
Zinc	µg/L	4500	5400

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. Modified Generic Risk Assessment Model. Microsoft Excel Spreadsheet. November 1.

[a.] The maximum concentration is the greater of the maximum detected concentration and the maximum detection limit of each parameter.

[b.] Estimated maximum concentration is the maximum detected concentration plus 20% (per MECP, 2016), or the maximum detection limit.

Notes:

% = percent

µg/L = microgram(s) per litre

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

Table 5-6a. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Soil - Plant and Soil Organisms

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Plants and Soil Organisms	Basis	Notes and References
2-(1-)Methylnaphthalene	µg/g	29	Soil Invertebrates	USEPA Eco-SSL [a,b]
Acenaphthene	µg/g	29	Soil Invertebrates	USEPA Eco-SSL [a,b]
Acenaphthylene	µg/g	29	Soil Invertebrates	USEPA Eco-SSL [a,b]
Anthracene	µg/g	2.5	--	MECP Plant and Soil Organism Component Value [c]
Antimony	µg/g	20	--	MECP Plant and Soil Organism Component Value [c]
Arsenic	µg/g	20	--	MECP Plant and Soil Organism Component Value [c]
Benzene	µg/g	25	--	MECP Plant and Soil Organism Component Value [c]
Benzo(a)anthracene	µg/g	0.5	--	MECP Plant and Soil Organism Component Value [c]
Benzo(a)pyrene	µg/g	20	--	MECP Plant and Soil Organism Component Value [c]
Benzo(b)fluoranthene	µg/g	18	Soil Invertebrates	USEPA Eco-SSL [a,d]
Benzo(g,h,i)perylene	µg/g	6.6	--	MECP Plant and Soil Organism Component Value [c]
Benzo(k)fluoranthene	µg/g	7.6	--	MECP Plant and Soil Organism Component Value [c]
Cadmium	µg/g	12	--	MECP Plant and Soil Organism Component Value [c]
Chrysene	µg/g	7	--	MECP Plant and Soil Organism Component Value [c]
Cobalt	µg/g	40	--	MECP Plant and Soil Organism Component Value [c]
Copper	µg/g	140	--	MECP Plant and Soil Organism Component Value [c]
Dibenzo(a,h)anthracene	µg/g	18	Soil Invertebrates	USEPA Eco-SSL [a,d]
Electrical Conductivity	mS/cm	0.7	--	MECP Plant and Soil Organism Component Value [c]
Ethylbenzene	µg/g	55	--	MECP Plant and Soil Organism Component Value [c]
Fluoranthene	µg/g	50	--	MECP Plant and Soil Organism Component Value [c]
Fluorene	µg/g	29	Soil Invertebrates	USEPA Eco-SSL [a,b]
Indeno(1,2,3-Cd)Pyrene	µg/g	0.38	--	MECP Plant and Soil Organism Component Value [c]
Lead	µg/g	250	--	MECP Plant and Soil Organism Component Value [c]
Mercury	µg/g	10	--	MECP Plant and Soil Organism Component Value [c]
Molybdenum	µg/g	40	--	MECP Plant and Soil Organism Component Value [c]
Naphthalene	µg/g	0.6	--	MECP Plant and Soil Organism Component Value [c]
Nickel	µg/g	100	--	MECP Plant and Soil Organism Component Value [c]
PCB, Total	µg/g	33	--	MECP Plant and Soil Organism Component Value [c]
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	150	--	MECP Plant and Soil Organism Component Value [c]
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	300	--	MECP Plant and Soil Organism Component Value [c]
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	2800	--	MECP Plant and Soil Organism Component Value [c]
Phenanthrene	µg/g	6.2	--	MECP Plant and Soil Organism Component Value [c]
Pyrene	µg/g	18	Soil Invertebrates	USEPA Eco-SSL [a,d]

Table 5-6a. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Soil - Plant and Soil Organisms

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Plants and Soil Organisms	Basis	Notes and References
Thallium	µg/g	1.4	--	MECP Plant and Soil Organism Component Value [c]
Trichloroethylene	µg/g	100	--	MECP Plant and Soil Organism Component Value [c]
Vanadium	µg/g	200	--	MECP Plant and Soil Organism Component Value [c]
Xylenes, Total	µg/g	95	--	MECP Plant and Soil Organism Component Value [c]
Zinc	µg/g	400	--	MECP Plant and Soil Organism Component Value [c]
Bismuth	µg/g	20	Plants	ODEQ - Level II Screening Values [e]
Calcium	µg/g	54000	--	MECP - Ontario Typical Range value [f]
Iron	µg/g	38000	--	MECP - Ontario Typical Range value [f]
Magnesium	µg/g	17000	--	MECP - Ontario Typical Range value [f]

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] United States Environmental Protection Agency. 2007. Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs), Interim Final. June. https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_pah.pdf. Values obtained from Table 2.1.

[b.] Value for low molecular weight (LMW) PAHs selected.

[c.] Ecological component values from the table entitled Soil Components for Table 6 – Shallow Soils, Potable Water Scenario (Coarse Textured Soil, Residential/Parkland Land Use) (MECP, 2011).

[d.] Value for high molecular weight (HMW) PAHs selected.

[e.] ODEQ. 2001. Guidance for Ecological Risk Assessment: Levels I, II, III, IV. April 1998, updated December 2001. Value from Table 1: Screening Level Values for Plants, Invertebrates, and Wildlife Exposed to Soil and Surface Water. Selection from: Soil, Terrestrial Receptor, Plants.

[f.] MECP. 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Value adjusted per the procedure outlined in Section 8.3.1 of the Rationale Document.

Notes:

-- = no value

µg/g = microgram(s) per gram

COC = contaminant of concern

EcoBMC = ecological benchmark concentration

Eco-SSL = ecological soil screening level

F = fraction

HMW = high molecular weight

LMW = low molecular weight

MECP = Ontario Ministry of the Environment, Conservation and Parks

ODEQ = Oregon Department of Environmental Quality

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyl

EPA = U.S. Environmental Protection Agency

Table 5-6b. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Soil - Birds and Mammals

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Birds and Mammals	Basis	Notes and References
2-(1-)Methylnaphthalene	µg/g	100	Mammals	USEPA Eco-SSL [a,b]
Acenaphthene	µg/g	6600	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Acenaphthylene	µg/g	100	Mammals	USEPA Eco-SSL [a,b]
Anthracene	µg/g	38000	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Antimony	µg/g	25	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Arsenic	µg/g	51	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Benzene	µg/g	370	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Benzo(a)anthracene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Benzo(a)pyrene	µg/g	1600	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Benzo(b)fluoranthene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Benzo(g,h,i)perylene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Benzo(k)fluoranthene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Cadmium	µg/g	1.9	American Woodcock	MECP Bird and Mammal Component Value [c]
Chrysene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Cobalt	µg/g	180	American Woodcock	MECP Bird and Mammal Component Value [c]
Copper	µg/g	770	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Dibenzo(a,h)anthracene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Electrical Conductivity	mS/cm	NA	--	MECP - Applicable to Plants Only [e]
Ethylbenzene	µg/g	90	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Fluoranthene	µg/g	0.69	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Fluorene	µg/g	100	Mammals	USEPA Eco-SSL [a,b]
Indeno(1,2,3-Cd)Pyrene	µg/g	1.1	Mammals	USEPA Eco-SSL [a,d]
Lead	µg/g	32	American Woodcock	MECP Bird and Mammal Component Value [c]
Mercury	µg/g	20	American Woodcock	MECP Bird and Mammal Component Value [c]
Molybdenum	µg/g	6.9	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Naphthalene	µg/g	380	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Nickel	µg/g	5000	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
PCB, Total	µg/g	1.1	American Woodcock	MECP Bird and Mammal Component Value [c]
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	9800	Wildlife Soil and Food Ingestion	AEP [f]
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	16000	Wildlife Soil and Food Ingestion	AEP [f]
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8400	Wildlife Soil and Food Ingestion	AEP [f]
Phenanthrene	µg/g	2700	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Pyrene	µg/g	4700	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Thallium	µg/g	3.9	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]

Table 5-6b. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Soil - Birds and Mammals

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Birds and Mammals	Basis	Notes and References
Trichloroethylene	µg/g	8.1	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Vanadium	µg/g	18	American Woodcock	MECP Bird and Mammal Component Value [c]
Xylenes, Total	µg/g	96	Short-tailed Shrew	MECP Bird and Mammal Component Value [c]
Zinc	µg/g	340	American Woodcock	MECP Bird and Mammal Component Value [c]
Bismuth	µg/g	--	--	--
Calcium	µg/g	54000	--	MECP - Ontario Typical Range value [g]
Iron	µg/g	38000	--	MECP - Ontario Typical Range value [g]
Magnesium	µg/g	17000	--	MECP - Ontario Typical Range value [g]

Sources:

Alberta Environment and Parks (AEP). 2019. *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* . January 10.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] U.S. Environmental Protection Agency (EPA). 2007. Ecological Soil Screening Levels for Polycyclic Aromatic Hydrocarbons (PAHs), Interim Final. June. https://www.epa.gov/sites/production/files/2015-09/documents/eco-ssl_pah.pdf. Values obtained from Table 2.1.

[b.] Value for LMW PAHs selected.

[c.] Ecological component values from the table entitled Soil Components for Table 6 - Shallow Soils, Potable Water Scenario (Coarse Textured Soil, Residential/Parkland Land Use) (MECP, 2011).

[d.] Value for HMW PAHs selected.

[e.] Per the MECP (2011), this analyte is only applicable to plants.

[f.] Per AEP (2019), PHCs "are not considered to bioaccumulate into potential food species". Therefore, the PHCs values for Wildlife Soil and Food Ingestion for Natural Area Land Use are applicable to soil ingestion only. Values obtained from Table A-1 (AEP, 2019).

[g.] MECP. 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Value adjusted per the procedure outlined in Section 8.3.1 of the Rationale Document.

Notes:

-- = no value
AEP = Alberta Environment and Parks
µg/g = microgram(s) per gram
COC = contaminant of concern
EcoBMG = ecological benchmark concentration
Eco-SSL = ecological soil screening level
F = fraction
HMW = high molecular weight
LMW = low molecular weight
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemens per centimetre
NA = not applicable
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
EPA = U.S. Environmental Protection Agency

Table 5-7a. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Groundwater - Terrestrial Plants

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Terrestrial Plants	Basis	Reference
1,1,1-Trichloroethane	µg/L	9000	--	MECP GW3 Component Value [a]
1,1-Dichloroethane	µg/L	2000000	--	MECP GW3 Component Value [a]
1,1-Dichloroethene	µg/L	12000	--	MECP GW3 Component Value [a]
2-(1-)Methylnaphthalene	µg/L	1500	--	MECP GW3 Component Value [a]
Acenaphthene	µg/L	5200	--	MECP GW3 Component Value [a]
Anthracene	µg/L	1	--	MECP GW3 Component Value [a]
Arsenic	µg/L	1500	--	MECP GW3 Component Value [a]
Benzene	µg/L	4600	--	MECP GW3 Component Value [a]
Benzo(a)anthracene	µg/L	1.8	--	MECP GW3 Component Value [a]
Benzo(a)pyrene	µg/L	2.1	--	MECP GW3 Component Value [a]
Benzo(b&j)fluoranthene	µg/L	4.2	--	MECP GW3 Component Value [a]
Benzo(k)fluoranthene	µg/L	1.4	--	MECP GW3 Component Value [a]
Chrysene	µg/L	0.7	--	MECP GW3 Component Value [a]
cis-1,2-Dichloroethene	µg/L	140000	--	MECP GW3 Component Value [a]
Ethylbenzene	µg/L	1800	--	MECP GW3 Component Value [a]
Fluoranthene	µg/L	73	--	MECP GW3 Component Value [a]
Lead	µg/L	20	--	MECP GW3 Component Value [a]
Naphthalene	µg/L	6200	--	MECP GW3 Component Value [a]
n-Hexane	µg/L	2500	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	420	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	170	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	NA	--	NA [b]
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	NA	--	NA [b]
Phenanthrene	µg/L	380	--	MECP GW3 Component Value [a]
Pyrene	µg/L	5.7	--	MECP GW3 Component Value [a]
Tetrachloroethene	µg/L	8400	--	MECP GW3 Component Value [a]
trans-1,2-Dichloroethene	µg/L	220000	--	MECP GW3 Component Value [a]

Table 5-7a. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Groundwater - Terrestrial Plants

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Terrestrial Plants	Basis	Reference
Trichloroethylene	µg/L	220000	--	MECP GW3 Component Value [a]
Vinyl Chloride	µg/L	360000	--	MECP GW3 Component Value [a]
Zinc	µg/L	890	--	MECP GW3 Component Value [a]

Sources:

Atlantic Partnership in Risk Based Corrective Action Implemental (Atlantic PIRI). 2012. Scientific Rationale to support the Adoption/Development of Tier 1 Ecological Screening Levels for Soil, Surface Water, Groundwater and Sediment. July. http://atlanticrbca.com/wp-

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] GW3 component values are considered protective of terrestrial plants; from table entitled Groundwater Components for Potable Water Scenario (Coarse Textured Soil) in MECP (2011).

[b] Per Table 2: Tier 1 Groundwater Ecological Screening Levels for Plant and Invertebrate Direct Contact with Shallow Groundwater of the Atlantic PIRI (2012) document, this fraction is considered "insufficiently soluble to migrate to groundwater from soil".

Notes:

-- = no value

µg/L = microgram(s) per litre

COC = contaminant of concern

EcoBMC = ecological benchmark concentration

F = fraction

GW3 = groundwater to surface water

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbons

SCS = Site Condition Standards

Table 5-7b. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Groundwater - Aquatic Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Aquatic	Basis	Reference
1,1,1-Trichloroethane	µg/L	9000	--	MECP GW3 Component Value [a]
1,1-Dichloroethane	µg/L	2000000	--	MECP GW3 Component Value [a]
1,1-Dichloroethene	µg/L	12000	--	MECP GW3 Component Value [a]
2-(1-)Methylnaphthalene	µg/L	1500	--	MECP GW3 Component Value [a]
Acenaphthene	µg/L	5200	--	MECP GW3 Component Value [a]
Anthracene	µg/L	1	--	MECP GW3 Component Value [a]
Arsenic	µg/L	1500	--	MECP GW3 Component Value [a]
Benzene	µg/L	4600	--	MECP GW3 Component Value [a]
Benzo(a)anthracene	µg/L	1.8	--	MECP GW3 Component Value [a]
Benzo(a)pyrene	µg/L	2.1	--	MECP GW3 Component Value [a]
Benzo(b&j)fluoranthene	µg/L	4.2	--	MECP GW3 Component Value [a]
Benzo(k)fluoranthene	µg/L	1.4	--	MECP GW3 Component Value [a]
Chrysene	µg/L	0.7	--	MECP GW3 Component Value [a]
cis-1,2-Dichloroethene	µg/L	140000	--	MECP GW3 Component Value [a]
Ethylbenzene	µg/L	1800	--	MECP GW3 Component Value [a]
Fluoranthene	µg/L	73	--	MECP GW3 Component Value [a]
Lead	µg/L	20	--	MECP GW3 Component Value [a]
Naphthalene	µg/L	6200	--	MECP GW3 Component Value [a]
n-Hexane	µg/L	2500	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	420	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	170	--	MECP GW3 Component Value [a]
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	NA	--	NA [a, b]
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	NA	--	NA [a, b]
Phenanthrene	µg/L	380	--	MECP GW3 Component Value [a]
Pyrene	µg/L	5.7	--	MECP GW3 Component Value [a]
Tetrachloroethene	µg/L	8400	--	MECP GW3 Component Value [a]
trans-1,2-Dichloroethene	µg/L	220000	--	MECP GW3 Component Value [a]
Trichloroethylene	µg/L	220000	--	MECP GW3 Component Value [a]

Table 5-7b. Summary of Ecological Benchmark Concentrations Used in the Assessment of COCs in Groundwater - Aquatic Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	EcoBMC - Aquatic	Basis	Reference
Vinyl Chloride	µg/L	360000	--	MECP GW3 Component Value [a]
Zinc	µg/L	890	--	MECP GW3 Component Value [a]

Sources:

Canadian Council of Ministers of the Environment (CCME). 2008. Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale. Supporting Technical Document. PN 1399. January.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

Notes:

[a.] GW3 (groundwater-to-surface water) component value from table entitled Groundwater Components for Potable Water, Shallow Soil Scenario (Coarse Textured Soil) in MECP (2011).

[b] Per CCME (2008), this fraction is considered "insufficiently soluble that movement via dissolution in groundwater is not likely to be an operable pathway."

-- = no value

µg/L = microgram per litre

EcoBMC = ecological benchmark concentration

COC = contaminant of concern

F = fraction

GW3 = groundwater to surface water

MECP = Ontario Ministry of the Environmental, Conservation and Parks

NA = not applicable

Table 5-8a. Summary of Estimated Maximum Concentrations of COCs in Soil Compared to EcoBMCs and Calculated Hazard Quotients - Plants and Soil Organisms

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	EcoBMC - Plants and Soil Organisms [a]	Hazard Quotient - Plants and Soil Organisms [b]
2-(1-)Methylnaphthalene	µg/g	5.9	29	0.2
Acenaphthene	µg/g	110	29	**3.8**
Acenaphthylene	µg/g	2	29	0.069
Anthracene	µg/g	190	2.5	**76**
Antimony	µg/g	22	20	**1.1**
Arsenic	µg/g	27	20	**1.4**
Benzene	µg/g	0.31	25	0.012
Benzo(a)anthracene	µg/g	240	0.5	**480**
Benzo(a)pyrene	µg/g	150	20	**7.5**
Benzo(b)fluoranthene	µg/g	220	18	**12**
Benzo(g,h,i)perylene	µg/g	84	6.6	**13**
Benzo(k)fluoranthene	µg/g	79	7.6	**10**
Cadmium	µg/g	100	12	**8.3**
Chrysene	µg/g	210	7	**30**
Cobalt	µg/g	470	40	**12**
Copper	µg/g	2900	140	**21**
Dibenzo(a,h)anthracene	µg/g	31	18	**1.7**
Electrical Conductivity	mS/cm	2.6	0.7	**3.7**
Ethylbenzene	µg/g	4.9	55	0.089
Fluoranthene	µg/g	790	50	**16**
Fluorene	µg/g	180	29	**6.2**
Indeno(1,2,3-Cd)Pyrene	µg/g	96	0.38	**250**
Lead	µg/g	12000	250	**48**
Mercury	µg/g	0.38	10	0.038
Molybdenum	µg/g	42	40	**1.1**
Naphthalene	µg/g	260	0.6	**430**
Nickel	µg/g	140	100	**1.4**
PCB, Total	µg/g	1.9	33	0.058
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	4300	150	**29**
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	27000	300	**90**
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8700	2800	**3.1**
Phenanthrene	µg/g	1000	6.2	**160**
Pyrene	µg/g	560	18	**31**
Thallium	µg/g	7.2	1.4	**5.1**
Trichloroethylene	µg/g	42	100	0.42
Vanadium	µg/g	120	200	0.6
Xylenes, Total	µg/g	4.6	95	0.048
Zinc	µg/g	80000	400	**200**
Bismuth	µg/g	180	20	**9**
Calcium	µg/g	260000	54000	**4.8**
Iron	µg/g	150000	38000	**3.9**
Magnesium	µg/g	140000	17000	**8.2**

[a.] Refer to Table 5-6a.

[b.] Hazard Quotient calculated as Estimated Maximum Concentration / EcoBMC, rounded to two significant digits.

Notes:

Bold and light grey shaded values have a HQ value greater than 1

-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
EcoBMC = ecological benchmark concentration
F = fraction
HQ = hazard quotient
mS/cm = milliSiemen per centimetre
PCB = polychlorinated biphenyl

Table 5-8b. Summary of Estimated Maximum Concentrations of COCs in Soil Compared to EcoBMCs and Calculated Hazard Quotients - Birds and Mammals

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	EcoBMC - Birds and Mammals [a]	Hazard Quotient - Birds and Mammals [b]
2-(1-)Methylnaphthalene	µg/g	5.9	100	0.059
Acenaphthene	µg/g	110	6600	0.017
Acenaphthylene	µg/g	2	100	0.02
Anthracene	µg/g	190	38000	0.005
Antimony	µg/g	22	25	0.88
Arsenic	µg/g	27	51	0.53
Benzene	µg/g	0.31	370	0.00084
Benzo(a)anthracene	µg/g	240	1.1	**220**
Benzo(a)pyrene	µg/g	150	1600	0.094
Benzo(b)fluoranthene	µg/g	220	1.1	**200**
Benzo(g,h,i)perylene	µg/g	84	1.1	**76**
Benzo(k)fluoranthene	µg/g	79	1.1	**72**
Cadmium	µg/g	100	1.9	**53**
Chrysene	µg/g	210	1.1	**190**
Cobalt	µg/g	470	180	**2.6**
Copper	µg/g	2900	770	**3.8**
Dibenzo(a,h)anthracene	µg/g	31	1.1	**28**
Electrical Conductivity	mS/cm	2.6	NA	NA
Ethylbenzene	µg/g	4.9	90	0.054
Fluoranthene	µg/g	790	0.69	**1100**
Fluorene	µg/g	180	100	**1.8**
Indeno(1,2,3-Cd)Pyrene	µg/g	96	1.1	**87**
Lead	µg/g	12000	32	**380**
Mercury	µg/g	0.38	20	0.019
Molybdenum	µg/g	42	6.9	**6.1**
Naphthalene	µg/g	260	380	0.68
Nickel	µg/g	140	5000	0.028
PCB, Total	µg/g	1.9	1.1	**1.7**
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	4300	9800	0.44
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	27000	16000	**1.7**
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8700	8400	1
Phenanthrene	µg/g	1000	2700	0.37
Pyrene	µg/g	560	4700	0.12
Thallium	µg/g	7.2	3.9	**1.8**
Trichloroethylene	µg/g	42	8.1	**5.2**
Vanadium	µg/g	120	18	**6.7**
Xylenes, Total	µg/g	4.6	96	0.048
Zinc	µg/g	80000	340	**240**
Bismuth	µg/g	180	--	--
Calcium	µg/g	260000	54000	**4.8**
Iron	µg/g	150000	38000	**3.9**
Magnesium	µg/g	140000	17000	**8.2**

[a.] Refer to Table 5-6b.

[b.] HQ calculated as Estimated Maximum Concentration / EcoBMCs, rounded to two significant digits.

Notes:

Bold and light grey shaded values have an HQ value greater than 1

-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
EcoBMC = ecological benchmark concentrations
F = fraction
HQ = hazard quotient
mS/cm = milliSiemen per centimetre
NA = not applicable
PCB = polychlorinated biphenyl

Table 5-9. Summary of Estimated Maximum Concentrations of COCs in Groundwater Compared to Ecological Benchmark Concentrations and Calculated Hazard Quotients - Terrestrial Plants

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	EcoBMC - Terrestrial Plants [a]	Hazard Quotient - Terrestrial Plants [b]
1,1,1-Trichloroethane	µg/L	44	11000	0.0049
1,1-Dichloroethane	µg/L	35	2600000	0.000018
1,1-Dichloroethene	µg/L	76	15000	0.0063
2-(1-)Methylnaphthalene	µg/L	330	1800	0.22
Acenaphthene	µg/L	48	6600	0.0092
Anthracene	µg/L	37	2.4	**37**
Arsenic	µg/L	54	1900	0.036
Benzene	µg/L	80	5800	0.017
Benzo(a)anthracene	µg/L	25	1.6E+11	**14**
Benzo(a)pyrene	µg/L	2.8	3.4E+12	**1.3**
Benzo(b&j)fluoranthene	µg/L	10	6.9E+12	**2.4**
Benzo(k)fluoranthene	µg/L	10	2.3E+12	**7.1**
Chrysene	µg/L	45	1.1E+11	**64**
cis-1,2-Dichloroethene	µg/L	1100	180000	0.0079
Ethylbenzene	µg/L	10	2300	0.0056
Fluoranthene	µg/L	28	41000	0.38
Lead	µg/L	20	25	1
Naphthalene	µg/L	32	7800	0.0052
n-Hexane	µg/L	8.9	3200	0.0036
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	660	750	**1.6**
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	250000	970	**1500**
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	1000000	NA	**> 1** [c]
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	44000	NA	**> 1** [c]
Phenanthrene	µg/L	130	920	0.34
Pyrene	µg/L	70	2700	**12**
Tetrachloroethene	µg/L	1.3	11000	0.00015
trans-1,2-Dichloroethene	µg/L	97	280000	0.00044
Trichloroethylene	µg/L	9400	280000	0.043
Vinyl Chloride	µg/L	990	450000	0.0028
Zinc	µg/L	5400	1100	**6.1**

[a] Refer to Table 5-7a.

[b] Hazard Quotient calculated as Estimated Maximum Concentration / EcoBMC, rounded to two significant digits.

[c] Risks assumed to be greater than one for PHC F3 and PHC F4 because petroleum-related NAPL is present at the RA Property.

Notes:

Bold and light grey shaded values have an HQ value greater than 1

> = greater than
µg/L = microgram per litre
COC = contaminant of concern
EcoBMC = ecological benchmark concentration
F = fraction
HQ = hazard quotient
NA = not applicable

Table 5-10. Proposed Ecological Property-specific Standards for Soil COCs and Risk Management Requirements

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	EcoBMC - Plants and Soil Organisms	EcoBMC - Birds and Mammals	EPSS	Risk Management Required for Plants and Soil Organisms	Risk Management Required for Birds and Mammals	Ecological Risk Management Requirements
2-(1-)Methylnaphthalene	µg/g	5.9	0.99	29	100	5.9	No	No	None
Acenaphthene	µg/g	110	7.9	29	6600	110	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Acenaphthylene	µg/g	2	0.15	29	100	2	No	No	None
Anthracene	µg/g	190	0.67	2.5	38000	190	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Antimony	µg/g	22	7.5	20	25	22	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Arsenic	µg/g	27	18	20	51	27	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Benzene	µg/g	0.31	0.21	25	370	0.31	No	No	None
Benzo(a)anthracene	µg/g	240	0.5	0.5	1.1	240	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Benzo(a)pyrene	µg/g	150	0.3	20	1600	150	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Benzo(b)fluoranthene	µg/g	220	0.78	18	1.1	220	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Benzo(g,h,i)perylene	µg/g	84	6.6	6.6	1.1	84	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Benzo(k)fluoranthene	µg/g	79	0.78	7.6	1.1	79	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Cadmium	µg/g	100	1.2	12	1.9	100	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Chrysene	µg/g	210	7	7	1.1	210	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Cobalt	µg/g	470	22	40	180	470	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Copper	µg/g	2900	140	140	770	2900	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Dibenzo(a,h)anthracene	µg/g	31	0.1	18	1.1	31	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Electrical Conductivity	mS/cm	2.6	0.7	0.7	NA	2.6	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Ethylbenzene	µg/g	4.9	1.1	55	90	4.9	No	No	None
Fluoranthene	µg/g	790	0.69	50	0.69	790	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Fluorene	µg/g	180	62	29	100	180	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Indeno(1,2,3-Cd)Pyrene	µg/g	96	0.38	0.38	1.1	96	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Lead	µg/g	12000	120	250	32	12000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Mercury	µg/g	0.38	0.27	10	20	0.38	No	No	None
Molybdenum	µg/g	42	6.9	40	6.9	42	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Naphthalene	µg/g	260	0.6	0.6	380	260	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Nickel	µg/g	140	100	100	5000	140	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
PCB, Total	µg/g	1.9	0.35	33	1.1	1.9	No	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	4300	98	150	9800	4300	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	27000	300	300	16000	27000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8700	2800	2800	8400	8700	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Phenanthrene	µg/g	1000	6.2	6.2	2700	1000	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Pyrene	µg/g	560	78	18	4700	560	Yes	No	Yes. Barriers/surface covers required to protect ecological receptors.
Thallium	µg/g	7.2	1	1.4	3.9	7.2	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Trichloroethylene	µg/g	42	0.061	100	8.1	42	No	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Vanadium	µg/g	120	86	200	18	120	No	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Xylenes, Total	µg/g	4.6	3.1	95	96	4.6	No	No	None
Zinc	µg/g	80000	340	400	340	80000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Bismuth	µg/g	180	--	20	--	180	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Calcium	µg/g	260000	--	54000	54000	260000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Iron	µg/g	150000	--	38000	38000	150000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.
Magnesium	µg/g	140000	--	17000	17000	140000	Yes	Yes	Yes. Barriers/surface covers required to protect ecological receptors.

Source:

Ontario Ministry of the Environment, Conservation and Parks (Ministry). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

[a] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils (MECP, 2011).

Notes:

-- = no value
µg/g = microgram(s) per gram
COC = contaminant of concern
EcoBMC = ecological benchmark concentration
EPSS = ecological property-specific standard
F = fraction
m = metre(s)
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not applicable
PCB = polychlorinated biphenyl
SCS = Site Condition Standards

Table 5-11. Proposed Ecological Property-specific Standards for Groundwater COCs and Risk Management Requirements

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	EcoBMC - Terrestrial Plants [b]	EcoBMC - Aquatic [c]	EPSS	Risk Management Required - Terrestrial Plants	Risk Management Required - Offsite Aquatic Receptors	Ecological Risk Management Requirements [d]
1,1,1-Trichloroethane	µg/L	44	23	11000	9000	44	No	No	None
1,1-Dichloroethane	µg/L	35	0.47	2600000	2000000	35	No	No	None
1,1-Dichloroethene	µg/L	76	0.05	15000	12000	76	No	No	None
2-(1-)Methylnaphthalene	µg/L	330	0.99	1800	1500	330	No	No	None
Acenaphthene	µg/L	48	600	6600	5200	48	No	No	None
Anthracene	µg/L	37	1	2.4	1	37	No	Yes	Groundwater monitoring, remediation, or both for protection of aquatic receptors.
Arsenic	µg/L	54	1500	1900	1500	54	No	No	None
Benzene	µg/L	80	44	5800	4600	80	No	No	None
Benzo(a)anthracene	µg/L	25	1.8	1.6E+11	1.8	25	No	No	None
Benzo(a)pyrene	µg/L	2.8	0.81	3.4E+12	2.1	2.8	No	No	None
Benzo(b&j)fluoranthene	µg/L	10	0.75	6.9E+12	4.2	10	No	No	None
Benzo(k)fluoranthene	µg/L	10	0.4	2.3E+12	1.4	10	No	No	None
Chrysene	µg/L	45	0.7	1.1E+11	0.7	45	No	No	None
cis-1,2-Dichloroethene	µg/L	1100	1.6	180000	140000	1100	No	No	None
Ethylbenzene	µg/L	10	1800	2300	1800	10	No	No	None
Fluoranthene	µg/L	28	73	41000	73	28	No	No	None
Lead	µg/L	20	20	25	20	20	No	No	None
Naphthalene	µg/L	32	1400	7800	6200	32	No	No	None
n-Hexane	µg/L	8.9	51	3200	2500	8.9	No	No	None
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	660	420	750	420	660	No	Yes	Groundwater monitoring, remediation, or both for protection of aquatic receptors.
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	250000	150	970	170	250000	No	Yes	Groundwater monitoring, remediation, or both for protection of aquatic receptors.
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	1000000	500	NA	NA	1000000	No	No	None
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	44000	500	NA	NA	44000	No	No	None
Phenanthrene	µg/L	130	380	920	380	130	No	No	None
Pyrene	µg/L	70	5.7	2700	5.7	70	No	No	None
Tetrachloroethene	µg/L	1.3	1.6	11000	8400	1.3	No	No	None
trans-1,2-Dichloroethene	µg/L	97	1.6	280000	220000	97	No	No	None
Trichloroethylene	µg/L	9400	1.6	280000	220000	9400	No	No	None
Vinyl Chloride	µg/L	990	0.5	450000	360000	990	No	No	None
Zinc	µg/L	5400	890	1100	890	5400	No	Yes	Groundwater monitoring, remediation, or both for protection of aquatic receptors.

Source:
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

[a.] O. Reg. 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (MECP, 2011).

[b.] Obtained from Table 5-7a.

[c.] Obtained from Table 5-7b.

[d.] While remediation is not considered a risk management measure per se, it is listed here as it is an option which may be exercised to reduce risks at the RA Property prior to Record of Site Condition filing.

Notes:

-- = no value
µg/L = microgram(s) per litre
COC = contaminant of concern
EcoBMC = ecological benchmark concentration
EPSS = ecological property-specific standard
m = metre(s)
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
SCS = Site Condition Standards

Table 5-12. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Proposed EPSS [a]	Inferred SCS Applicable to Offsite [b]	Potential for Offsite Exceedance of Inferred Offsite SCS	Comment	Nearest Offsite Receptor - Terrestrial	Nearest Offsite Receptor - Aquatic
1,1,1-Trichloroethane	µg/L	44	23	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
1,1-Dichloroethane	µg/L	35	5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
1,1-Dichloroethene	µg/L	76	0.5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
2-(1-)Methylnaphthalene	µg/L	330	3.2	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Acenaphthene	µg/L	48	4.1	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Anthracene	µg/L	37	1	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	Pelagic invertebrates, fish, and aquatic plants
Arsenic	µg/L	54	25	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Benzene	µg/L	80	0.5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Benzo(a)anthracene	µg/L	25	1	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Benzo(a)pyrene	µg/L	2.8	0.01	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Benzo(b&j)fluoranthene	µg/L	10	0.1	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Benzo(k)fluoranthene	µg/L	10	0.1	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Chrysene	µg/L	45	0.1	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
cis-1,2-Dichloroethene	µg/L	1100	1.6	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Ethylbenzene	µg/L	10	2.4	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Fluoranthene	µg/L	28	0.41	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Lead	µg/L	20	10	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Naphthalene	µg/L	32	7	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
n-Hexane	µg/L	8.9	5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	660	420	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	Pelagic invertebrates, fish, and aquatic plants
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	250000	150	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	Pelagic invertebrates, fish, and aquatic plants

Table 5-12. Potential Risks to Offsite Receptors

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Proposed EPSS [a]	Inferred SCS Applicable to Offsite [b]	Potential for Offsite Exceedance of Inferred Offsite SCS	Comment	Nearest Offsite Receptor - Terrestrial	Nearest Offsite Receptor - Aquatic
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	1000000	500	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	44000	500	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Phenanthrene	µg/L	130	1	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Pyrene	µg/L	70	4.1	×	Mobility in groundwater is not anticipated; offsite exceedance unlikely	NA	NA
Tetrachloroethene	µg/L	1.3	0.5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
trans-1,2-Dichloroethene	µg/L	97	1.6	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Trichloroethylene	µg/L	9400	0.5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Vinyl Chloride	µg/L	990	0.5	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	-- [d]
Zinc	µg/L	5400	890	✓	Potentially mobile parameter	Offsite terrestrial plants at properties hydraulically downgradient of the RA Property [c]	Pelagic invertebrates, fish, and aquatic plants

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

[a.] The proposed EPSS apply to the RA Property only.

[b.] The inferred SCS applicable to offsite properties is O. Reg. 153/04, *Table 6: Full Depth Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition* (MECP, 2011).

[c.] Applicable only if depth to groundwater at offsite properties is less than the typical rooting depths of plants (that is, up to 1 to 1.5 mbgs).

[d.] Per Table F1-5e in Appendix F1; risks to aquatic receptors in the nearest offsite water bodies are not anticipated for this COC.

Notes:

-- = no value
µg/L = microgram(s) per litre
COC = contaminant of concern
EPSS = ecological property-specific standard
F = fraction
m = metre(s)
mbgs = metre(s) below ground surface
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
RA = Risk Assessment
SCS = Site Condition Standards

Table 5-13. Ecological Risk-based Target Concentrations for Soil~~– Direct Contact~~

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	Risk-based Target Concentration (Plants and Soil Organisms) [b]	Risk-based Target Concentration (Birds and Mammals) [c]	Risk-based Target Concentration (Soil Leaching to Groundwater with Discharge to Surface Water) [d]	Overall Ecological Risk-based Target Concentration for Soil [e]	Basis
2-(1-)Methylnaphthalene	µg/g	5.9	0.99	29	100	76	29	Plants and Soil Organisms
Acenaphthene	µg/g	110	7.9	29	6600	560	29	Plants and Soil Organisms
Acenaphthylene	µg/g	2	0.15	29	100	0.15	0.15	Soil Leaching
Anthracene	µg/g	190	0.67	2.5	38000	0.67	0.67	Soil Leaching
Antimony	µg/g	22	7.5	20	25	--	20	Plants and Soil Organisms
Arsenic	µg/g	27	18	20	51	--	20	Plants and Soil Organisms
Benzene	µg/g	0.31	0.21	25	370	14	14	Soil Leaching
Benzo(a)anthracene	µg/g	240	0.5	0.5	1.1	5.1E+11	0.5	Plants and Soil Organisms
Benzo(a)pyrene	µg/g	150	0.3	20	1600	3.8E+13	20	Plants and Soil Organisms
Benzo(b)fluoranthene	µg/g	220	0.78	18	1.1	7.7E+13	1.1	Birds and Mammals
Benzo(g,h,i)perylene	µg/g	84	6.6	6.6	1.1	1.2E+13	6.6	Plants and Soil Organisms
Benzo(k)fluoranthene	µg/g	79	0.78	7.6	1.1	2.5E+13	1.1	Birds and Mammals
Cadmium	µg/g	100	1.2	12	1.9	--	1.9	Birds and Mammals
Chrysene	µg/g	210	7	7	1.1	3.6E+11	7	Plants and Soil Organisms
Cobalt	µg/g	470	22	40	180	--	40	Plants and Soil Organisms
Copper	µg/g	2900	140	140	770	--	140	Plants and Soil Organisms
Dibenzo(a,h)anthracene	µg/g	31	0.1	18	1.1	2.4E+13	1.1	Birds and Mammals
Electrical Conductivity	mS/cm	2.6	0.7	0.7	NA	--	0.7	Plants and Soil Organisms
Ethylbenzene	µg/g	4.9	1.1	55	90	17	17	Soil Leaching
Fluoranthene	µg/g	790	0.69	50	0.69	40000	0.69	Birds and Mammals
Fluorene	µg/g	180	62	29	100	62	62	Soil Leaching/Table 6 SCS
Indeno(1,2,3-Cd)Pyrene	µg/g	96	0.38	0.38	1.1	8.6E+13	0.38	Plants and Soil Organisms
Lead	µg/g	12000	120	250	32	--	120	Table 6 SCS
Mercury	µg/g	0.38	0.27	10	20	1.2E+14	10	Plants and Soil Organisms
Molybdenum	µg/g	42	6.9	40	6.9	--	6.9	Birds and Mammals
Naphthalene	µg/g	260	0.6	0.6	380	200	0.6	Plants and Soil Organisms
Nickel	µg/g	140	100	100	5000	--	100	Plants and Soil Organisms
PCB, Total	µg/g	1.9	0.35	33	1.1	9.9E+11	1.1	Birds and Mammals
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	4300	98	150	9800	230	150	Plants and Soil Organisms
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	27000	300	300	16000	--	300	Plants and Soil Organisms
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8700	2800	2800	8400	--	2800	Plants and Soil Organisms
Phenanthrene	µg/g	1000	6.2	6.2	2700	270	6.2	Plants and Soil Organisms
Pyrene	µg/g	560	78	18	4700	2600	78	Table 6 SCS
Thallium	µg/g	7.2	1	1.4	3.9	--	1.4	Plants and Soil Organisms
Trichloroethylene	µg/g	42	0.061	100	8.1	300	8.1	Birds and Mammals
Vanadium	µg/g	120	86	200	18	--	86	Table 6 SCS
Xylenes, Total	µg/g	4.6	3.1	95	96	26	26	Soil Leaching
Zinc	µg/g	80000	340	400	340	--	340	Birds and Mammals
Bismuth	µg/g	180	--	20	--	--	20	Plants and Soil Organisms
Calcium	µg/g	260000	--	54000	54000	--	54000	Birds and Mammals
Iron	µg/g	150000	--	38000	38000	--	38000	Birds and Mammals
Magnesium	µg/g	140000	--	17000	17000	--	17000	Birds and Mammals

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] Ontario Regulation 153/04, Table 6: Full Depth Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition - Residential/Parkland/Institutional land use; Coarse Textured Soils (MECP, 2011).

[b.] Refer to EcoBMCs in Table 5-6a.

[c.] Refer to EcoBMCs in Table 5-6b.

[d.] Ecological component values from the table entitled Soil Components for Table 2 – Full Depth, Potable Water Scenario (Coarse Textured Soil, Residential/Parkland Land Use) (MECP, 2011b).

[e.] Overall Ecological RBC is the lowest of the EcoBMCs applicable to birds and mammals or soil organisms and plants. The Table 6 SCS is selected as the RBC in cases where the calculated RBC was less than the SCS for the RA Property.

Notes:

-- = no value
µg/g = microgram per gram
COC = contaminant of concern
EcoBMC = ecological benchmark concentration
EPSS = ecological property-specific standard
F = fraction
m = metre(s)
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not applicable
O. Reg. = Ontario Regulation
RA = Risk Assessment
RBC = risk-based concentrations
SCS = Site Condition Standards

Table 6-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS for Eco Health	Recommended PSS -All Receptors	Risk Management Required [c]	Maximum HH Cancer Risk (ILCR)	Dominant HH Risk Receptor and Pathway [d]	Maximum HH Noncancer Hazard (HQ)	Dominant HH Hazard Receptor and Exposure Pathway [d]	Maximum Eco Hazard (HQ)	Dominant Eco Receptor and Exposure Pathway [d]	Dominant Exposure Pathway for Recommended PSS
Soil (Full Depth)	2-(1-)Methylnaphthalene	µg/g	4.93	0.5	0.99	5.9	5.9	5.9	No	--	--	--	--	2.E-01	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Acenaphthene	µg/g	94	0.63	7.9	110	110	110	**Yes**	8.E-06	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	2.E-02	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	4.E+00	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident
Soil (Full Depth)	Acenaphthylene	µg/g	1	2	0.15	2	2	2	No	1.E-06	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	<2.E-01	--	7.E-02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident
Soil (Full Depth)	Anthracene	µg/g	160	0.5	0.67	190	190	190	**Yes**	--	--	4.E-02	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	8.E+01	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Antimony	µg/g	18.6	2	7.5	22	22	22	**Yes**	--	--	4.E-02	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	1.E+00	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Arsenic	µg/g	23	--	18	27	27	27	**Yes**	2.E-04	Soil Direct Contact - Composite Resident	5.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	1.E+00	Direct Contact - Plants and Soil Organisms	Soil Direct Contact - Composite Resident
Soil (Full Depth)	Benzene	µg/g	0.26	0.1	0.21	0.31	0.31	0.31	**Yes**	1.E-04	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	8.E+00	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	1.E-02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident
Soil (Full Depth)	Benzo(a)anthracene	µg/g	200	0.5	0.5	240	240	240	**Yes**	4.E-06	Soil Direct Contact - Composite Resident	--	--	5.E+02	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Benzo(a)pyrene	µg/g	130	0.5	0.3	150	150	150	**Yes**	3.E-04	Soil Direct Contact - Composite Resident	9.E+00	Dust Inhalation - Pregnant Female Construction/Utility Worker	8.E+00	Direct Contact - Plants and Soil Organisms	Soil Direct Contact - Composite Resident
Soil (Full Depth)	Benzo(b)fluoranthene	µg/g	190	0.5	0.78	220	220	220	**Yes**	4.E-05	Soil Direct Contact - Composite Resident	--	--	2.E+02	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Benzo(g,h,i)perylene	µg/g	70	0.5	6.6	84	84	84	**Yes**	1.E-06	Soil Direct Contact - Composite Resident	--	--	8.E+01	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Benzo(k)fluoranthene	µg/g	66	0.5	0.78	79	79	79	**Yes**	1.E-05	Soil Direct Contact - Composite Resident	--	--	7.E+01	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Bismuth	µg/g	150	1	--	180	180	180	**Yes**	--	--	<2.E-01	--	9.E+00	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Cadmium	µg/g	83.4	0.5	1.2	100	100	100	**Yes**	1.E-06	Dust Inhalation - Utility Worker	9.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	5.E+01	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Calcium	µg/g	220000	--	--	260000	260000	260000	**Yes**	--	--	<2.E-01	--	5.E+00	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Chrysene	µg/g	180	0.5	7	210	210	210	**Yes**	4.E-06	Soil Direct Contact - Composite Resident	--	--	2.E+02	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Cobalt	µg/g	393	2	22	470	470	470	**Yes**	6.E-14	Dust Inhalation - Utility Worker	4.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	1.E+01	Direct Contact - Plants and Soil Organisms	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	Copper	µg/g	2460	--	140	2900	2900	2900	**Yes**	--	--	3.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	2.E+01	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Dibenzo(a,h)anthracene	µg/g	26	0.5	0.1	31	31	31	**Yes**	5.E-05	Soil Direct Contact - Composite Resident	--	--	3.E+01	Direct Contact and Food Chain - Birds and Mammals	Soil Direct Contact - Composite Resident
Soil (Full Depth)	Electrical Conductivity	mS/cm	2.19	--	0.7	2.6	2.6	2.6	**Yes**	--	--	--	--	4.E+00	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Ethylbenzene	µg/g	4.1	0.05	1.1	4.9	4.9	4.9	No	--	--	2.E-01	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	9.E-02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)
Soil (Full Depth)	Fluoranthene	µg/g	660	0.5	0.69	790	790	790	**Yes**	1.E-05	Soil Direct Contact - Composite Resident	2.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	1.E+03	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals

Table 6-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS for Eco Health	Recommended PSS -All Receptors	Risk Management Required [c]	Maximum HH Cancer Risk (ILCR)	Dominant HH Risk Receptor and Pathway [d]	Maximum HH Noncancer Hazard (HQ)	Dominant HH Hazard Receptor and Exposure Pathway [d]	Maximum Eco Hazard (HQ)	Dominant Eco Receptor and Exposure Pathway [d]	Dominant Exposure Pathway for Recommended PSS
Soil (Full Depth)	Fluorene	µg/g	150	0.63	62	180	180	180	**Yes**	--	--	1.E-01	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	6.E+00	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Indeno(1,2,3-Cd)Pyrene	µg/g	80	0.5	0.38	96	96	96	**Yes**	2.E-05	Soil Direct Contact - Composite Resident	--	--	3.E+02	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Iron	µg/g	128000	--	--	150000	150000	150000	**Yes**	--	--	3.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	4.E+00	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	Lead	µg/g	10100	--	120	12000	12000	12000	**Yes**	--	--	>2.E-01	--	4.E+02	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Magnesium	µg/g	120000	--	--	140000	140000	140000	**Yes**	--	--	<2.E-01	--	8.E+00	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals	Direct Contact - Plants and Soil Organisms/Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Mercury	µg/g	0.319	0.05	0.27	0.38	0.38	0.38	**Yes**	--	--	9.E-01	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)	4.E-02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	Molybdenum	µg/g	35	3	6.9	42	42	42	**Yes**	--	--	<2.E-01	--	6.E+00	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Naphthalene	µg/g	220	0.25	0.6	260	260	260	**Yes**	--	--	9.E+01	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)	4.E+02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	Nickel	µg/g	117	2	100	140	140	140	**Yes**	<1.E-06	--	<2.E-01	--	1.E+00	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	PCB, Total	µg/g	1.65	0.05	0.35	1.9	1.9	1.9	**Yes**	2.E-10	Dust Inhalation - Utility Worker	1.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	2.E+00	Direct Contact and Food Chain - Birds and Mammals	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	PHC F2	µg/g	3600	50	98	4300	4300	4300	**Yes**	--	--	1.E+02	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	3.E+01	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)
Soil (Full Depth)	PHC F3	µg/g	23000	50	300	27000	27000	27000	**Yes**	--	--	2.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	9.E+01	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	PHC F4	µg/g	7300	50	2800	8700	8700	8700	**Yes**	--	--	7.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	3.E+00	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Phenanthrene	µg/g	900	0.46	6.2	1000	1000	1000	**Yes**	--	--	3.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	2.E+02	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Pyrene	µg/g	470	0.5	78	560	560	560	**Yes**	1.E-06	Soil Direct Contact - Composite Resident	2.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	3.E+01	Direct Contact - Plants and Soil Organisms	Direct Contact - Plants and Soil Organisms
Soil (Full Depth)	Thallium	µg/g	6	2	1	7.2	7.2	7.2	**Yes**	--	--	5.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	5.E+00	Direct Contact - Plants and Soil Organisms	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)
Soil (Full Depth)	Trichloroethylene	µg/g	35.4	0.05	0.061	42	42	42	**Yes**	1.E-01	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident	2.E+04	Inhalation of Vapours in Indoor Air Derived from Soil - Pregnant Female Resident (20+ y)	5.E+00	Direct Contact and Food Chain - Birds and Mammals	Inhalation of Vapours in Indoor Air Derived from Soil - Composite Resident
Soil (Full Depth)	Vanadium	µg/g	100	0.3	86	120	120	120	**Yes**	--	--	6.E-01	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	7.E+00	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals
Soil (Full Depth)	Xylenes, Total	µg/g	3.9	0.07	3.1	4.6	4.6	4.6	**Yes**	--	--	6.E-01	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)	5.E-02	Direct Contact - Plants and Soil Organisms	Inhalation of Vapours in Indoor Air Derived from Soil - Infant Resident (0 – 5 mo.)
Soil (Full Depth)	Zinc	µg/g	67200	--	340	80000	80000	80000	**Yes**	--	--	3.E+00	Soil Direct Contact - Toddler Resident (6 mo. – 4 y)	2.E+02	Direct Contact and Food Chain - Birds and Mammals	Direct Contact and Food Chain - Birds and Mammals

Table 6-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS for Eco Health	Recommended PSS -All Receptors	Risk Management Required [c]	Maximum HH Cancer Risk (ILCR)	Dominant HH Risk Receptor and Pathway [d]	Maximum HH Noncancer Hazard (HQ)	Dominant HH Hazard Receptor and Exposure Pathway [d]	Maximum Eco Hazard (HQ)	Dominant Eco Receptor and Exposure Pathway [d]	Dominant Exposure Pathway for Recommended PSS
Groundwater	1,1,1-Trichloroethane	µg/L	37.1	20	23	44	44	44	**Yes**	--	--	4.E-01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	5.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	1,1-Dichloroethane	µg/L	29.5	5	5	35	35	35	**Yes**	2.E-04	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	6.E-01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	2.E-05	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident
Groundwater	1,1-Dichloroethene	µg/L	64	25	0.5	76	76	76	**Yes**	--	--	6.E+00	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	6.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	2-(1-)Methylnaphthalene	µg/L	280	14	3.2	330	330	330	**Yes**	--	--	1.E+01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	2.E-01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)
Groundwater	Acenaphthene	µg/L	40	10	4.1	48	48	48	**Yes**	4.E-06	Potable Site Groundwater Direct Contact - Composite Resident	1.E-01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	9.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Anthracene	µg/L	31	20	1	37	37	37	**Yes**	--	--	1.E-02	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	4.E+01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors
Groundwater	Arsenic	µg/L	45.7	1	25	54	54	54	**Yes**	2.E-02	Potable Site Groundwater Direct Contact - Composite Resident	2.E+01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	4.E-02	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Benzene	µg/L	66.8	5	0.5	80	80	80	**Yes**	5.E-04	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	2.E+01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	2.E-02	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident
Groundwater	Benzo(a)anthracene	µg/L	21	5	1	25	25	25	**Yes**	1.E-04	Potable Site Groundwater Direct Contact - Composite Resident	--	--	1.E+01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Benzo(a)pyrene	µg/L	2.4	2	0.01	2.8	2.8	2.8	**Yes**	2.E-03	Potable Site Groundwater Direct Contact - Composite Resident	1.E+01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	1.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Benzo(b&j)fluoranthene	µg/L	6.1	10	0.1	10	10	10	**Yes**	4.E-04	Potable Site Groundwater Direct Contact - Composite Resident	--	--	2.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Benzo(k)fluoranthene	µg/L	0.06	10	0.1	10	10	10	**Yes**	7.E-04	Potable Site Groundwater Direct Contact - Composite Resident	--	--	7.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Chrysene	µg/L	38	10	0.1	45	45	45	**Yes**	2.E-04	Potable Site Groundwater Direct Contact - Composite Resident	--	--	6.E+01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	cis-1,2-Dichloroethene	µg/L	960	5	1.6	1100	1100	1100	**Yes**	--	--	5.E+01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	8.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)

Table 6-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS for Eco Health	Recommended PSS -All Receptors	Risk Management Required [c]	Maximum HH Cancer Risk (ILCR)	Dominant HH Risk Receptor and Pathway [d]	Maximum HH Noncancer Hazard (HQ)	Dominant HH Hazard Receptor and Exposure Pathway [d]	Maximum Eco Hazard (HQ)	Dominant Eco Receptor and Exposure Pathway [d]	Dominant Exposure Pathway for Recommended PSS
Groundwater	Ethylbenzene	µg/L	8.46	5	2.4	10	10	10	No	--	--	1.E-02	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	6.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)
Groundwater	Fluoranthene	µg/L	24	20	0.41	28	28	28	**Yes**	7.E-05	Potable Site Groundwater Direct Contact - Composite Resident	3.E-01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	4.E-01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Lead	µg/L	17	0.5	10	20	20	20	**Yes**	--	--	>2.E-01	--	1.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors
Groundwater	Naphthalene	µg/L	27	15	7	32	32	32	**Yes**	--	--	1.E+00	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	5.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	n-Hexane	µg/L	7.46	5	5	8.9	8.9	8.9	**Yes**	--	--	1.E+01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	4.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	PHC F1	µg/L	550	100	420	660	660	660	**Yes**	--	--	6.E+01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	2.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	PHC F2	µg/L	210000	100	150	250000	250000	250000	**Yes**	--	--	8.E+03	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	2.E+03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	PHC F3	µg/L	850000	500	500	1000000	1000000	1000000	**Yes**	--	--	6.E+03	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	--	--	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)
Groundwater	PHC F4	µg/L	37000	500	500	44000	44000	44000	**Yes**	--	--	1.E+02	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	--	--	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)
Groundwater	Phenanthrene	µg/L	110	1.4	1	130	130	130	**Yes**	--	--	8.E-01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	3.E-01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)
Groundwater	Pyrene	µg/L	59	0.05	4.1	70	70	70	**Yes**	1.E-05	Potable Site Groundwater Direct Contact - Composite Resident	8.E-01	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	1.E+01	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Composite Resident
Groundwater	Tetrachloroethene	µg/L	1.14	0.5	0.5	1.3	1.3	1.3	**Yes**	3.E-06	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	3.E-01	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	2.E-04	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident
Groundwater	trans-1,2-Dichloroethene	µg/L	81	5	1.6	97	97	97	**Yes**	--	--	8.E+00	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	4.E-04	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)
Groundwater	Trichloroethylene	µg/L	7900	5	0.5	9400	9400	9400	**Yes**	2.E-01	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	2.E+04	Inhalation of Vapours in Indoor Air Derived Groundwater - Pregnant Female Resident (20+ y)	4.E-02	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident

Table 6-1. Proposed Property-specific Standards for the RA Property
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Media	COC	Units	Max. Concentration [a]	Max. ND Concentration	Table 6 SCS [b]	PSS for HH	PSS for Eco Health	Recommended PSS -All Receptors	Risk Management Required [c]	Maximum HH Cancer Risk (ILCR)	Dominant HH Risk Receptor and Pathway [d]	Maximum HH Noncancer Hazard (HQ)	Dominant HH Hazard Receptor and Exposure Pathway [d]	Maximum Eco Hazard (HQ)	Dominant Eco Receptor and Exposure Pathway [d]	Dominant Exposure Pathway for Recommended PSS
Groundwater	Vinyl Chloride	µg/L	86	100	0.5	990	990	990	**Yes**	1.E-01	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident	3.E+02	Inhalation of Vapours in Indoor Air Derived Groundwater - Infant Resident (0 – 5 mo.)	3.E-03	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Inhalation of Vapours in Indoor Air Derived from GW - Composite Resident
Groundwater	Zinc	µg/L	4500	10	890	5400	5400	5400	**Yes**	--	--	2.E+00	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)	6.E+00	Groundwater Uptake - Terrestrial Plants/Groundwater to Surface Water - Aquatic Receptors	Potable Site Groundwater Direct Contact - Infant Resident (0 – 5 mo.)

[a.] Maximum concentration detected on site, all quantitatively assessed COCs were modeled using the estimated site maximums.
[b.] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for Residential Land Use with Coarse Textured Soils (MECP, 2011).
[c.] Risk management required when estimated site maximum results in risks exceeding target levels
[d.] The maximum ecological and human health risks were determined by selecting the maximum risk from all applicable pathways (that is, dermal contact, dust inhalation, outdoor air, and/or indoor air for human health; and birds and mammals, plants and soil organisms, and/or aquatic receptors for ecological health)
[e.] The dominant exposure pathway for the recommend PSS is determined by selecting the minimum risk-based concentration based on the maximum ecological and human health risks.

Grey shaded values indicate a predicted risk exceeding MECP target risk values (i.e., ILCR> 10^{-6}, HQ>0.2 or HQ>0.5 [PHCs only] for human health, HQ>1 for ecological health)
Grey Text - indicates results based on qualitative assessment.

- = no value
< = less than
> = greater than
µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
Adj = adjusted
COC = contaminant of concern
Eco = ecological
F = fraction
GW = groundwater
HH = human health
ILCR = incremental lifetime cancer risk
HQ = hazard quotient
max = maximum
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not applicable
ND = nondetect
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
PSS = Property-specific Standards
RA Property = 200 Beverley Street, Guelph, Ontario
SCS = site condition standard

Table 6-2a. Comparison of Proposed Soil PSS to Free Phase Threshold Limit

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Maximum Concentration	Proposed PSS	Free Phase Threshold [a]
2-(1-)Methylnaphthalene	µg/g	4.93	5.9	3600
Acenaphthene	µg/g	94	110	2800
Acenaphthylene	µg/g	2	2	2900
Anthracene	µg/g	160	190	2700
Antimony	µg/g	18.6	22	8000
Arsenic	µg/g	23	27	12000
Benzene	µg/g	0.26	0.31	5000
Benzo(a)anthracene	µg/g	200	240	7600
Benzo(a)pyrene	µg/g	130	150	7600
Benzo(b)fluoranthene	µg/g	190	220	7600
Benzo(g,h,i)perylene	µg/g	70	84	7600
Benzo(k)fluoranthene	µg/g	66	79	7600
Bismuth	µg/g	150	180	--
Cadmium	µg/g	83.4	100	18000
Calcium	µg/g	220000	260000	--
Chrysene	µg/g	180	210	7700
Cobalt	µg/g	393	470	19000
Copper	µg/g	2460	2900	--
Dibenzo(a,h)anthracene	µg/g	26	31	7600
Electrical Conductivity	mS/cm	2.19	2.6	--
Ethylbenzene	µg/g	4.1	4.9	2700
Fluoranthene	µg/g	660	790	7600
Fluorene	µg/g	150	180	2800
Indeno(1,2,3-Cd)Pyrene	µg/g	80	96	7600
Iron	µg/g	128000	150000	--
Lead	µg/g	10100	12000	24000
Magnesium	µg/g	120000	140000	--
Mercury	µg/g	0.319	0.38	34000
Molybdenum	µg/g	35	42	22000
Naphthalene	µg/g	220	260	2800
Nickel	µg/g	117	140	--
PCB, Total	µg/g	1.65	1.9	5000
PHC F2	µg/g	3600	4300	**2700**
PHC F3	µg/g	23000	27000	**5800**
PHC F4	µg/g	7300	8700	**6900**
Phenanthrene	µg/g	900	1000	2300
Pyrene	µg/g	470	560	7700
Thallium	µg/g	6	7.2	22000
Trichloroethylene	µg/g	35.4	42	4100
Vanadium	µg/g	100	120	7100
Xylenes, Total	µg/g	3.9	4.6	2300
Zinc	µg/g	67200	80000	**15000**

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] Free phase threshold values obtained from the table entitled Soil Components for Table 2 - Full Depth, Potable Water Scenario (Residential/Parkland use; Coarse Textured Soils) (MECP, 2011).

Notes:

Bolded and shaded values indicate that the PSS is greater than the free phase threshold

Bolded values indicate that the PSS is greater than the free phase threshold, but free phase formation of metals is not expected.

-- = no value

µg/g = microgram(s) per gram

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

mS/cm = milisecond per centimetre

PHC = petroleum hydrocarbon

PSS = property specific standard

Table 6-2b. Comparison of Proposed Groundwater PSS to Half Solubility

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Maximum Concentration	PSS	Half Solubility [a]
1,1,1-Trichloroethane	µg/L	37.1	44	650000
1,1-Dichloroethane	µg/L	29.5	35	2500000
1,1-Dichloroethene	µg/L	64	76	1200000
2-(1-)Methylnaphthalene	µg/L	280	330	12000
Acenaphthene	µg/L	40	48	2000
Anthracene	µg/L	31	37	**22**
Arsenic	µg/L	45.7	54	17000000
Benzene	µg/L	66.8	80	900000
Benzo(a)anthracene	µg/L	21	25	**4.7**
Benzo(a)pyrene	µg/L	2.4	2.8	**0.81**
Benzo(b&j)fluoranthene	µg/L	10	10	**0.75**
Benzo(k)fluoranthene	µg/L	10	10	**0.4**
Chrysene	µg/L	38	45	**1**
cis-1,2-Dichloroethene	µg/L	960	1100	1800000
Ethylbenzene	µg/L	8.46	10	85000
Fluoranthene	µg/L	24	28	130
Lead	µg/L	17	20	4800000
Naphthalene	µg/L	27	32	16000
n-Hexane	µg/L	7.46	8.9	4800
PHC F1	µg/L	550	660	1900
PHC F2	µg/L	210000	250000	**150**
PHC F3	µg/L	850000	1000000	**4.90E-08**
PHC F4	µg/L	37000	44000	**3.9E-12**
Phenanthrene	µg/L	110	130	580
Pyrene	µg/L	59	70	**68**
Tetrachloroethene	µg/L	1.14	1.3	100000
trans-1,2-Dichloroethene	µg/L	81	97	1800000
Trichloroethylene	µg/L	7900	9400	640000
Vinyl Chloride	µg/L	100	100	4400000
Zinc	µg/L	4500	5400	170000000

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a] Half Solubility values obtained from the table entitled Groundwater Components for Potable Water Scenario (Coarse Textured Soils) (MECP, 2011).

Notes:

Bolded and shaded values indicate that the PSS is above the half solubility

-- = no value

µg/L = microgram(s) per litre

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

PSS = property specific standard

Table 6-3. Fill Cap Target Concentrations - Residental Land Use

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	HH Residential RBC [a] (µg/g)	Ecological RBC [b] (µg/g)	Table 6 SCS [c] (µg/g)	Observed Maximum [d] (µg/g)	Fill Cap Target Concentration [e] (µg/g)	Fill Cap Target Concentration Driver
2-(1-)Methylnaphthalene	7.20E+01	2.90E+01	9.90E-01	4.93E+00	4.93E+00	Observed Max
Acenaphthene	1.50E+01	2.90E+01	7.90E+00	9.40E+01	1.50E+01	Human Health
Acenaphthylene	2.10E+00	1.50E-01	1.50E-01	2.00E+00	1.50E-01	Ecological/Table 6 SCS
Anthracene	1.00E+03	6.70E-01	6.70E-01	1.60E+02	6.70E-01	Ecological/Table 6 SCS
Antimony	1.13E+02	2.00E+01	7.50E+00	1.86E+01	1.86E+01	Observed Max
Arsenic	1.80E+01	2.00E+01	1.80E+01	2.30E+01	1.80E+01	Human Health/Table 6 SCS
Benzene	2.10E-01	1.40E+01	2.10E-01	2.60E-01	2.10E-01	Human Health/Table 6 SCS
Benzo(a)anthracene	5.71E+01	5.00E-01	5.00E-01	2.00E+02	5.00E-01	Ecological/Table 6 SCS
Benzo(a)pyrene	5.71E-01	2.00E+01	3.00E-01	1.30E+02	5.71E-01	Human Health
Benzo(b)fluoranthene	5.71E+00	1.10E+00	7.80E-01	1.90E+02	1.10E+00	Ecological
Benzo(g,h,i)perylene	5.71E+01	6.60E+00	6.60E+00	7.00E+01	6.60E+00	Ecological/Table 6 SCS
Benzo(k)fluoranthene	5.71E+00	1.10E+00	7.80E-01	6.60E+01	1.10E+00	Ecological
Bismuth	1.80E+02	2.00E+01	--	1.50E+02	2.00E+01	Ecological
Cadmium	2.17E+00	1.90E+00	1.20E+00	8.34E+01	1.90E+00	Ecological
Calcium	2.60E+05	5.40E+04	--	2.20E+05	5.40E+04	Ecological
Chrysene	5.71E+01	7.00E+00	7.00E+00	1.80E+02	7.00E+00	Ecological/Table 6 SCS
Cobalt	2.20E+01	4.00E+01	2.20E+01	3.93E+02	2.20E+01	Human Health/Table 6 SCS
Copper	2.00E+02	1.40E+02	1.40E+02	2.46E+03	1.40E+02	Ecological/Table 6 SCS
Dibenzo(a,h)anthracene	5.71E-01	1.10E+00	1.00E-01	2.60E+01	5.71E-01	Human Health
Electrical Conductivity	2.60E+00	7.00E-01	7.00E-01	2.19E+00	7.00E-01	Ecological/Table 6 SCS
Ethylbenzene	4.00E+00	1.70E+01	1.10E+00	4.10E+00	4.00E+00	Human Health
Fluoranthene	5.71E+01	6.90E-01	6.90E-01	6.60E+02	6.90E-01	Ecological/Table 6 SCS
Fluorene	2.90E+02	6.20E+01	6.20E+01	1.50E+02	6.20E+01	Ecological/Table 6 SCS
Indeno(1,2,3-Cd)Pyrene	5.71E+00	3.80E-01	3.80E-01	8.00E+01	3.80E-01	Ecological/Table 6 SCS
Iron	1.10E+04	3.80E+04	--	1.28E+05	1.10E+04	Human Health
Lead	1.20E+02	1.20E+02	1.20E+02	1.01E+04	1.20E+02	Human Health/Table 6 SCS
Magnesium	1.40E+05	1.70E+04	--	1.20E+05	1.70E+04	Ecological
Mercury	2.70E-01	1.00E+01	2.70E-01	3.19E-01	2.70E-01	Human Health/Table 6 SCS
Molybdenum	1.10E+02	6.90E+00	6.90E+00	3.50E+01	6.90E+00	Ecological/Table 6 SCS
Naphthalene	6.00E-01	6.00E-01	6.00E-01	2.20E+02	6.00E-01	Human Health/Table 6 SCS
Nickel	3.30E+02	1.00E+02	1.00E+02	1.17E+02	1.00E+02	Ecological/Table 6 SCS
PCB, Total	3.55E-01	1.10E+00	3.50E-01	1.65E+00	3.55E-01	Human Health
PHC F2	9.80E+01	1.50E+02	9.80E+01	3.60E+03	9.80E+01	Human Health/Table 6 SCS
PHC F3	5.79E+03	3.00E+02	3.00E+02	2.30E+04	3.00E+02	Ecological/Table 6 SCS
PHC F4	6.10E+03	2.80E+03	2.80E+03	7.30E+03	2.80E+03	Ecological/Table 6 SCS
Phenanthrene	7.19E+02	6.20E+00	6.20E+00	9.00E+02	6.20E+00	Ecological/Table 6 SCS
Pyrene	5.39E+02	7.80E+01	7.80E+01	4.70E+02	7.80E+01	Ecological/Table 6 SCS
Thallium	1.00E+00	1.40E+00	1.00E+00	6.00E+00	1.00E+00	Human Health/Table 6 SCS
Trichloroethylene	6.10E-02	8.10E+00	6.10E-02	3.54E+01	6.10E-02	Human Health/Table 6 SCS
Vanadium	8.60E+01	8.60E+01	8.60E+01	1.00E+02	8.60E+01	Human Health/Table 6 SCS
Xylenes, Total	3.10E+00	2.60E+01	3.10E+00	3.90E+00	3.10E+00	Human Health/Table 6 SCS
Zinc	5.63E+03	3.40E+02	3.40E+02	6.72E+04	3.40E+02	Ecological/Table 6 SCS

[a] Obtained from Table 4-~~43~~44 of this RA report.

[b] Obtained from Table 5-13 of this RA report.

[c] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (coarse-textured soils) (MECP, 2011).

[d] Maximum concentration observed onsite, as shown in Table 4-1.

[e] Cap Target Concentration is the minimum of the Human Health RBC, Ecological RBC, and observed maximum concentration. If the Cap Target Concentration is less than Table 6 SCS, the Table 6 SCS is selected as the Cap Target Concentration. Direct Contact and Inhalation of vapours originating from soil in the absence of RMMs have been considered in the derivation of the Cap Target Concentrations.

* Units for Electrical Conductivity are mS/cm

Notes:

µg/g = microgram per gram
COC = contaminant of concern
F = fraction
HH = human health
MECP = Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
RA = risk assessment
RBC = risk-based back-calculation concentration
RMM = risk management measure
SCS = site condition standard

Table 7-1. Summary of Risks for Receptors and Pathways

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Pathway	Risks Predicted Above MECP Risk Targets?		Risk from NAPL? (Qualitatively Assessed)	Contaminant Class
Human Receptors				
Ingestion Exposure – Soil	✓	Composite Resident, Toddler Resident, Outdoor Worker, Utility Worker, Construction Worker	✓	PAHs, Metals, PCBs, TCE, PHC F3
Dermal Contact Exposure – Soil	✓	Composite Resident, Toddler Resident, Outdoor Worker, Utility Worker, Construction Worker	✓	PAHs, Metals, PHC F3
Dermal Contact & Ingestion – Soil	✓	Composite Resident, Toddler Resident, Outdoor Worker, Utility Worker	✓	PAHs, Metals, PCBs, TCE, PHCs
Ingestion Exposure – Groundwater	✓	Composite Resident, Toddler Resident, Pregnant Female Resident, Composite Resident, Utility Worker, Construction Worker, Pregnant Female Construction and Utility Worker	✓	PAHs, Metals, PCBs, VOCs, PHCs
Dermal Contact Exposure – Groundwater	✓	Residents, Pregnant Female Resident, Composite Resident, Utility Worker, Construction Worker, Pregnant Female Construction and Utility Worker	✓	PAHs, Metals, VOCs, PHCs
Dermal Contact & Ingestion – Groundwater	✓	Residents, Pregnant Female Resident, Composite Resident, Utility Worker, Construction Worker, Pregnant Female Construction and Utility Worker	✓	PAHs, Metals, VOCs, PHCs
Inhalation Exposure – Indoor Air Volatiles (derived from soil and groundwater) – Generic Residential Building	✓	Toddler Resident, Composite Resident, Pregnant Female Resident	✓	Benzene, PAHs, VOCs, Xylenes, PHC F1 and F2
Inhalation Exposure – Indoor Air Volatiles (derived from soil and groundwater) – Generic Commercial Building	✓	Indoor Worker, Pregnant Female Indoor Worker	✓	Benzene, Naphthalene, VOCs, PHC F1 and F2
Inhalation Exposure – Outdoor Air Volatiles above Ground Surface (derived from soil and groundwater)	×	NA	×	NA
Inhalation Exposure – Outdoor Air Volatiles within a Trench (derived from soil and groundwater)	×	Pregnant Female Construction and Utility Worker, Construction Worker	✓	Naphthalene, TCE, PHC F2
Inhalation Exposure – Outdoor Fugitive Dust (derived from soil)	✓	Pregnant Female Construction and Utility Worker, Construction Worker	×	B(a)P, Lead, Iron, Cobalt, Zinc
Ecological Receptors				
Incidental ingestion and dermal contact with COCs from the groundwater to surface water pathway	✓	Offsite Fish, Pelagic Invertebrates, and Amphibians	✓	PHC F1 and F2, Anthracene, and Zinc
Root, stem and foliar uptake of COCs from the groundwater to surface water pathway	✓	Offsite Aquatic Plants	✓	
Incidental ingestion and dermal contact with soil	✓	Soil Invertebrates	✓	PAHs, Metals, EC, and PHCs
Root uptake from soil	✓	Terrestrial Plants	✓	
Incidental ingestion of soil and food chain/dietary exposure	✓	Birds and Small Mammals	✓	PAHs, Metals, PHC F3, PCBs, TCE
Root uptake from groundwater	✓	Terrestrial Plants	✓	PAHs, PHC F1 and F2, Zinc

Notes:

✓ = Risks predicted greater than MECP Risk Targets

× = Risks predicted less than MECP Risk Targets

B(a)P = benzo[a]pyrene

COC = contaminant of concern

EC = electrical conductivity

F = fraction (petroleum)

MECP = Ontario Ministry of the Environment, Conservation and Parks

NA = not applicable

NAPL = nonaqueous phase liquid

PAH = polycyclic aromatic hydrocarbon

PCB = polychlorinated biphenyls

PHC = petroleum hydrocarbon

TCE = trichloroethylene

Table 7-2a. Required Percentage Reduction in Exposure Concentration for the Soil to Indoor Air Exposure Pathway
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Estimated Maximum Concentration (µg/g)	RBC Soil - Residential Indoor Air Inhalation [a] (µg/g)	Concentration Reduction Required (%)	RBC Soil - Commercial Indoor Air Inhalation [b] (µg/g)	Concentration Reduction Required (%)
2-(1-)Methylnaphthalene	5.90E+00	NA	NA	NA	NA
Acenaphthene	1.10E+02	15	86	210	NR
Acenaphthylene	2.00E+00	2.1	NR	30	NR
Anthracene	1.90E+02	1000	NR	16000	NR
Antimony	2.20E+01	NA	NA	NA	NA
Arsenic	2.70E+01	NA	NA	NA	NA
Benzene	3.10E-01	0.0021	> 99	0.031	90
Benzo(a)anthracene	2.40E+02	1200	NR	18000	NR
Benzo(a)pyrene	1.50E+02	NA	NA	NA	NA
Benzo(b)fluoranthene	2.20E+02	NA	NA	NA	NA
Benzo(g,h,i)perylene	8.40E+01	NA	NA	NA	NA
Benzo(k)fluoranthene	7.90E+01	NA	NA	NA	NA
Bismuth	1.80E+02	NA	NA	NA	NA
Cadmium	1.00E+02	NA	NA	NA	NA
Calcium	2.60E+05	NA	NA	NA	NA
Chrysene	2.10E+02	NA	NA	NA	NA
Cobalt	4.70E+02	NA	NA	NA	NA
Copper	2.90E+03	NA	NA	NA	NA
Dibenzo(a,h)anthracene	3.10E+01	NA	NA	NA	NA
Electrical Conductivity	2.60E+00	NA	NA	NA	NA
Ethylbenzene	4.90E+00	4	18	64	NR
Fluoranthene	7.90E+02	NA	NA	NA	NA
Fluorene	1.80E+02	290	NR	4600	NR
Indeno(1,2,3-Cd)Pyrene	9.60E+01	NA	NA	NA	NA
Iron	1.50E+05	NA	NA	NA	NA
Lead	1.20E+04	NA	NA	NA	NA
Magnesium	1.40E+05	NA	NA	NA	NA
Mercury	3.80E-01	0.083	78	1.3	NR
Molybdenum	4.20E+01	NA	NA	NA	NA
Naphthalene	2.60E+02	0.59	> 99	9.4	96
Nickel	1.40E+02	NA	NA	NA	NA
PCB, Total	1.90E+00	3.1	NR	45	NR
PHC F2	4.30E+03	15	> 99	240	94
PHC F3	2.70E+04	NA	NA	NA	NA
PHC F4	8.70E+03	NA	NA	NA	NA
Phenanthrene	1.00E+03	1400	NR	21000	NR
Pyrene	5.60E+02	1900	NR	28000	NR
Thallium	7.20E+00	NA	NA	NA	NA
Trichloroethylene	4.20E+01	0.00029	> 99	0.0043	> 99
Vanadium	1.20E+02	NA	NA	NA	NA
Xylenes, Total	4.60E+00	1.5	67	24	NR
Zinc	8.00E+04	NA	NA	NA	NA

[a] Obtained from Table 4-~~42a~~43a of this RA report.
[b] Obtained from Table 4-~~42b~~43b of this RA report.
* Units for Electrical Conductivity are mS/cm

Notes:
> = greater than
µg/g = microgram per gram
COC = contaminant of concern
F = fraction
mS/cm = milliSiemen per centimetre
NA = not applicable
NR = reduction not required
RBC = risk-based back-calculation concentration

Table 7-2b. Required Percentage Reduction in Exposure Concentration for the Groundwater to Indoor Air Exposure
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Estimated Maximum Concentration (µg/L)	RBC Groundwater - Residential Indoor Air Inhalation [a] (µg/L)	Concentration Reduction Required (%)	RBC Groundwater - Commercial Indoor Air Inhalation [b] (µg/L)	Concentration Reduction Required (%)
1,1,1-Trichloroethane	44	23	48	390	NR
1,1-Dichloroethane	35	0.23	> 99	3.6	90
1,1-Dichloroethene	76	2.7	96	47	38
2-(1-)Methylnaphthalene	330	54	84	920	NR
Acenaphthene	48	32	33	500	NR
Anthracene	37	650	NR	11000	NR
Arsenic	54	NA	NA	NA	NA
Benzene	80	0.18	> 99	2.8	97
Benzo(a)anthracene	25	71	NR	1100	NR
Benzo(a)pyrene	2.8	NA	NA	NA	NA
Benzo(b&j)fluoranthene	10	NA	NA	NA	NA
Benzo(k)fluoranthene	10	NA	NA	NA	NA
Chrysene	45	NA	NA	NA	NA
cis-1,2-Dichloroethene	1100	5.7	> 99	98	91
Ethylbenzene	10	NA	NA	NA	NA
Fluoranthene	28	NA	NA	NA	NA
Lead	20	NA	NA	NA	NA
Naphthalene	32	4.4	86	75	NR
n-Hexane	8.9	0.15	98	2.6	71
PHC F1	660	5.9	> 99	100	85
PHC F2	250000	15	> 99	200	> 99
PHC F3	1000000	NA	NA	NA	NA
PHC F4	44000	NA	NA	NA	NA
Phenanthrene	130	840	NR	14000	NR
Pyrene	70	NA	NA	NA	NA
Tetrachloroethene	1.3	0.51	61	8	NR
trans-1,2-Dichloroethene	97	2.4	98	42	57
Trichloroethylene	9400	0.055	> 99	0.86	> 99
Vinyl Chloride	100	0.00077	> 99	0.023	> 99
Zinc	5400	NA	NA	NA	NA

[a.] Obtained from Table 4-~~45a~~46a of this RA report.
[b.] Obtained from Table 4-~~45b~~46b of this RA report.

Notes:
> = greater than
µg/L = microgram per litre
COC = contaminant of concern
F = fraction
NA = not applicable
NR = reduction not required
PHC = petroleum hydrocarbon
RBC = risk-based back-calculation concentration

Table 7-2c. Summary of Required Risk Reduction Levels for Fill Caps

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Estimated Maximum Concentration (mg/kg)	Fill Cap Target Concentration for Parks (FCTC)[a] (Concentration Required to Achieve Risk Reduction for Direct Contact) (mg/kg)	Concentration Reduction Required for Fill Cap (%)
2-(1-)Methylnaphthalene	5.90E+00	4.9	17
Acenaphthene	1.10E+02	15	86
Acenaphthylene	2.00E+00	0.15	93
Anthracene	1.90E+02	0.67	> 99
Antimony	2.20E+01	19	14
Arsenic	2.70E+01	18	33
Benzene	3.10E-01	0.21	32
Benzo(a)anthracene	2.40E+02	0.5	> 99
Benzo(a)pyrene	1.50E+02	0.57	> 99
Benzo(b)fluoranthene	2.20E+02	1.1	> 99
Benzo(g,h,i)perylene	8.40E+01	6.6	92
Benzo(k)fluoranthene	7.90E+01	1.1	99
Bismuth	1.80E+02	20	89
Cadmium	1.00E+02	1.9	98
Calcium	2.60E+05	54000	79
Chrysene	2.10E+02	7	97
Cobalt	4.70E+02	22	95
Copper	2.90E+03	140	95
Dibenzo(a,h)anthracene	3.10E+01	0.57	98
Electrical Conductivity	2.60E+00	0.7	73
Ethylbenzene	4.90E+00	4	18
Fluoranthene	7.90E+02	0.69	> 99
Fluorene	1.80E+02	62	66
Indeno(1,2,3-Cd)Pyrene	9.60E+01	0.38	> 99
Iron	1.50E+05	11000	93
Lead	1.20E+04	120	99
Magnesium	1.40E+05	17000	88
Mercury	3.80E-01	0.27	29
Molybdenum	4.20E+01	6.9	84
Naphthalene	2.60E+02	0.6	> 99
Nickel	1.40E+02	100	29
PCB, Total	1.90E+00	0.35	82
PHC F2	4.30E+03	98	98
PHC F3	2.70E+04	300	99
PHC F4	8.70E+03	2800	68
Phenanthrene	1.00E+03	6.2	> 99
Pyrene	5.60E+02	78	86
Thallium	7.20E+00	1	86
Trichloroethylene	4.20E+01	0.061	> 99
Vanadium	1.20E+02	86	28
Xylenes, Total	4.60E+00	3.1	33
Zinc	8.00E+04	340	> 99

[a] Corresponds to Fill Cap Target Concentrations obtained from Table 6-3 of this RA report.

* Units for Electrical Conductivity are mS/cm

Notes:

> = greater than
F = fraction
mg/kg = milligram per kilogram
mS/cm = milliSiemen per centimetre
NR = reduction not required
RA = risk assessment

Table 7-2d. Required Percentage Reduction in Exposure Concentration for the Soil Direct Contact Exposure Pathway - Subsurface Workers

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Estimated Maximum Concentration (µg/g)	RBC Soil - Subsurface Workers [a] (µg/g)	Concentration Reduction Required (%)
2-(1-)Methylnaphthalene	5.9	5.60E+02	NR
Acenaphthene	110	1.37E+04	NR
Acenaphthylene	2	3.60E+02	NR
Anthracene	190	4.20E+05	NR
Antimony	22	9.45E+02	NR
Arsenic	27	3.86E+00	86
Benzene	0.31	4.80E+02	NR
Benzo(a)anthracene	240	1.37E+03	NR
Benzo(a)pyrene	150	1.37E+01	91
Benzo(b)fluoranthene	220	1.37E+02	38
Benzo(g,h,i)perylene	84	1.37E+03	NR
Benzo(k)fluoranthene	79	1.37E+02	NR
Bismuth	180	1.80E+02	NR
Cadmium	100	2.48E+01	75
Calcium	260000	2.60E+05	NR
Chrysene	210	1.37E+03	NR
Cobalt	470	2.48E+03	NR
Copper	2900	1.88E+03	35
Dibenzo(a,h)anthracene	31	1.37E+01	56
Electrical Conductivity	2.6	2.60E+00	NR
Ethylbenzene	4.9	2.20E+04	NR
Fluoranthene	790	1.37E+03	NR
Fluorene	180	5.60E+04	NR
Indeno(1,2,3-Cd)Pyrene	96	1.37E+02	NR
Iron	150000	7.85E+04	48
Lead	12000	1.20E+02	99
Magnesium	140000	1.70E+04	88
Mercury	0.38	6.70E+02	NR
Molybdenum	42	1.20E+03	NR
Naphthalene	260	2.80E+04	NR
Nickel	140	5.10E+02	NR
PCB, Total	1.9	4.07E+00	NR
PHC F2	4300	4.83E+04	NR
PHC F3	27000	2.63E+05	NR
PHC F4	8700	3.97E+05	NR
Phenanthrene	1000	5.62E+03	NR
Pyrene	560	1.37E+04	NR
Thallium	7.2	3.35E+01	NR
Trichloroethylene	42	5.34E+01	NR
Vanadium	120	1.64E+02	NR
Xylenes, Total	4.6	8.80E+04	NR
Zinc	80000	4.73E+04	41

[a] Obtained from Table 4-~~41b~~42b of this RA report.

Notes:

mg/kg = milligram per kilogram
COC = contaminant of concern
F = fraction
NR = reduction not required
PHC = petroleum hydrocarbon
RBC = risk-based back-calculation concentration
NA = not applicable

Table 7-2e. Required Percentage Reduction in Exposure Concentration for the Groundwater Direct Contact Exposure Pathway

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Estimated Maximum Concentration (µg/L)	RBC Potable Groundwater [a] (µg/L)	Concentration Reduction Required (%)	RBC Incidental Groundwater [b] (µg/L)	Concentration Reduction Required (%)
1,1,1-Trichloroethane	44	2.00E+02	NR	2.00E+02	NR
1,1-Dichloroethane	35	4.85E+00	86	1.41E+04	NR
1,1-Dichloroethene	76	1.02E+02	NR	1.91E+04	NR
2-(1-)Methylnaphthalene	330	4.90E+00	99	4.18E+02	NR
Acenaphthene	48	1.18E+01	75	1.93E+04	NR
Anthracene	37	8.90E+02	NR	8.90E+02	NR
Arsenic	54	2.38E-03	> 99	1.03E+01	81
Benzene	80	2.48E-01	> 99	1.84E+02	NR
Benzo(a)anthracene	25	2.17E-01	> 99	2.26E+02	NR
Benzo(a)pyrene	2.8	4.54E-07	> 99	1.51E+00	46
Benzo(b&j)fluoranthene	10	2.42E-02	> 99	2.55E+01	NR
Benzo(k)fluoranthene	10	1.53E-02	> 99	1.56E+01	NR
Chrysene	45	2.02E-01	> 99	2.10E+02	NR
cis-1,2-Dichloroethene	1100	4.10E+00	> 99	6.60E+03	NR
Ethylbenzene	10	1.64E+02	NR	7.75E+04	NR
Fluoranthene	28	4.14E-01	99	4.67E+02	NR
Lead	20	1.00E+01	50	1.00E+01	50
Naphthalene	32	5.90E+01	NR	5.90E+01	NR
n-Hexane	8.9	5.96E+01	NR	4.41E+04	NR
PHC F1	660	8.20E+02	NR	8.20E+02	NR
PHC F2	250000	1.40E+02	> 99	1.53E+04	94
PHC F3	1000000	7.75E+01	> 99	5.86E+04	94
PHC F4	44000	1.64E+02	> 99	3.96E+05	NR
Phenanthrene	130	3.41E+01	74	2.33E+03	NR
Pyrene	70	5.79E+00	92	6.99E+03	NR
Tetrachloroethene	1.3	2.00E+01	NR	2.00E+01	NR
trans-1,2-Dichloroethene	97	4.10E+01	58	2.52E+04	NR
Trichloroethylene	9400	1.05E-05	> 99	8.80E+01	> 99
Vinyl Chloride	100	1.45E-03	> 99	1.14E+01	89
Zinc	5400	6.57E+02	88	1.58E+05	NR

[a.] Obtained from Table ~~4-44a~~4-45a of this RA report - residential contact

[b.] Obtained from Table ~~4-44b~~4-45b of this RA report - construction/utility worker contact

Notes:

> = greater than
µg/L = microgram per litre
COC = contaminant of concern
F = fraction
NA = not applicable
NC = not calculated
RBC = risk-based back-calculation concentration

Table 7-2f. Required Percentage Reduction in Exposure Concentration for the Trench Air Exposure Pathway
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Estimated Maximum Concentration (µg/g)	RBC Soil/Groundwater - Trench Air Inhalation [a] (µg/g)	Concentration Reduction Required (%)
1,1,1-Trichloroethane	5.00E-02	7.80E+03	NR
1,1-Dichloroethane	5.00E-02	1.30E+02	NR
1,1-Dichloroethene	5.00E-02	1.60E+02	NR
2-(1-)Methylnaphthalene	3.30E+02	3.30E+04	NR
Acenaphthene	1.10E+02	NA	NA
Acenaphthylene	2.00E+00	1.30E+03	NR
Anthracene	1.90E+02	2.50E+04	NR
Benzene	3.10E-01	2.20E+01	NR
Benzo(a)anthracene	2.40E+02	4.50E+08	NR
cis-1,2-Dichloroethene	1.10E+03	2.90E+06	NR
Ethylbenzene	4.90E+00	5.00E+03	NR
Fluorene	1.80E+02	8.20E+03	NR
n-hexane	1.00E+00	1.40E+03	NR
Mercury	3.80E-01	3.30E+00	NR
Naphthalene	2.60E+02	5.90E+01	77
PHC F1	3.66E+01	7.00E+03	NR
PHC F2	2.50E+05	4.20E+04	83
Phenanthrene	1.00E+03	3.20E+04	NR
Tetrachloroethene	5.00E-02	7.80E+02	NR
trans-1,2-Dichloroethene	9.70E+01	3.20E+06	NR
Trichloroethylene	4.20E+01	2.30E+00	95
Vinyl Chloride	9.90E+02	2.00E+06	NR
Xylenes, Total	4.60E+00	6.90E+03	NR

[a.] Obtained from Table 4-46 of this RA report.

Notes:

Shaded values are groundwater concentrations (that is, not soil). Units are µg/L. Risk was driven by groundwater for these COCs (with cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride only retained as COCs in groundwater [not soil]). Soil RBCs for 2-(1-)Methylnaphthalene and PHC F2 are 1,100 µg/g and 8,300 µg/g, respectively.

µg/L = microgram per litre
COC = contaminant of concern
F = fraction
NA = not applicable
NR = reduction not required
PHC = petroleum hydrocarbon
RBC = risk-based back-calculation concentration

Table 7-3. Building Types and Applicable Vapour Mitigation Approaches

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Building Type	Construction	Is the Building Foundation in Contact with Groundwater?	Vapour Mitigation Approach(es) [a,b]
New Construction	Slab-on-grade construction – occupied or constructed with vertical, below-grade foundation walls, or both	Possibly	Vapourproof barrier (and sealing of foundation penetrations, where required), and passive subslab venting system. Additional strategic placement of passive suction pit (plenum box), or vapour cut-off trench within the affected portion of the building may be used, where applicable.
	Parking garages under structures	Yes	Vapourproof and waterproof barrier; sealing of foundation penetrations; and moisture protection and passive subslab venting system.
		No	Sealing of foundation, vapourproof barrier, and passive subslab venting system.
	Other basement [c]	Yes	Passive submembrane venting layer and venting at the periphery of the foundation, vapour- and waterproof barrier, sealing of foundation penetrations; and moisture protection.
		No	Vapourproof barrier (and sealing of foundation penetrations, where required), and passive subslab venting system. Additional strategic placement of passive suction pits (or plenum boxes), or vapour cut-off trench within the affected portion of the building may be used, where applicable.
If a sump is present in the structure			Sealing, secured access, and venting to exterior of structure

[a.] Detailed design will be based on actual building type and configuration, and is required to be designed and sized appropriately by a qualified professional (for example, a P.Eng.).

[b.] Standard construction practices (that is, waterproofing versus sealing) may address the vapour intrusion management requirements. It will be the responsibility of the qualified professional to determine the acceptance of this approach.

[c.] Refers to scenarios other than parking garages.

Notes:

P.Eng. = registered Professional Engineer

Table 7-4. Summary of Capping Requirements

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Application	Scenario	Type of Cap	Minimum Cap Thickness (mm)	Soil Quality Required	Frequency of Inspection
Parkland, Residential and Commercial Areas not covered by a Building Footprint	All landscaped areas (except trees)	Fill Cap	1,000 mm minimum total thickness	FCTC (reuse) or Table 6 SCS (importation)	Semi-annually (minimum)
	New trees	Fill Cap	1,500 mm to mature tree drip line or 3-metre radius from tree trunk, whichever is greater (trees species to be selected by Landscape Architect to reduce risk to mature trees due to periodic contact with shallow groundwater)		
	Hardscaping	Hard Cap	225 mm minimum total thickness; includes 75 mm hardscape (asphalt or concrete top cover or equivalent), underlain by 150 mm sub-base (Granular "A' or equivalent)		
	Buried utilities	Fill or Hard Cap	Requirements listed in this table for fill and hard cap, plus: • An additional 500 mm below the base of each new utility pipe installed below 1,000 mm • 600 mm on either side of pipes with diameters of 900 mm or less • 1,300 mm on either side of pipes with diameters greater than 900 mm		

Notes:

FCTC = fill cap target concentration

mm = millimetre

SCS = site condition standard

Table 7-5. Administrative Control Implementation

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Timeframe [a]	Exposure Scenario	Administrative Controls	Specified Receptor
Current	Contact with contaminated soil at surface by unauthorized personnel	Maintain a fence surrounding the RA Property to prevent access by unauthorized personnel (that is, trespassers) or large terrestrial ecological receptors. The fence should be inspected semi-annually for deficiencies that may allow unauthorized access to the RA Property. Deficiencies should be repaired in a timely fashion. Evidence of unauthorized personnel entry should be recorded. If trespassing is noted to occur frequently, the need for upgraded fencing or security will be evaluated.	Trespassers; Large Terrestrial Mammals
Current	Animal burrowing	Maintain any existing landscaped and vegetated areas prior to redevelopment of all or portions of the RA Property.	Terrestrial Ecological Receptors
Current, Future	Contact with contaminated soil, groundwater, or NAPL during construction activities	Block exposure to contaminated soil, groundwater, or NAPL by implementing a HSP that accounts for the Site-specific conditions and prescribes the use of appropriate PPE.	Construction and Utility Workers
Current, Future	Contact with contaminated soil, groundwater, or NAPL during activities that remove soil from subsurface, relocate soil within the RA Property, or import soil for filling and grading	Reduce exposure by implementing the SGMP during construction activities that may involve breaching of the capping RMM. Implement appropriate groundwater control and treatment of groundwater entering excavations.	Construction and Utility Workers
Current, Future	Contact with soil vapours during trench excavation	Adequate air ventilation as outlined in O. Reg. 213/91, to be determined by appropriate monitoring. Mechanical ventilation may be applied, if required.	Construction and Utility Workers
Future	Release of or contact with impacted groundwater associated with foundation drains	Groundwater must be managed, treated and disposed of as per City of Guelph Sewer Use by-law	Future site users
Future	Residents in freehold dwellings; using property with no oversight or planting of community gardens	RA Property cannot be used for single family freehold dwellings that do not have oversight. Restriction on planting a vegetable garden and fruit gardens or development of allotment gardens and restriction on planting of medicinal plants except in containerized plots.	Future residential or community users
Future	Installation of well for potable or commercial use allowing direct contact with groundwater from any depth at the RA Property	Restriction on the title of the property restricting the installation of wells for potable or commercial use. Monitoring wells for testing are excepted.	Future site users

[a] Refers to stage at which the Administrative Control applies. The term "Current" refers to the RA Property in its current pre-redevelopment condition, while the term "Future" refers to redevelopment activities and post-redevelopment conditions when other RMMs will be in place as per Section 7.2.1 and 7.2.2.

Notes:

HSP = health and safety plan

NAPL = non-aqueous phase liquid

PPE = personal protective equipment

RA = risk assessment

RA Property = 200 Beverley Street, Guelph, Ontario

RMM = risk management measure

SGMP = soil and groundwater management plan

Table 7-6. Ontario Regulation 153/04 Minimum Confirmation Sampling Requirements for Soil Excavations to be Reused Onsite

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Stockpile Volume (m^3)	Minimum Number of Samples
≤ 130	3
> 130 to 220	4
> 220 to 320	5
> 320 to 430	6
> 430 to 550	7
> 550 to 670	8
> 670 to 800	9
> 800 to 950	10
> 950 to 1100	11
> 1100 to 1250	12
> 1250 to 1400	13
> 1400 to 1550	14
> 1550 to 1700	15
> 1700 to 1850	16
> 1850 to 2050	17
> 2050 to 2200	18
> 2200 to 2350	19
> 2350 to 2500	20
> 2500 to 2700	21
> 2700 to 2900	22
> 2900 to 3100	23
> 3100 to 3300	24
> 3300 to 3500	25
> 3501 to 3700	26
> 3700 to 3900	27
> 3900 to 4100	28
> 4100 to 4300	29
> 4300 to 4500	30
> 4500 to 4700	31
> 4700 to 5000	32
> 5000	The amount determined by applying the formula set out in paragraph 6 of section 36 of Schedule E [a]

Notes:

Sampling requirements from Table 2 of Schedule E of O. Reg. 153/04.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. "Records of Site Condition —Part XV.1 of the Act." Environmental Protection Act. Ontario Regulation (O. Reg.) 153/04, as amended.

[a.] Per Schedule E and formula as presented in Section 7.2.3.2

≤ = less than or equal to

> = greater than

m^3 = cubic metre(s)

Table 7-7. Selected Indoor Air Indicator Concentrations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Medium	COCs [a]	Indoor Air Risk from	Selected Indoor Air Indicator Concentration for the Generic Residential and Commercial Buildings (µg/m^3) [b,c]	
			Residential	Commercial
Air	Acenaphthene	Soil and Groundwater	1.9 [d]	6 [d]
Air	Benzene	Soil and Groundwater	0.51	1.6
Air	1,1-Dichloroethane	Groundwater	0.7	2.2
Air	1,1-Dichloroethene	Groundwater	15	50
Air	cis-1,2-Dichloroethene	Groundwater	13	43
Air	trans-1,2-Dichloroethene	Groundwater	13	43
Air	n-Hexane	Groundwater	150	500
Air	2-(1-)Methylnaphthalene	Groundwater	10 [d]	36 [d]
Air	Mercury	Soil	0.0063 [d]	0.021 [d]
Air	Naphthalene	Soil and Groundwater	0.77	2.6
Air	Tetrachloroethene	Groundwater	4.3	14
Air	1,1,1-Trichloroethane	Groundwater	210	720
Air	Trichloroethylene	Soil and Groundwater	0.27	0.4
Air	Vinyl Chloride	Groundwater	0.13	0.43
Air	Xylenes, Total	Soil	150	500
Air	PHC F1	Groundwater	2500	8500
Air	PHC F2	Soil	470	1600

[a.] COCs selected as indicators based on predicted Indoor Air risk from COCs measured in soil or groundwater (Tables 4-34a, 4-34b, 4-35a and 4-35b).

[b.] The indicator concentrations were calculated within the MECP MGRA Model (MECP, 2016) using the TRVs presented in Table 4-26. The values presented are the resulting “Health Based Indoor Air Criteria – Residential and Industrial" appearing on the “Human Health” tab of the MGRA Model.

[c.] Discussion with the MECP prior to the development and initiation of sampling program is recommended to confirm approach for COCs for which the indicator concentration cannot be achieved by commercial laboratories.

[d.] Parameter is not able to be sampled using TO-15. Alternative sampling techniques will need to be considered.

Notes:
µg/m^3 = microgram per cubic metre
COC = contaminant of concern
F = fraction
MGRA = Modified Generic Risk Assessment
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
TRV = toxicity reference value

Table 7-8. Selected Soil Vapour Indicator Concentrations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Medium	COCs [a]	Indoor Air Risk from	Selected Soil Vapour Indicator Concentrations (µg/m^3) [b, c]	
			Residential	Commercial
Soil Vapour	Acenaphthene	Soil and Groundwater	95	1500
Soil Vapour	Benzene	Soil and Groundwater	26	400
Soil Vapour	1,1-Dichloroethane	Groundwater	35	550
Soil Vapour	1,1-Dichloroethene	Groundwater	750	13000
Soil Vapour	cis-1,2-Dichloroethene	Groundwater	650	11000
Soil Vapour	trans-1,2-Dichloroethene	Groundwater	650	11000
Soil Vapour	n-Hexane	Groundwater	7500	130000
Soil Vapour	2-(1-)Methylnaphthalene	Groundwater	500	9000
Soil Vapour	Mercury	Soil	0.32	5.3
Soil Vapour	Naphthalene	Soil and Groundwater	39	650
Soil Vapour	Tetrachloroethene	Groundwater	220	3500
Soil Vapour	1,1,1-Trichloroethane	Groundwater	11000	180000
Soil Vapour	Trichloroethylene	Soil and Groundwater	14	100
Soil Vapour	Vinyl Chloride	Groundwater	6.5	110
Soil Vapour	Xylenes, Total	Soil	7500	130000
Soil Vapour	PHC F1	Groundwater	130000	2100000
Soil Vapour	PHC F2	Soil	24000	400000

[a.] COCs selected as indicators based on predicted Indoor Air risk from COCs measured in soil or groundwater (Tables 4-34a, 4-34b, 4-35a and 4-35b).

[b.] Back-calculated from the Indoor Air Indicator Concentrations as shown in Table 7-7, using the MECP default attenuation factors of 0.02 (residential scenario) and 0.004 (commercial scenario). These indicator concentrations apply to subslab vapour data.

[c.] Discussion with the MECP prior to the development and initiation of sampling program is recommended to confirm approach for COCs for which the indicator concentration cannot be achieved by commercial laboratories.

Notes:

µg/m^3 = microgram per cubic metre

COC = contaminant of concern

F = fraction

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

Table 7-9. Conceptual Groundwater Monitoring Program

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Well	Existing or Proposed	Hydraulic Unit	Screen Depth (mbgs)		Screen Elevation (masl)		Location on RA Property	Monitoring Requirements			
			top	bottom	top	bottom		NAPL Mobility/ Presence	GW Quality Changes	Applicable Trigger Concentrations (see Table 7-10)	Parameters Analyzed (COCs as per Table 7-10)
Background - Groundwater Entering RA Property											
OW19	Existing	Overburden and Bedrock Contact Zone	1.77	4.82	314.71	311.66	North corner	Yes	Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW18-I	Existing	Overburden and Bedrock Contact Zone	1.81	4.86	314.66	311.61	Northeast property boundary	Yes	Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW18-II	Existing	Eramosa Formation	6.32	7.84	310.15	308.63	Northeast property boundary		Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW24S	Existing	Overburden and Bedrock Contact Zone	2.6	5.34	313.87	311.13	East corner	Yes	Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW24D	Existing	Overburden and Bedrock Contact Zone	6.55	7.77	309.91	308.69	East corner		Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW13-39S	Existing	Overburden and Bedrock Contact Zone	3.04	6.09	313.46	310.41	Northeast property boundary	Yes	Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
OW13-39D	Existing	Eramosa Formation	10.68	12.2	305.83	304.31	Northeast property boundary		Yes	PSS	VOCs, PAHs, metals, PHCF1&F2
Groundwater Exiting - Shallow Wells (NAPL and All pathways)											
MW19-137S	Existing	Overburden and Bedrock Contact Zone	2.21	5.26	314.23	311.18	South property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
OW09-I	Existing	Overburden and Bedrock Contact Zone	1.79	4.84	314.48	311.43	South property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
OW10	Existing	Overburden and Bedrock Contact Zone	1.8	4.85	313.73	310.68	South property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
OW11-I	Existing	Overburden and Bedrock Contact Zone	1.6	4.65	313.81	310.76	Southwest property boundary	Yes	Yes	PSS,B,C,D,E	VOCs, PAHs, metals, PHCF1&F2
OW12	Existing	Overburden and Bedrock Contact Zone	1.76	4.81	313.77	310.72	Southwest property boundary	Yes	Yes	PSS,B,C,D,E	VOCs, PAHs, metals, PHCF1&F2
OW15	Existing	Overburden and Bedrock Contact Zone	1.75	4.8	313.4	310.35	West property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
MW21-138S	Proposed	Overburden and Bedrock Contact Zone	~1.7	~4.8	--	--	South property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
MW21-139S	Proposed	Overburden and Bedrock Contact Zone	~1.7	~4.8	--	--	South property boundary	Yes	Yes	PSS,A,C,D,E	VOCs, PAHs, metals, PHCF1&F2
MW21-140S	Proposed	Overburden and Bedrock Contact Zone	~1.7	~4.8	--	--	South property boundary	Yes	Yes	PSS,B,C,D,E	VOCs, PAHs, metals, PHCF1&F2
Groundwater Exiting - Deep Wells (Potable Pathway and Aquatic Receptors)											
OW13	Existing	Shallow Bedrock	6.48	8	309	307.48	South property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
OW26D	Existing	Eramosa Formation	10.28	11.8	305.2	303.68	South property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
MW18-123D	Existing	Eramosa Formation	18.79	20.32	296.81	295.28	South property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
OW11-II	Existing	Shallow Bedrock	6.28	7.8	309.17	307.65	Southwest property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
MW18-122D	Existing	Eramosa Formation	12.44	13.96	302.95	301.43	Southwest property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
MW21-141D	Proposed	Shallow Bedrock	~6	~9	--	--	South property boundary		Yes	PSS, C,E	VOCs, PAHs, metals, PHCF1&F2
Existing NAPL - NAPL Thickness and Stability Monitoring										**Trigger Thickness[1] (cm)**	
MW17-108S	Existing	Overburden and Bedrock Contact Zone	1.93	4.98	314.43	311.38	Southeast	Yes	No	107	NA
MW18-135S	Existing	Overburden and Bedrock Contact Zone	4.27	5.79	312.26	310.74	Southeast	Yes	No	20	NA
OW23S	Existing	Overburden and Bedrock Contact Zone	2.52	5.26	313.96	311.22	Southeast	Yes	No	103	NA

Parameter groupings as per MECP, 2011c

Notes:

[1] - Trigger Thickness is maximum observed NAPL Thickness (2019-2020) plus 10% rounded up to nearest centimetre (cm)

~ = approximately

21 = nomenclature for proposed wells will be determined based on year of installation

COCs = contaminants of concern

F = fraction

GW = groundwater

masl = metres above sea level

mbgs = metres below ground surface

NAPL = nonaqueous phase liquid

NA = not applicable, NAPL monitoring only

PAHs = polycyclic aromatic hydrocarbons

PHC = petroleum hydrocarbons

PSS = property specific standards

VOCs = volatile organic compounds

Table 7-10. Groundwater Concentrations Used to Trigger Assessment for Contingency Measures

Risk Assessment, 200 Beverley Street, Guelph, Ontario

											Recommended Trigger Concentrations [g]				
Medium	COCs [a]	Minimum MDL (MECP, 2011)	Risk from [a]	GW Concentration (GW2) Protective of Residential Offsite Indoor Air Risk [b]	GW Concentration (GW2) Protective of Commercial Offsite Indoor Air Risk [b]	GW Concentration (GW3) Protective of Offsite Aquatic Risks [c]	GW Concentration (RBC) Protective of Offsite Construction Workers (Direct Contact with Groundwater) [d]	GW Concentration (RBC) Protective of Offsite Construction Workers (Inhalation in a Trench) [e]	GW1 [f] (Potable Pathway)	Proposed PSS (Table 6-1)	A Commercial IA Pathway	B Residential IA Pathway	C Downgradient Aquatic Receptors	D Offsite Construction/Utility Workers	E Potable Water Pathway
				(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
GW	1,1-dichloroethane	0.5	Risks to offsite human receptors in residential and commercial buildings and potable pathway	11	190	NA	NA	NA	5	35	190	11	NA	NA	5
GW	1,1-dichloroethene	0.5	Risks to offsite human receptors in residential and commercial buildings	0.072	1.2	NA	NA	NA	14	76	1.2	0.5	NA	NA	14
GW	1,1,1-trichloroethane	0.5	Risks to offsite human receptors in residential buildings	23	NA	NA	NA	NA	NA	44	NA	23	NA	NA	NA
GW	2-(1-)Methylnaphthalene	2	Risks to offsite human receptors in residential and commercial buildings and potable pathway	7.2	NA	NA	NA	NA	12	330	NA	7.2	NA	NA	12
GW	Acenaphthene	1	Risks to offsite human receptors in residential buildings and potable pathway	17	NA	NA	NA	NA	4.1	48	NA	17	NA	NA	4.1
GW	Anthracene	0.1	Risks to offsite aquatic receptors	NA	NA	1	NA	NA	NA	37	NA	NA	1	NA	NA
GW	Arsenic	1	Risk to Offsite Construction Workers (direct contact with groundwater) and potable pathway	NA	NA	NA	10	NA	25	54	NA	NA	NA	10	25
GW	Benzene	0.5	Risks to offsite human receptors in residential and commercial buildings and potable pathway	0.17	2.8	NA	NA	NA	5	80	2.8	0.5	NA	NA	5
GW	Cis-1,2-dichloroethene	0.5	Risks to offsite human receptors in residential and commercial buildings and potable pathway	0.072	1.2	NA	NA	NA	20	1100	1.2	0.5	NA	NA	20
GW	Trans-1,2-dichloroethene	0.5	Risks to offsite human receptors in residential and commercial buildings and potable pathway	0.072	1.2	NA	NA	NA	20	97	1.2	0.5	NA	NA	20
GW	Ethylbenzene	0.5	Risk not calculated in RA but PSS is >GW1	57	NA	NA	NA	NA	2.4	10	NA	57	NA	NA	2.4
GW	n-hexane	5	Risks to offsite human receptors in residential and commercial buildings	0.34	5.9	NA	NA	NA	NA	8.9	5.9	5	NA	NA	NA
GW	Naphthalene	2	Risks to offsite human receptors in residential buildings and offsite construction/utility workers (trench air)	4.4	NA	NA	NA	58	NA	32	NA	4.4	NA	58	NA
GW	Pyrene	0.2	Risk to potable pathway	NA	NA	NA	NA	NA	4.1	70	NA	NA	NA	NA	
GW	Tetrachloroethene	0.5	Risks to offsite human receptors in residential buildings	0.072	NA	NA	NA	NA	NA	1.3	NA	0.5	NA	NA	NA
GW	Trichloroethylene	0.5	Risks to offsite human receptors in residential and commercial buildings and offsite construction/utility workers (trench air)	0.053	0.4	NA	88	2.3	5	9400	0.5	0.5	NA	2.3	5
GW	Vinyl Chloride	0.5	Risks to offsite human receptors in residential and commercial buildings and potable pathway	0.0072	0.12	NA	11	NA	2	990	0.5	0.5	NA	11	2
GW	PHC F1	25	Risks to offsite human receptors in residential and commercial buildings and aquatic receptors	3.4	58	420	NA	NA	NA	660	58	3.4	420	NA	NA
GW	PHC F2	100	Risks to offsite human receptors in residential and commercial buildings, aquatic receptors and offsite construction/utility workers (direct groundwater contact and trench air)	5.7	97	150	15000	42000	300	250000	97	5.7	150	15000	300
GW	Zinc	5	Risks to offsite aquatic receptors and potable pathway	NA	NA	890	NA	NA	5000	5400	NA	NA	890	NA	5000

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*. Prepared by Standards Development Branch. April 15.

[a] Refer to qualitative assessment of offsite risks in Section 4.4.3.2, 4,4,6 and Table 4-40 and Section 5.5.6, Table 5-12

[b] MECP Table 6 Component Value residential GW2 for coarse-textured soil (MECP, 2016).

[c] MECP GW3 Component Value; refer to Table F1-5e

[d] Refer to Table 4-44b

[e] Refer to Table 4-46, shaded values (groundwater only)

[f] MECP Table 6 Component Value GW1 (MECP, 2016).

[g] Refer to Table 7-9 for wells that TCs apply to

Notes:

Proposed TCs are the minimum water detection limit as per MECP (2011), the risk-based concentration is lower

B(a)P = benzo(a)pyrene

COC = contaminant of concern

F = fraction

GW = groundwater

GW2 = MECP component value protective of the groundwater-to-indoor air pathway.

MECP = Ontario Ministry of the Environment, Conservation and Parks

PHC = petroleum hydrocarbon

PSS = Property-specific Standard

TC = trigger concentration

NA = not applicable – pathway not assessed for COC or no potential risk above target levels indicated for offsite

Table 7-11. Financial Assurance - Vapour Intrusion Monitoring Cost

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Cost Item	Baseline Monitoring (Year 1) ($)	Confirmatory Monitoring (Year 2) ($)
Sample Collection	9,600	7,500
Laboratory Analytical	18,000	14,000
Annual Sampling Port Maintenance	5,000	5,200
Annual Reporting	16,000	12,000
Contingency	9,800	7,800
Project Management	5,900	4,700
Total per Structure	**64,300**	**51,200**
Total for Site (3 Structures)	**192,900**	**153,600**
	2 Year Total^	**347,000**

Notes:

RA Property assumed to have three structures (with an approximate 600 m^2 footprint) with a passive venting vapour mitigation system. The vapour monitoring for the structure is assumed to consist of the following samples: 4 indoor air, 1 ambient (outdoor) air, and 1 duplicate (that is, a total of 6 samples per event) to be collected during four events during the first year and three events during the second year.

A 20% contingency for sample collection, laboratory costs, and annual reporting is assumed to account for potential resampling to further assess unexpected results or account for other field issues.

It is assumed that each vapour sample analysis costs $750.

A consumer price index of 3% year-over-year has been assumed.

^ = rounded up to the nearest thousand

% = percent

RA = risk assessment

m^2 = square metre(s)

Table 7-12. Financial Assurance - Groundwater Monitoring Co

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Cost Item	Year 1 ($)	Year 2 ($)
Laboratory Analytical	40,000	20,600
Sample Collection and Water Disposal	20,300	10,500
Well Installation and Annual Maintenance	28,000	2,100
Reporting	30,000	18,600
Contingency	23,700	10,400
Project Management	14,200	6,300
Total	**156,200**	**68,500**
	2 Year Total^:	**225,000**

Notes:

It is assumed that each groundwater sample analysis costs $400

Assumes 22 groundwater samples plus 3 duplicate per event (25 samples total), with four events in Year 1 and two events in Year 2. It is assumed that groundwater samples are collected from all 22 wells and that free product (NAPL) monitoring (groundwater level monitoring) will also be completed in each well to confirm the groundwater gradient and to check for the presence or absence of NAPL product in the wells.

Based on installation of four new wells; it is assumed that the well depths will range between 1.5 and 11 metres below ground surface.

A 20 percent contingency for sample collection, laboratory costs, and annual reporting is assumed to account for potential resampling to further assess unexpected results or account for other field issues and potential maintenance of wells.

A consumer price index of 3% year-over-year has been assumed.

^ - rounded up to the nearest thousand

Table 8-1. Summary of Public Comments Received at Public Information Meetings

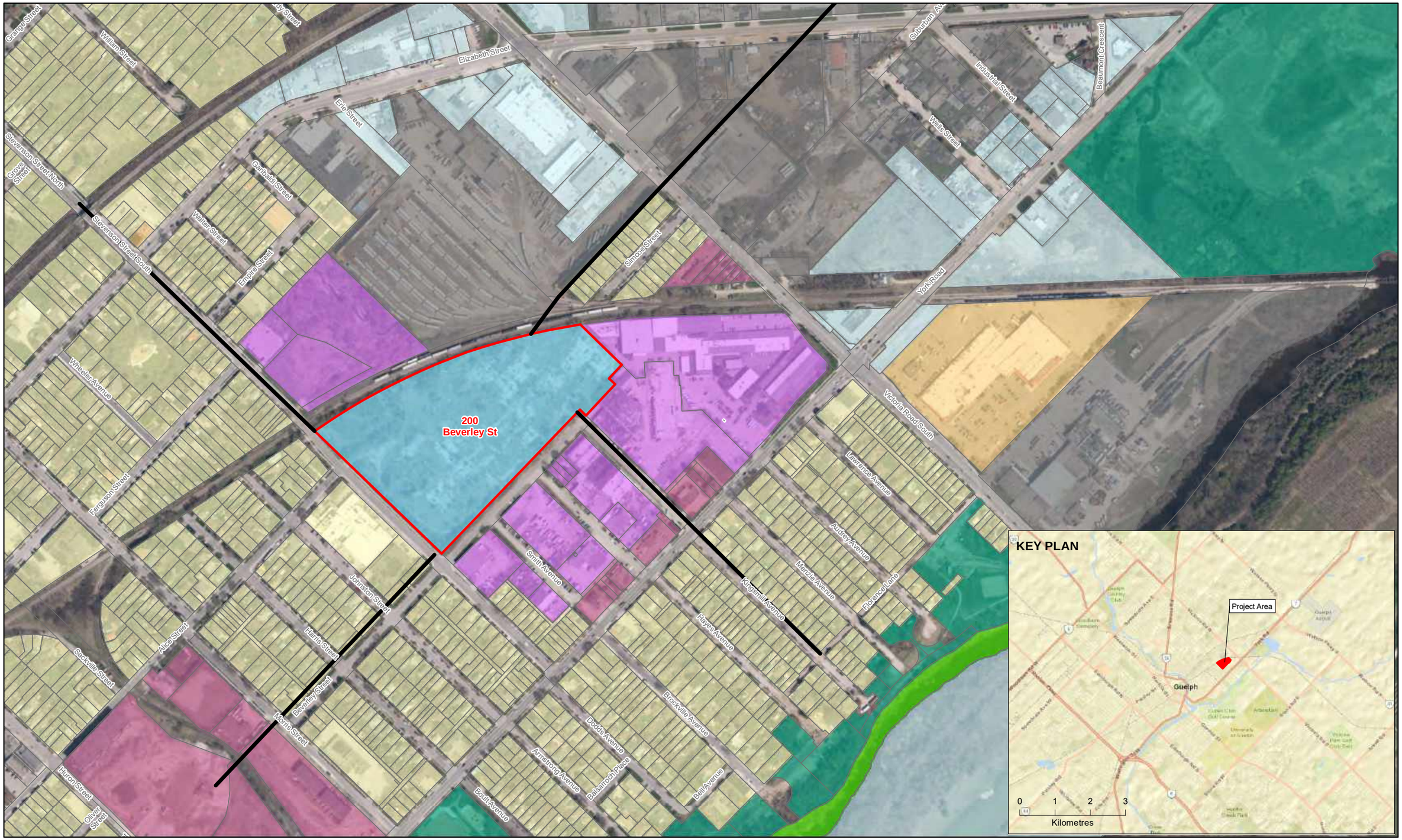
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Comment No.	Comment	Response
Developers Open House, January 23, 2018		
1	Can we have an example of how contaminants would be managed onsite?	Identified Risk Management Measure – prevents a contaminant from having an effect on environment; for example, if the parameter of concern is an issue for plants; a site gets paved and prevents plant growth
2	At the corner of Alice and Stevenson, there is a little business with pipes– do they have anything to do with the IMICO cleanup?	That is a privately owned site, and private remediation is ongoing. (The owner of the site was in the audience and additionally responded that he owned for 20 years; main contaminant is toluene. The site monitoring has been occurring from before he owned it. They have "put bugs down there", some chemicals, only remaining contamination is a small corner which is "not going anywhere". BP – bought Foseco and has been paying these costs.)
3	With reference to the contaminant figures, they show a significant amount of the site is impacted. How much of the 13 acres is developable?	All of it is developable, just a matter of managing contaminants. Under the current regulatory regime, many industrial properties are fully developable.
4	With respect to the discussion on the difference between clean and managed – will the decision for what is to be cleaned up and what is to be managed depend on the development plan?	Yes. The decisions will depend on cost considerations if things start getting expensive. Management and clean up will be rationalized with the development plan.
5	What happens at the edge of the property (with respect to delineation)?	We stop looking; project ends at the property boundary.
6	If a chemical gets into the groundwater, does it move throughout the city?	Contaminants do move with groundwater; however, many mechanisms come into play. As it moves, it dilutes. Other contaminants retard through soil adsorption, or stop migrating.
7	When dealing with zinc and managing in place, does it then have the potential to move to groundwater? How do you ensure the contaminants in place don't affect the groundwater?	You change characterization of the site. Soil caps change the amount of infiltration from such things as rain water. The MOE regulations are such that it ensures it does not further contaminate.
8	With respect to the mechanisms for managing on site – with the COCs we've seen, is there more natural treatment methods?	Yes, phytoremediation, bio treatments – usually these involve long term monitoring; generally for short term development they are not preferred due to timelines.
9	Does IMICO compare to other projects worked on, and timelines?	The Site is not exceptional, from our perspective, by end of year we should be looking at options and remediation.

Note:

1. For Developer's meeting(s), only comments relavent to the environmental site assessment, manamgement and schedule have been recorded.

Figures



Notes:
1. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. Source of Land use: City of Guelph Official Plan, Schedule 2.

Figure 1-1
Site Location
Risk Assessment
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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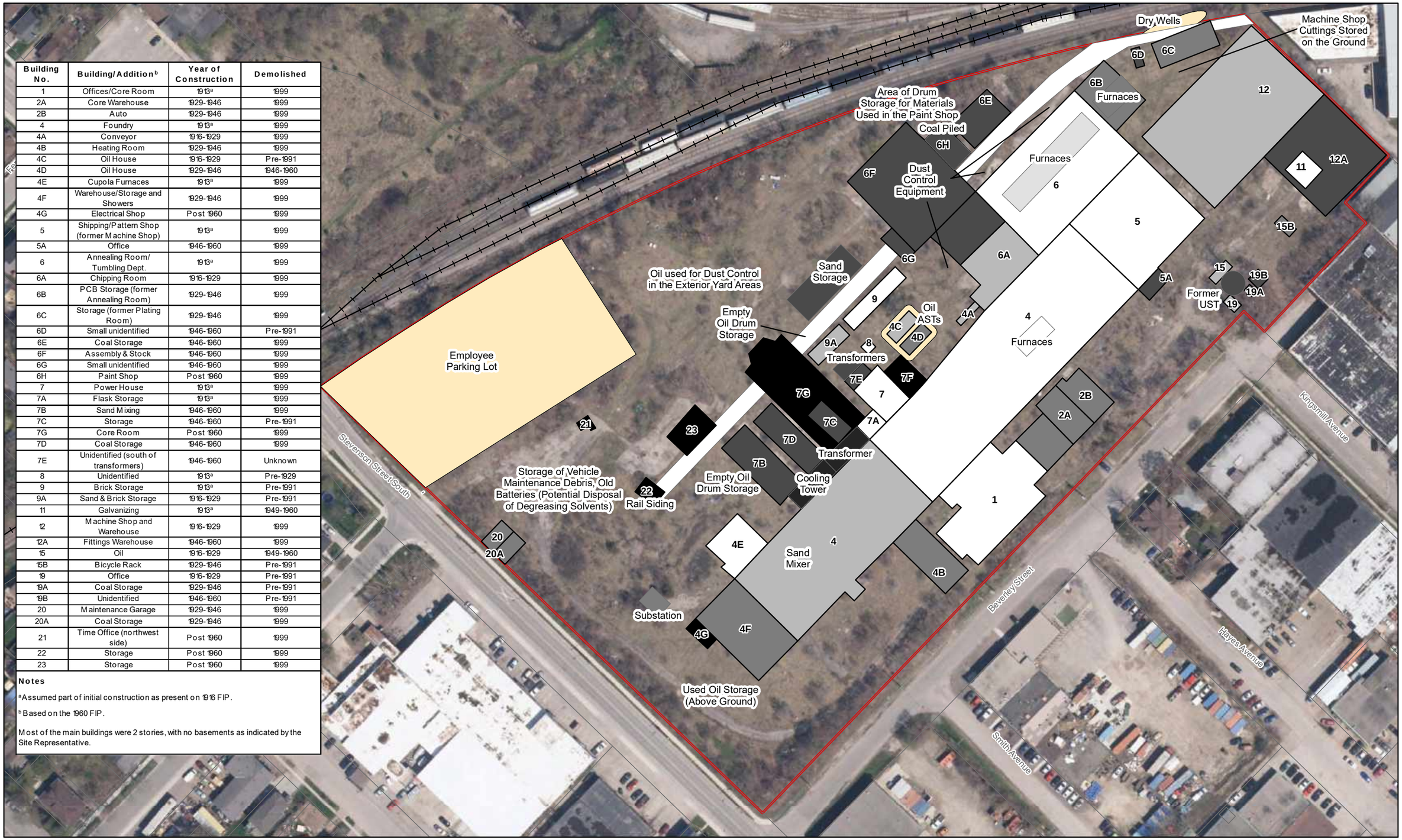
Building No.	Building/Addition[b]	Year of Construction	Demolished
1	Offices/Core Room	1913[a]	1999
2A	Core Warehouse	1929-1946	1999
2B	Auto	1929-1946	1999
4	Foundry	1913[a]	1999
4A	Conveyor	1916-1929	1999
4B	Heating Room	1929-1946	1999
4C	Oil House	1916-1929	Pre-1991
4D	Oil House	1929-1946	1946-1960
4E	Cupola Furnaces	1913[a]	1999
4F	Warehouse/Storage and Showers	1929-1946	1999
4G	Electrical Shop	Post 1960	1999
5	Shipping/Pattern Shop (former Machine Shop)	1913[a]	1999
5A	Office	1946-1960	1999
6	Annealing Room/ Tumbling Dept.	1913[a]	1999
6A	Chipping Room	1916-1929	1999
6B	PCB Storage (former Annealing Room)	1929-1946	1999
6C	Storage (former Plating Room)	1929-1946	1999
6D	Small unidentified	1946-1960	Pre-1991
6E	Coal Storage	1946-1960	1999
6F	Assembly & Stock	1946-1960	1999
6G	Small unidentified	1946-1960	1999
6H	Paint Shop	Post 1960	1999
7	Power House	1913[a]	1999
7A	Flask Storage	1913[a]	1999
7B	Sand Mixing	1946-1960	1999
7C	Storage	1946-1960	Pre-1991
7G	Core Room	Post 1960	1999
7D	Coal Storage	1946-1960	1999
7E	Unidentified (south of transformers)	1946-1960	Unknown
8	Unidentified	1913[a]	Pre-1929
9	Brick Storage	1913[a]	Pre-1991
9A	Sand & Brick Storage	1916-1929	Pre-1991
11	Galvanizing	1913[a]	1949-1960
12	Machine Shop and Warehouse	1916-1929	1999
12A	Fittings Warehouse	1946-1960	1999
15	Oil	1916-1929	1949-1960
15B	Bicycle Rack	1929-1946	Pre-1991
19	Office	1916-1929	Pre-1991
19A	Coal Storage	1929-1946	Pre-1991
19B	Unidentified	1946-1960	Pre-1991
20	Maintenance Garage	1929-1946	1999
20A	Coal Storage	1929-1946	1999
21	Time Office (northwest side)	Post 1960	1999
22	Storage	Post 1960	1999
23	Storage	Post 1960	1999

Notes

[a] Assumed part of initial construction as present on 1916 FIP.

[b] Based on the 1960 FIP.

Most of the main buildings were 2 stories, with no basements as indicated by the Site Representative.



N

0 10 20 30
Metres

Railway
Former IMICO Property Boundary
Reference to Date Building Built
Fire Insurance Plan, 1916
Fire Insurance Plan, Maar. 1922, Reprinted Oct 1929
Fire Insurance Plan, Mar. 1922, Reprinted 1946
Fire Insurance Plan, June 1960
From Procter & Redfern Draft Report, June 10, 1991
Post 1960
Unknown Date
Unknown Date, Extent

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 1-2
Site Plan and Historical Buildings
Risk Assessment
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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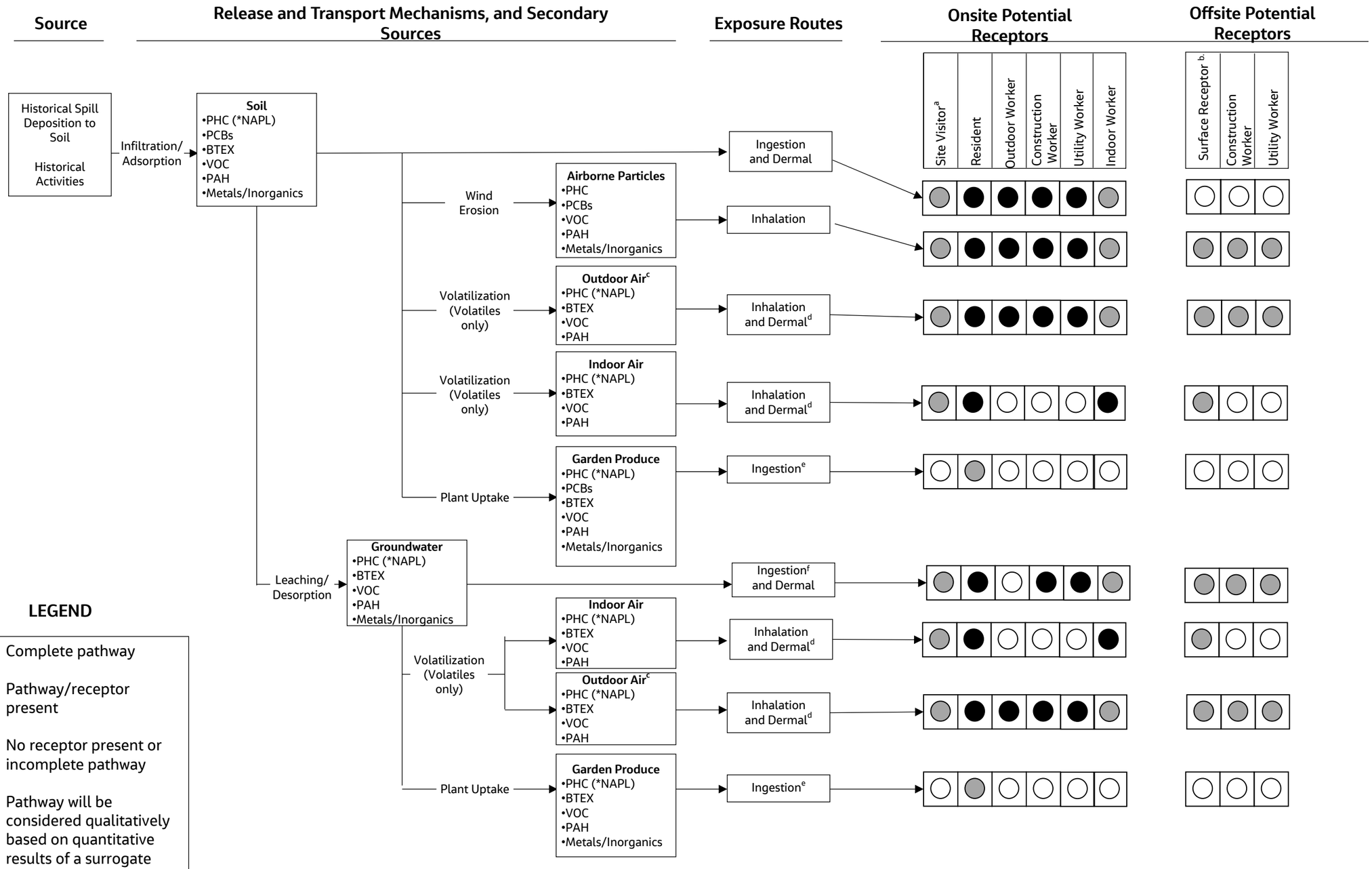


LEGEND

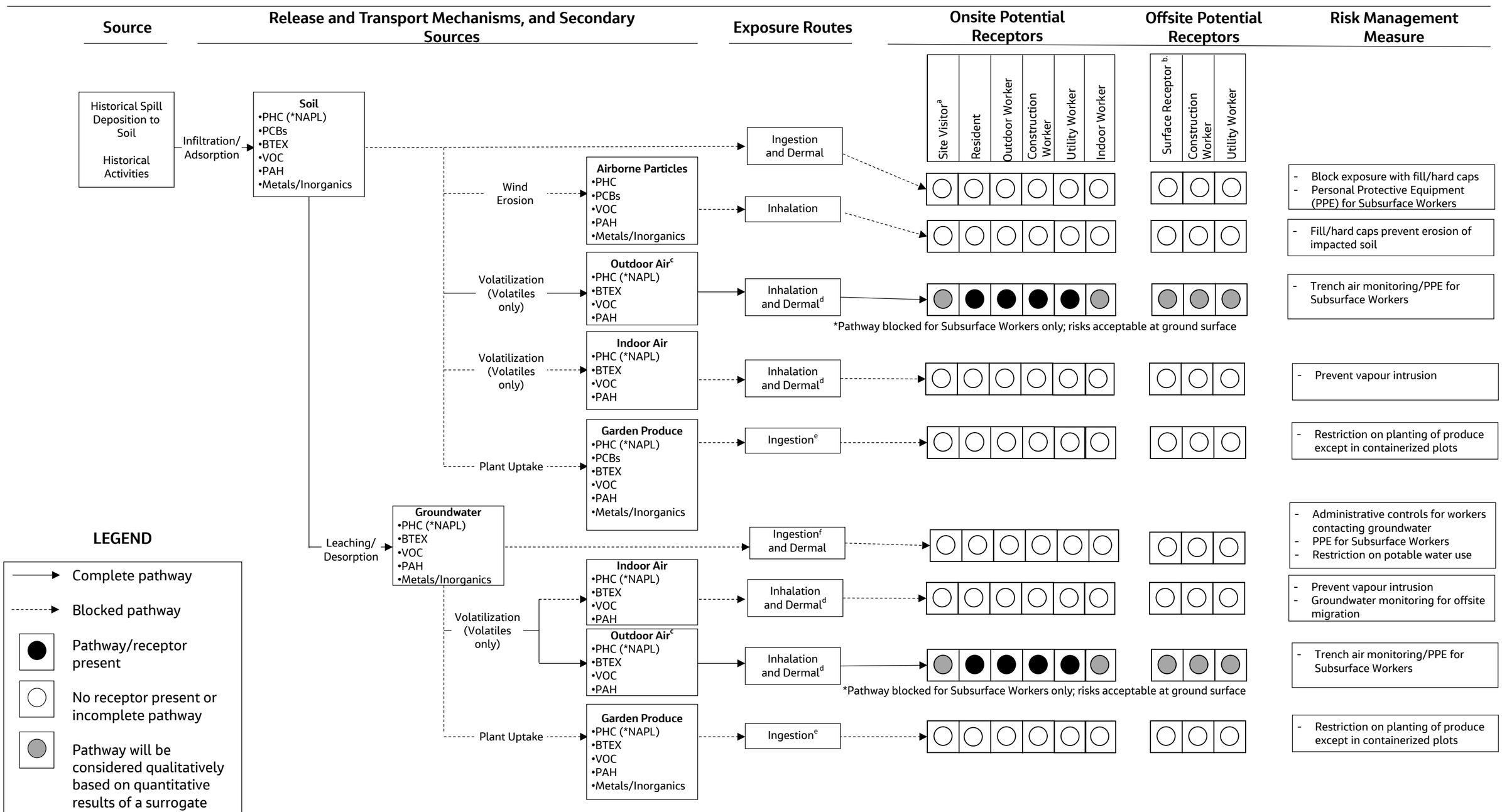
- Complete pathway
- Pathway/receptor present
- No receptor present or incomplete pathway
- Pathway will be considered qualitatively based on quantitative results of a surrogate receptor

BTEX = benzene, toluene, ethylbenzene, xylenes
COC = contaminant of concern
NAPL = nonaqueous phase liquid
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
RMM = risk management measure
VOC = volatile organic compound

Notes:
* As part of the Phase Two ESA investigation, measurable NAPL (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Site Visitors from all age categories would be anticipated to frequent the Site.
b. Surface Receptor incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as indoor workers, residents, visitors, outdoor workers, or patrons of nearby properties that may be exposed to dust (soil particulates) or groundwater migrating offsite during the redevelopment of the property in the absence of RMMs.
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore, this pathway will not be considered quantitatively.
f. As groundwater at the Site is potable, the ingestion of groundwater pathway includes both incidental ingestion (as a result of subsurface activities) and ingestion of water from the municipal water supply

Figure 4-1. Human Health Conceptual Site Model
200 Beverley Street, Guelph, Ontario)

Jacobs



LEGEND

- Complete pathway
- Blocked pathway
- Pathway/receptor present
- No receptor present or incomplete pathway
- Pathway will be considered qualitatively based on quantitative results of a surrogate receptor

COC = contaminant of concern
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
RMM = risk management measure
BTEX = benzene, toluene, ethylbenzene, xylenes
VOC = volatile organic compound

Notes:
* As part of the Phase Two ESA investigation, measurable NAPL (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Site Visitors from all age categories would be anticipated to frequent the Site.
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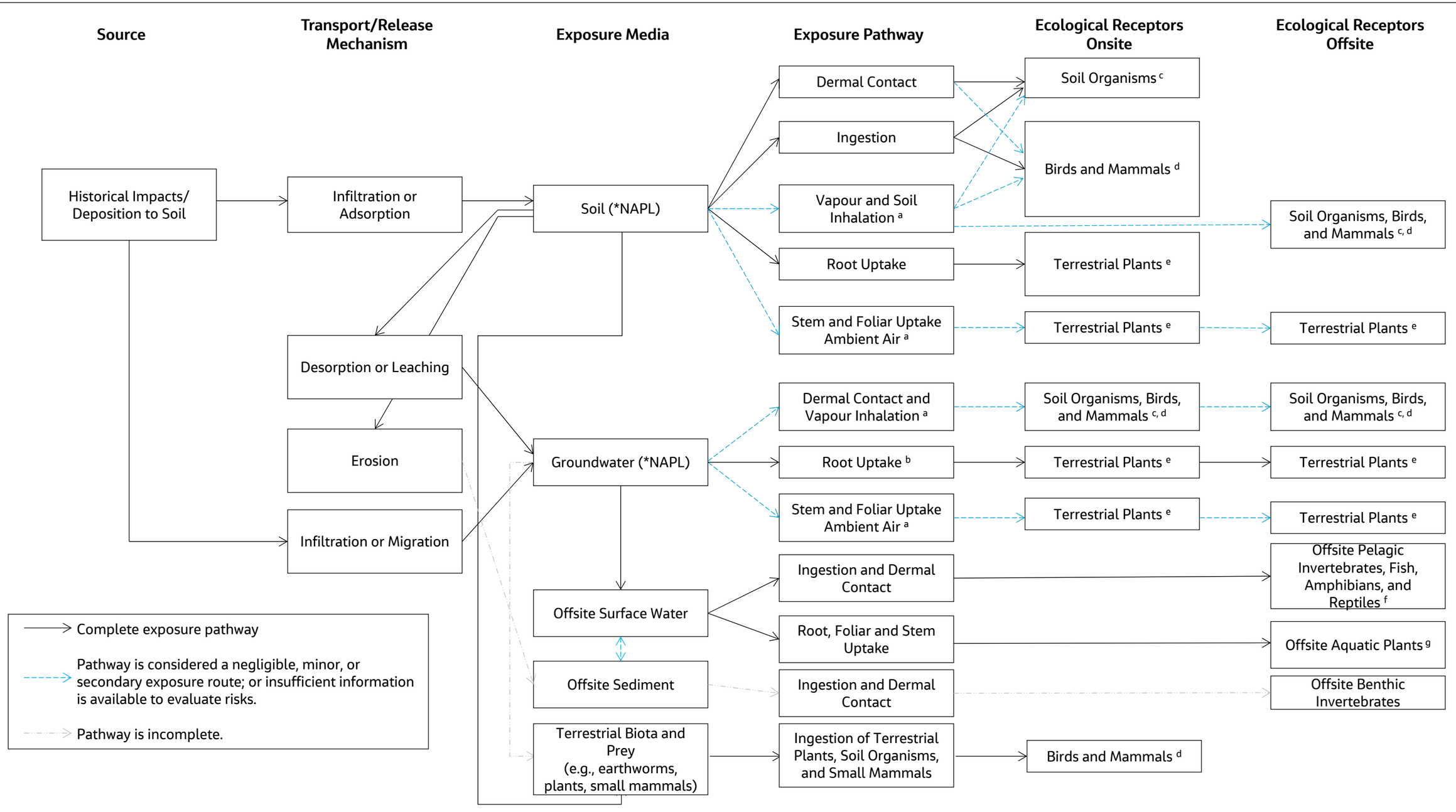
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore, this pathway will not be considered quantitatively.
f. As groundwater at the Site is potable, the ingestion of groundwater pathway includes both incidental ingestion (as a result of subsurface activities) and ingestion of water from the municipal water supply

Figure 4-2. Human Health Conceptual Site Model with Risk Management Measures
200 Beverley Street, Guelph, Ontario)

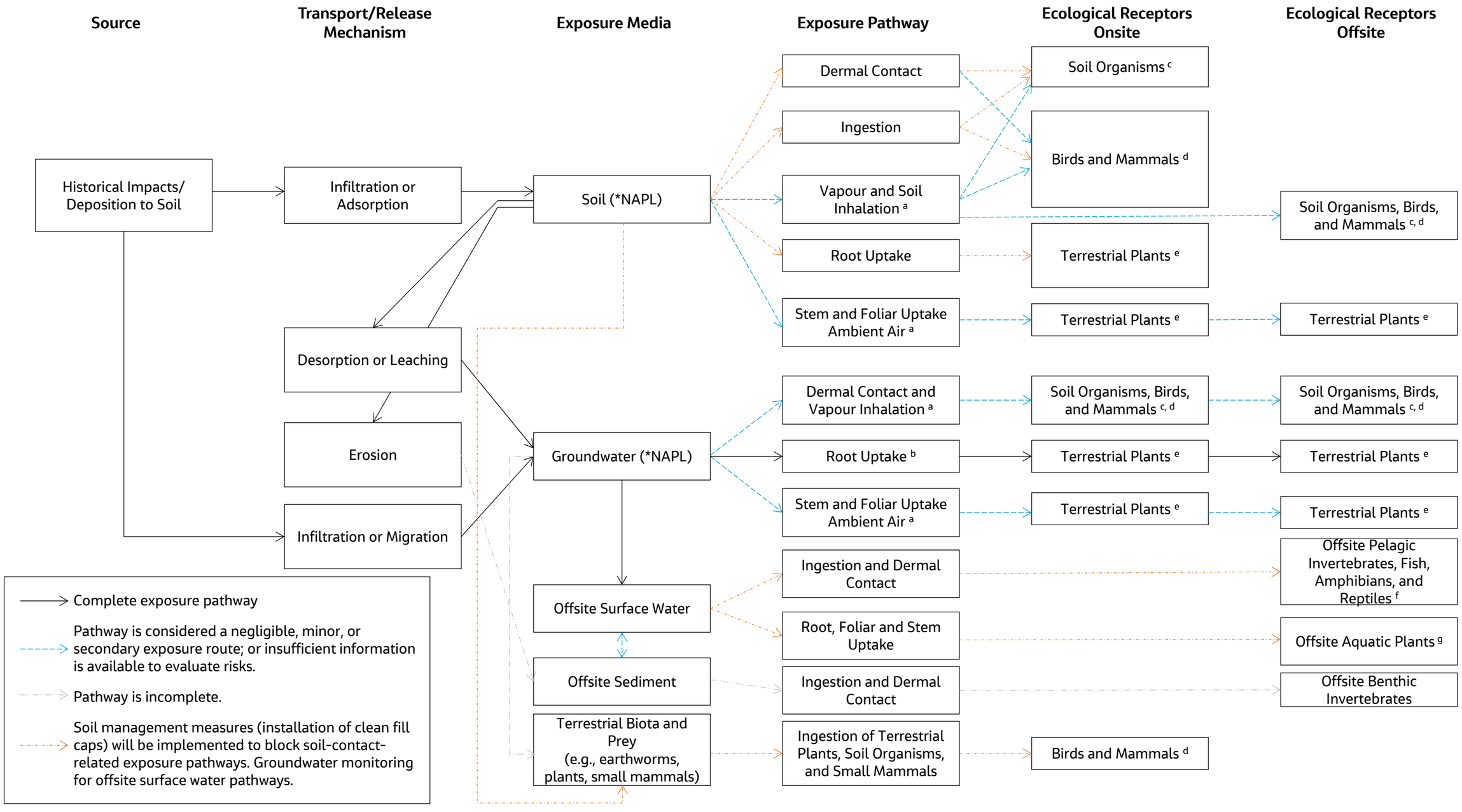
Jacobs



Notes:
* As part of the Phase Two ESA investigation, measurable nonaqueous phase liquid (NAPL) (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Minimum depth to groundwater is less than 1.5 metres below ground surface.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Common Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure 5-1. Ecological Conceptual Site Model
200 Beverley Street, Guelph, Ontario

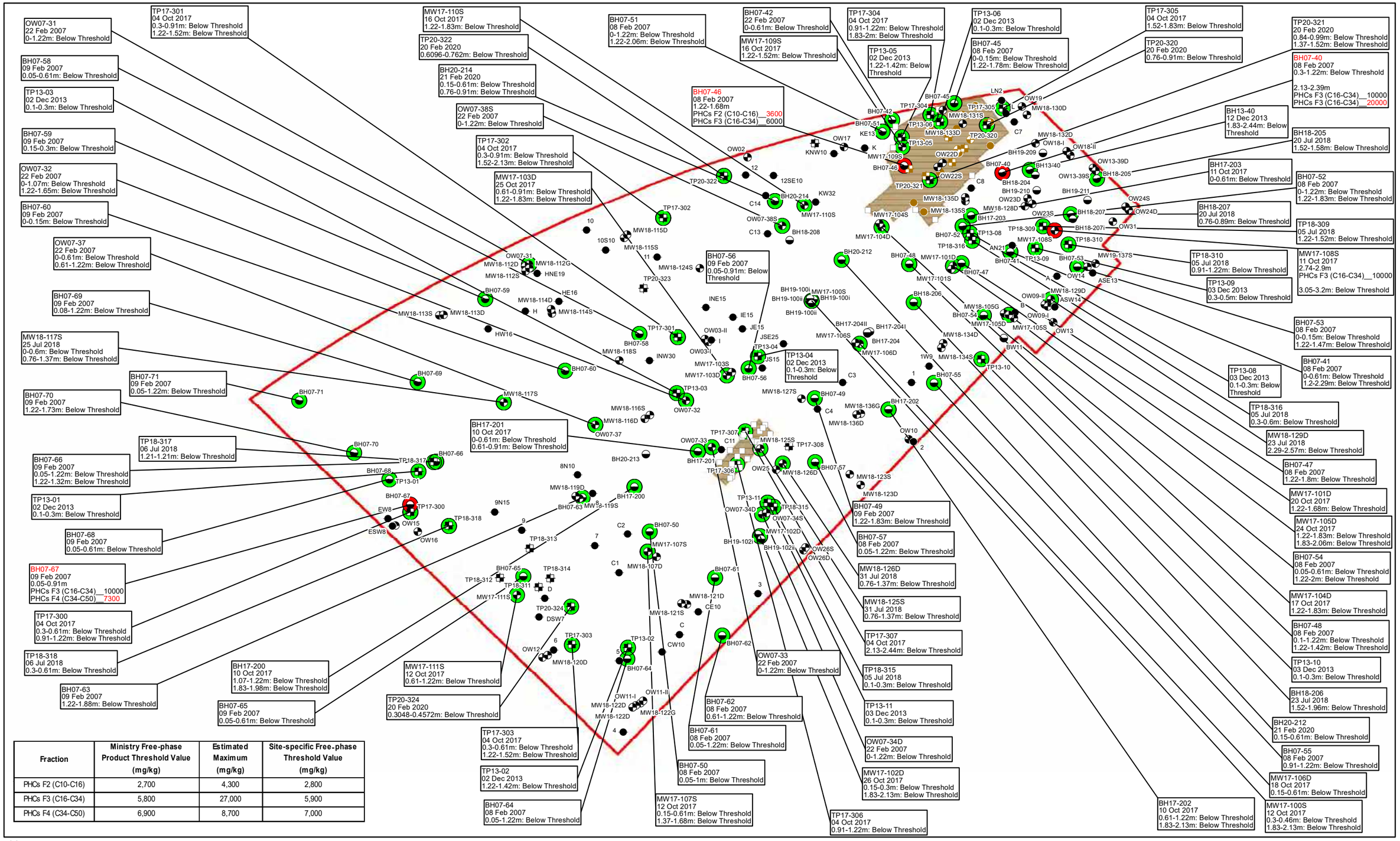
Jacobs



Notes:
* As part of the Phase Two ESA investigation, measurable nonaquous phase liquid (NAPL) (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Minimum depth to groundwater is less than 1.5 metres below ground surface.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Common Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure 5-2. Ecological Conceptual Site Model with Risk Management Measures
200 Beverley Street, Guelph, Ontario

Jacobs



Fraction	Ministry Free-phase Product Threshold Value (mg/kg)	Estimated Maximum (mg/kg)	Site-specific Free-phase Threshold Value (mg/kg)
PHCs F2 (C10-C16)	2,700	4,300	2,800
PHCs F3 (C16-C34)	5,800	27,000	5,900
PHCs F4 (C34-C50)	6,900	8,700	7,000

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- Above Threshold
- Below Threshold
- RA Property Boundary
- Historical Excavation area, EarthTech, 1999

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-1
Soil Locations Exceeding Ministry PHC Free Phase Threshold Values
Risk Assessment
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Fraction	Ministry Half-Solubility Value (µg/L)	Estimated Maximum (µg/L)
PHCs F2 (C10-C16)	150	250000

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

Above Threshold
Below Threshold

RA Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1.Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-2
Groundwater Locations Exceeding Ministry PHC Half-Solubility Values
Risk Assessment
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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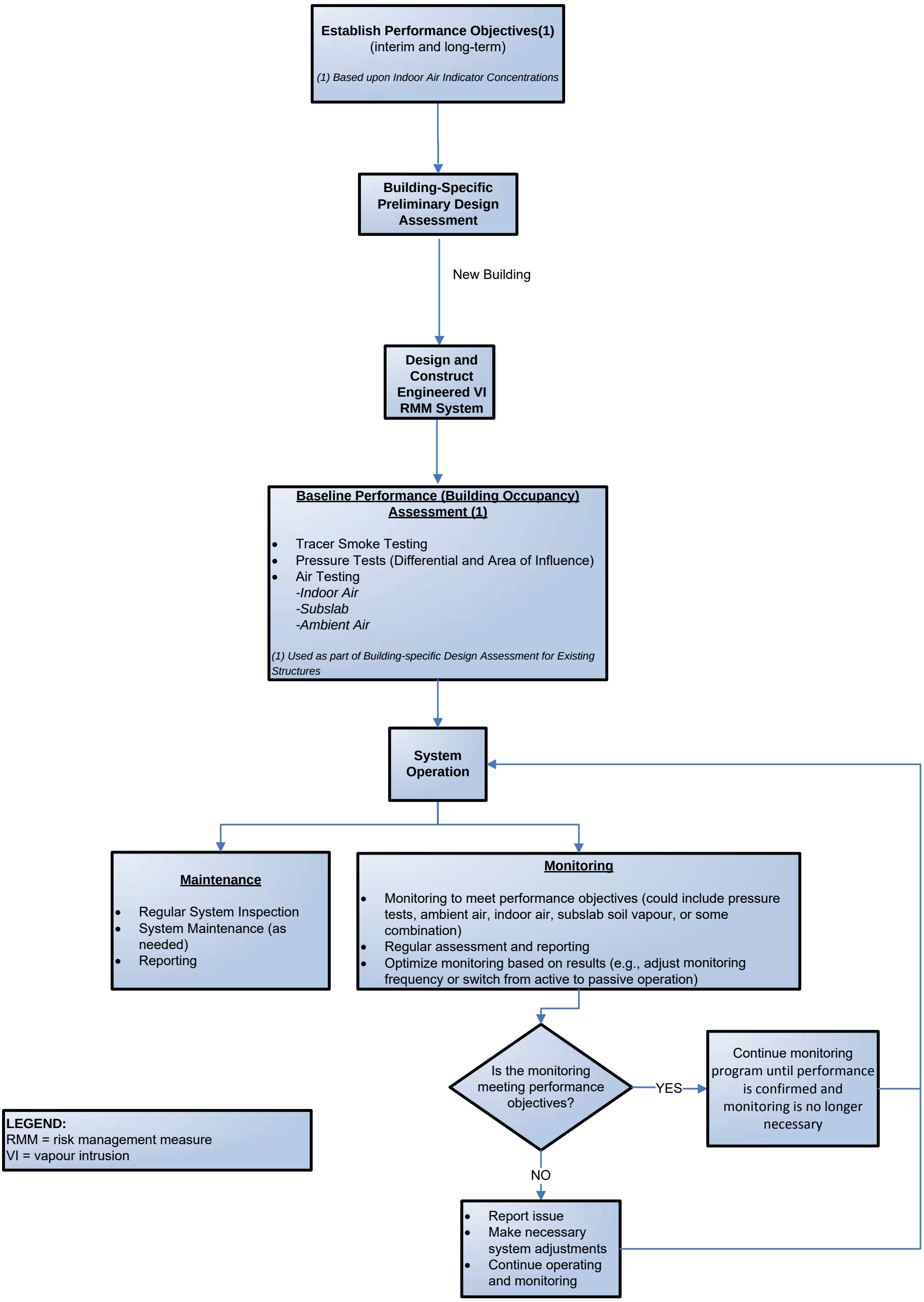
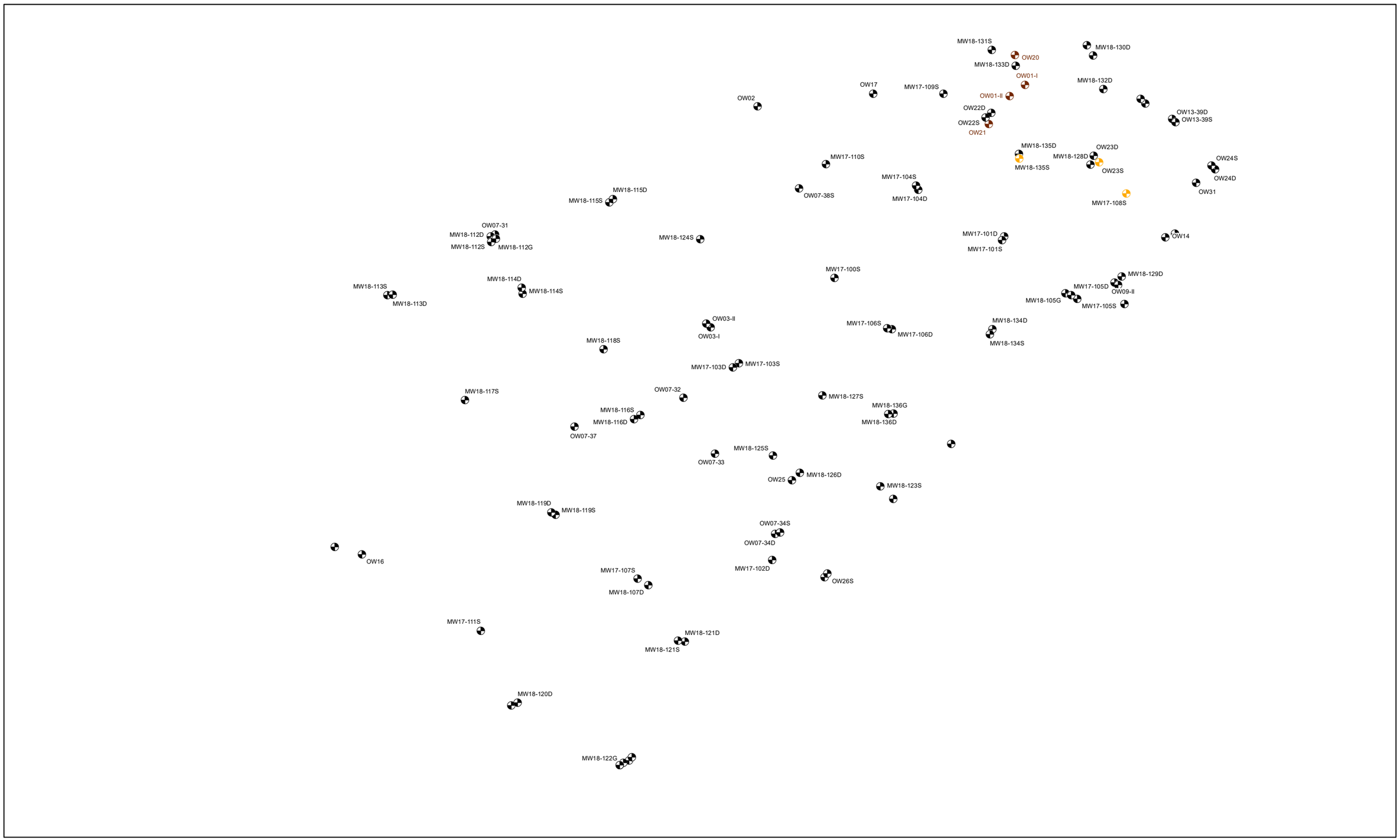
Figure 7-1 Vapor Intrusion RMM – Design, Construction, and Monitoring and Maintenance Process





N

0 10 20 30

Metres

- Monitoring Well
- Excavated Monitoring Well
- Existing Monitoring Well with NAPL Present
- Former IMICO Property Boundary
- Excavated Area
- Historical Excavation area, EarthTech, 1999
- Potential NAPL Area (See Administrative Requirements in Section 7.2.3.5)

Notes:
1. Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
3. NAPL = nonaqueous phase liquid

Figure 7-2
Administrative Requirements - NAPL
Risk Management Plan
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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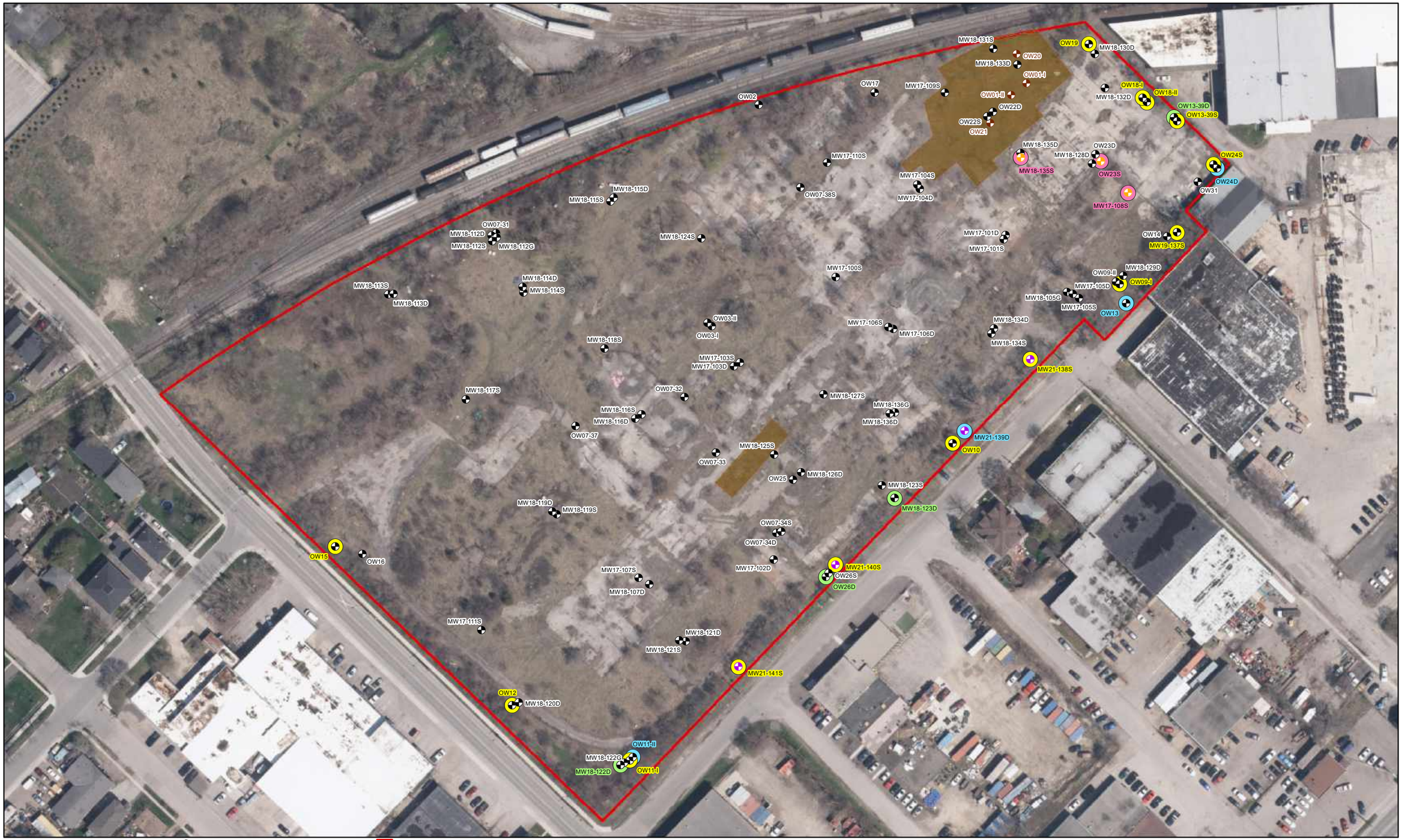

N

0 10 20 30

Metres

- Monitoring Well
- Proposed Monitoring Well
- Excavated Monitoring Well
- Existing Monitoring Well with NAPL Present
- Former IMICO Property Boundary
- Excavated Area
- Historical Excavation area, EarthTech, 1999

Conceptual Monitoring Well Location

- Water Table Well
- Shallow Bedrock (Screen ~6-10 mbgs)
- Deep Bedrock (Eramosa Foundation)
- Shallow Well to be Monitored for NAPL Thickness Only

Notes:
1. Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
2. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
3. NAPL = nonaqueous phase liquid

Figure 7-3
Conceptual Groundwater Monitoring Locations
Risk Management Plan
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Appendix A
Pre-submission Form (PSF) and Response to Comments

Appendix A1
Pre-submission Form

Risk Assessment Pre-Submission Form
200 Beverley Street, Guelph, Ontario

Prepared for

City of Guelph

February 2019

CH2M HILL Canada Limited
72 Victoria Street South, Suite 300
Kitchener, ON
N2G 4Y9

Ontario

Ministry of the Environment and Climate Change

Risk Assessment Pre-submission

Ministry Use Only		
Reference Number	Date (yyyy/mm/dd)	Initials

General Information and Instructions

- Submit the completed form to: The Director
  Environmental Approvals Access and Service Integration Branch
  Ontario Ministry of the Environment and Climate Change
  135 St Clair Ave W, 1st Floor
  Toronto ON M4V 1P5
- Questions and inquiries: Call 416-314-8001
- In order for this form to be considered complete, all relevant sections must be completed and it must be accompanied by the required supporting documents (please see Important Note below).
- Sections A and B must be signed.
- **Forms that are incomplete will be returned without comment.**

Important Note to Property Owners and their Qualified Persons

Preparing and submitting the Risk Assessment Pre-submission form (PSF) is a mandatory part of the risk assessment review process. The PSF is an opportunity for the property owner and their Qualified Person to provide a thorough description of the property and of the planned risk assessment approach, and for the Ministry to provide comments in return. When used effectively, the PSF can improve the quality of the risk assessment (RA) submission, enabling a more efficient Ministry review.

The PSF must be filled out completely and accurately for it to be reviewed by the ministry. Critical supporting documents that must accompany the PSF include:

- A Conceptual Site Model that meets the requirements of O. Reg. 153/04, Schedule C, section 3. Please carefully review completeness checklist included in Section 7 of this form.
- Human Health Conceptual Site Model and Ecological Conceptual Site Model (with and without risk management measures (RMMs) in place).

It is very important for property owners and Qualified Persons to know that if the Conceptual Site Model submitted with this form does not meet all of the requirements specified in O. Reg. 153/04, Schedule C, Section 3, the PSF will not be considered complete and review will not be initiated by the Ministry.

Notice of Collection of Personal Information

Personal information is collected under the authority of Part XV.1 of the *Environmental Protection Act*, R.S.O. 1990, c. E-19, as amended (EPA). Personal information will be used to identify current and previous owner(s) of the risk assessment property. Questions about the collection of personal information should be directed to the Director, Environmental Approvals Access and Service Integration Branch, Ministry of the Environment and Climate Change, 135 St. Clair Avenue West, 1st Floor, Toronto ON M4V 1P5, 416-314-8001.

Note: Comments provided by the Ministry of the Environment and Climate Change (Ministry) on the content of this PSF are not in any way a Director's response to a risk assessment referred to in section 168.5 of the EPA.

It is an offence under subsection 184 (2) of the EPA for a person to give or submit false or misleading information in any statement, document or data to any provincial officer, the Minister, the Ministry, any employee or agent of the Ministry, or any person involved in carrying out a program of the Ministry in respect of any matter related to the EPA or a regulation under the EPA.

Information contained in this form is not considered confidential and will be made available to the public upon request. Information submitted with this form as supporting information may be marked confidential but will be subject to the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31. If you do not mark supporting information as confidential at the time of submitting the information, the Ministry may make the supporting information available to the public without further notice to you.

Record Information

Has a previous PSF been filed for this property?

☐ Yes ☑ No If yes, provide the PSF/RA reference number ►

Is it intended that a Record of Site Condition be filed for this property?

☑ Yes ☐ No

Is a Record of Site Condition required for this property because of a planned change to a more sensitive land use?

☑ Yes ☐ No ☐ Other (specify) ►

A. Statement of Qualified Person

Note: It is an offence to submit false or misleading information.

I, the undersigned hereby declare that, to the best of my knowledge, the information contained herein and the information submitted in support of this form is complete and accurate in every way and that I meet the applicable qualifications of a Qualified Person for risk assessments as set out in O. Reg. 153/04 for the purpose of preparing the PSF undertaking or supervising the risk assessment work and preparing the subsequent RA Report and that the required documents as indicated below are attached.

Have your qualifications been approved as a result of a previous submitted PSF?

☐ Yes ☑ No If no, specify details below ▼

Resume attached?	Work references attached?	University transcripts attached?
☑ Yes ☐ No	☑ Yes ☐ No	☑ Yes ☐ No

I do not hold and have not held a direct or indirect interest in the Risk Assessment property or any property which includes the Risk Assessment property and was the subject of the phase one or two environmental site assessment upon which the Risk Assessment is based.

☑ Yes ☐ No

(Print) Name (Last name, first name)	Signature	Date (yyyy/mm/dd)
Katherine Appleby	K. Appleby	2019/02/22

B. Property Owner Information (To be completed by each owner of the property)

Property Owner 1

Business Name

Legal name and the name under which the entity is operating or trading if different from the legal name.

The City of Guelph

Contact Person

Last name	First name
Adhikari	Prasoon
Title	**Email address**
Environmental Engineer	prasoon.adhikari@guelph.ca
Telephone number (include country code if outside Canada)	**Fax number (include country code if outside Canada)**
519-822-1260 ext. 2946	

Property Owner's Business Mailing Address

Street number	Qualifier (e.g., A)	Street name	Type	Direction
1		Carden	Street	

Unit/Suite number	Rural route	PO box	Postal station	City/Town
				Guelph

Province/State	Postal/Zip code	Country
Ontario	N1H 3A1	Canada

Additional address information (if applicable)

Statement of Property Owner

I, the undersigned hereby declare that, to the best of my knowledge, the information contained herein and the information submitted in support of this form is complete and accurate in every way and that the Qualified Person identified in section 8 of this form is authorized to act on my behalf for the purpose of preparing the PSF undertaking or supervising the RA work and preparing the subsequent RA Report. If the Property Owner is a corporation or entity, I declare that I have authority to bind the corporation.

(Print) Name (Last name, first name)	Signature	Date (yyyy/mm/dd)
ADHIKARI, PRASOON		2019/02/21
Title		
ENVIRONMENTAL ENGINEER / PM		

1. Property Information

Ministry district office name
Guelph District Office

Site Street Address

Street number	Qualifier (e.g., A)	Street name	Type	Direction
200		Beverley	Street	

Rural route	Municipality/unorganized township	Province	Postal code
	Guelph	Ontario	

Plan of survey of the property attached
☑ Yes ☐ No

Legal description/lawyer's letter attached?
☑ Yes ☐ No

Alternate address (e.g., near Thickson and Rosslands Roads, Whitby, Ontario)
200 Beverly Street

Assessment roll number(s)	Property identification number(s)
23 08 010 008 031 00	71343-0074(LT)

Geo Reference

GIS map datum	Accuracy estimate	UTM zone	Easting (required)	Northing (required)	Latitude (optional)	Longitude (optional)
UTM NAD 83	+/- 5 m	17	562213	4822326		

2. Planned Risk Assessment Approach (determines timelines for review)

Select appropriate approach

☐ Limited Scope Risk Assessment O. Reg. 153/04 Schedule C, section 7
Reason for limited scope
- ☐ Modified Generic Risk Assessment (Tier 2)
- ☐ Risk Assessment using a community assessment report

☐ New Science risk assessment O. Reg. 153/04 Schedule C, section 9
- ☐ Proposed new toxicity data
- ☐ Probabilistic model (specify details below) ▼
- ☐ New model (specify details below) ▼

Name of new model used?

Are any new models used proprietary?
☐ Yes ☐ No

☐ Estimation of local background concentration O. Reg. 153/04 Schedule C, Section 8. Omit section 4, 5 and 7.
☐ Wider area of Abatement O. Reg. 153/04 Schedule C, section 10
☑ A Risk Assessment other than those identified in O. Reg. 153/04 Schedule C, Part II

Identify the computer models to be used in the preparation of the Risk Assessment

☐ Modified generic Risk Assessment approved model (Ministry of Environment and Climate Change)

Date (yyyy/mm/dd) ►

☑ Other (specify) ▼

1. USEPA (2004) Johnson and Ettinger Model
2. MECP (November 2016) MGRA Approved Model
3.
4.
5.
6.
7.

3. Site Information

3.1 Site Use Information (Information about current, proposed, and historical property use for the site)

Year	Name of Owner (Last Name, First Name)	Description of Property Use(s)	Property Use(s) (per regulatory types)	Other Observations from Aerial Photographs, Fire Insurance Plans, etc.
1997	City of Guelph	Vacant	Industrial	Aerials show the Site buildings demolished between 1998 and 2006 and the Site vacant thereafter
1993	The Assembly of the Church of the Universe	Unknown	Institutional/ Industrial	Aerials during this time show damage (assumed from fires) to the buildings on Site
1992	John H. Long	Storage	Industrial	No additional information available for this time period
1913	International Malleable Iron Company Limited	Iron-jobbing Foundry	Industrial	Aerials, FIPs show industrial use through this time period; previous reports indicate operations ceased in 1989
1834	Various	Agricultural or residential	Agricultural or residential	Private individuals were listed in the Title Search; no aerials were available before 1930, and no FIP coverage was available for the area prior to 1916

3.2 Adjacent Property Use Information (Information about current property use for the adjacent property)

Description of Property Use(s)	Property Use(s) (per regulatory types)	Other Observations from Aerial Photographs, Fire Insurance Plans, etc.	Does property receive surface water run-off from the Risk Assessment property?	Does ground water from Risk Assessment property flow?
North of the Site: rail use, manufacturing, mixed business, and residential	Industrial, commercial, residential	Rail lines present on aerial photographs dating back to 1930. Outdoor storage visible on 1990 aerial photograph. Spur lines and rail car storage visible on 2006 aerial photograph	No	Up-gradient
East of the Site: manufacturing, mixed office, mixed business, residential	Industrial, commercial, residential	Residential land evident on 1930 aerial photograph. Industrial development evident on 1964 aerial photograph.	No	Cross-gradient

South of the Site: manufacturing, mixed office, mixed business, residential	Industrial, commercial, residential	1930 aerial photograph shows a mix of undeveloped and residential land. Industrial development evident on 1964 aerial photograph.	No	Down-gradient
West of the Site: residential	Residential	1930 aerial photograph shows a mix of undeveloped and residential land. Industrial development evident on 1964 aerial photograph.	No	Cross-gradient

3.3 Additional Project Information

3.3.1 Has municipality been notified of non-potable ground water? . . . . . ☐ Yes ☑ No

If yes, attach notification

3.3.2 Has municipality responded? . . . . . ☐ Yes ☐ No ☑ Not applicable

If yes, specify location of response

Please provide a copy of the response.

3.3.3 Flow through of contaminated ground water? . . . . . ☐ Yes ☐ No ☑ Not determined

3.3.4 Are there ongoing industrial/commercial operations on the property? . . . ☐ Yes ☑ No

3.3.5 Are there structures currently on the property? . . . . . ☐ Yes ☑ No

3.3.6 Have buildings/structures on the property been demolished? . . . . . ☑ Yes ☐ No

3.3.7 Has any remedial action taken place on the property? . . . . . ☑ Yes ☐ No

3.3.8 Has the contaminant source been removed from the property? . . . . . ☐ Yes ☐ No ☑ Not determined

3.3.9 Has free phase product (non-aqueous phase liquid (NAPL) / dense non-aqueous phase liquid (DNAPL)) been visually observed or documented via an interface probe on the site? . . . . . ☑ Yes ☐ No

If yes, state maximum reported thickness or other evidence

Light non-aqueous phase liquid: 39 centimeters (OW23S)

3.3.10 Do chemical analysis results for soil or ground water indicate the potential for, or likelihood of free phase product within ground water based on solubility concentrations or saturated soil conditions on the site?

Ground water . . . . . ☑ Yes ☐ No

Soil . . . . . ☑ Yes ☐ No

3.3.11 Depth of organic contamination in soil 0 to 2.89 m ☐ Not applicable

3.3.12 Depth of inorganic contamination in soil 0 to 3.2 m ☐ Not applicable

3.3.13 On site contamination source . . . . . ☑ Yes ☐ No ☐ Not determined

3.3.14 Off site contamination source . . . . . ☑ Yes ☐ No ☐ Not determined

3.3.15 Based on the Conceptual Site Model and the identified potential pathways/routes of contaminants to receptors, have all pathways/routes been assessed in the Phase 1 and Phase 2 environmental site assessment (ESAs)? . . . . . ☑ Yes ☐ No

If no, is additional site characterization planned prior to submission of Risk Assessment? . . . . . ☐ Yes ☐ No

3.4 Sampling Summary

Media sampled as part of Phase 2 ESA requirements for filing a Record of Site Condition

	Media	Was This Medium Sampled?	Year of Most Recent Sample Collection
3.4.1	Surface soil (up to 1.5 metres)	☑ Yes ☐ No	2018
3.4.2	Subsurface soil (greater than 1.5 metres)	☑ Yes ☐ No	2018
3.4.3	Ground water	☑ Yes ☐ No	2018
3.4.4	Soil vapour/sub slab	☐ Yes ☑ No	
3.4.5	Sediment	☐ Yes ☑ No	
3.4.6	Surface water	☐ Yes ☑ No	
3.4.7	Indoor air	☐ Yes ☑ No	
3.4.8	Outdoor air	☐ Yes ☑ No	
3.4.9.		☐ Yes ☑ No	

3.5 Selection of Applicable Site Condition Standards

3.5.1 Is property within an area of natural significance? . . . . . ☐ Yes ☑ No

3.5.2 Does property:

- include or is adjacent to an area of natural significance? . . . . . ☐ Yes ☑ No
- include land that is within 30 metres of an area of natural significance? ☐ Yes ☑ No

3.5.3 Soil at the property has:

- pH value for surface soil less than 5 or greater than 9? . . . . . ☑ Yes ☐ No
- pH value for subsurface soil less than 5 or greater than 11? . . . . . ☐ Yes ☑ No

3.5.4 Is the property a shallow soil property? . . . . . ☑ Yes ☐ No

3.5.5 Does the property include or is the property adjacent to a water body or does it include land that is within 30 metres of a water body? . . . . . ☐ Yes ☑ No

3.5.6 What is the ground water condition for the property? . . . . . ☑ Potable ☐ Non-potable

3.5.7 What is the texture of the soil? . . . . . ☑ Coarse ☐ Medium or fine

If medium or fine, attach grain size analysis and rationale

3.5.8 What is the Assessment/Restoration approach? . . . ☐ Background ☑ Full-depth generic ☐ Stratified

3.5.9 What is the intended use of the property?

☐ Agricultural/Other ☑ Commercial ☑ Community ☐ Industrial

☐ Institutional ☑ Parkland ☑ Residential

3.6 Contaminant Inventory for the Media

Surface Soil (up to 1.5 metres) (Complete if using stratified approach)

Surface soil applicable

- ☐ Yes
- ☑ No

Soil pH Measured ☐ Not determined

Minimum

Maximum

Number of samples

Soil texture

- ☐ Coarse
- ☐ Medium or fine ►
- ☐ Not determined

If medium or fine, specify grain size analysis, figure showing grain size sampling locations and rationale for soil texture

Contaminant inventory for surface soil

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Measured Concentration	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS)	Potential for Exceedance of Applicable SCSs at Nearest Off-site Receptors?	Retained as a Contaminant for Risk Assessment?
See Full Depth Soil						☐ Yes ☐ No	☐ Yes ☐ No

Subsurface Soil (greater than 1.5 metres) (Complete if using stratified approach)

Subsurface soil applicable

- ☐ Yes
- ☑ No

Soil pH Measured ☐ Not determined

Minimum

Maximum

Number of samples

Soil texture

- ☐ Coarse
- ☐ Medium or fine ►
- ☐ Not determined

If medium or fine, specify grain size analysis, figure showing grain size sampling locations and rationale for soil texture

Contaminant inventory for subsurface soil

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Measured Concentration	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS)	Potential for Exceedance of Applicable SCSs at Nearest Off-site Receptors?	Retained as a Contaminant for Risk Assessment?
See Full Depth Soil						☐ Yes ☐ No	☐ Yes ☐ No

Full Depth Soil

Full depth soil applicable

- ☑ Yes
- ☐ No

Soil pH Measured ☐ Not determined

Minimum 6.6

Maximum 9.45

Number of samples 91

Soil texture

- ☑ Coarse
- ☐ Medium or fine ►
- ☐ Not determined

If medium or fine, specify grain size analysis, figure showing grain size sampling locations and rationale for soil texture

Contaminant inventory for full depth soil

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Measured Concentration	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS)	Potential for Exceedance of Applicable SCSs at Nearest Off-site Receptors?	Retained as a Contaminant for Risk Assessment?
See Table D-1 in Attachment D						☐ Yes ☐ No	☐ Yes ☐ No

Ground Water

Ground water applicable	How many ground water units are present to the depth of concern on the site?	Minimum depth to water table (in metres)
☑ Yes ☐ No	3, data for all units pooled for Risk Assessment	0.93

Is more than one aquifer impacted?	☑ Yes	☐ No	☐ Not determined
Vertical delineation for the Risk Assessment property shown on conceptual site model (CSM) cross-sectional figures?	☑ Yes	☐ No	
Lateral delineation for the Risk Assessment property shown on CSM plan view and cross-sectional figures?	☑ Yes	☐ No	
Does the plume extend off site?	☐ Yes	☐ No	☑ Not determined

Aquifer hydraulic conductivity (in metres per second)		Aquifer horizontal gradient (in metres per metres)	
2.4 x 10^-5	☐ Not determined	0.006 to 0.027	☐ Not determined

Contaminant inventory for ground water

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Measured Concentration	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS)	Potential for Exceedance of Applicable SCSs at Nearest Off-site Receptors?	Retained as a Contaminant for Risk Assessment?
See Table D-2 in Attachment D						☐ Yes ☐ No	☐ Yes ☐ No

Sediment

Sediment applicable ☐ Yes ☑ No

Contaminant inventory for sediment

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Measured Concentration	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS)	Potential for Exceedance of Applicable SCSs at Nearest Off-site Receptors?	Retained as a Contaminant for Risk Assessment?
						☐ Yes ☐ No	☐ Yes ☐ No

Vapour

Soil vapour applicable	Sub-slab vapour applicable	Indoor air applicable	Outdoor air applicable
☐ Yes ☑ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

Contaminant inventory for vapour

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Concentration (include unit of measure)	Number of Sample Locations	Number of Samples Analysed	Analytical Method	Minimum Detection Limit (MDL)	Maximum Detection Limit Unit (MDLU)

Other

Other applicable	If yes, specify
☐ Yes ☑ No	

Contaminant inventory

Note: If there is a contaminant not listed under the drop down menu, enter the chemical information and its contaminant identifier directly into the fields.

Contaminant	Contaminant Identifier	Maximum Concentration (include unit of measure)	Number of Sample Locations	Number of Samples Analysed	Analytical Method	Minimum Detection Limit (MDL)	Maximum Detection Limit Unit (MDLU)

4. Laboratory Information

Laboratory 1

Laboratory name
ALS Canada Ltd

Address

Street number	Qualifier (e.g., A)	Street name	Type	Direction
60		Northland	Road	

Unit/Suite number	Rural route	PO box	Postal station	City/Town
1				Waterloo

Province/State	Postal/Zip Code	Country
Ontario	N2V 2B8	Canada

Additional address information (if applicable)

Contact Person

Last name	First name
Mahadeva	Mathy

Telephone number (include country code if outside Canada)	Email address
519-886-6910 ext. 245	mathy.mahadeva@alsglobal.com

Medium tested by laboratory

	Medium	Was Medium Tested?		
1.	Surface soil layer	☐ Yes	☐ No	☑ Not applicable
2.	Subsurface soil layer	☐ Yes	☐ No	☑ Not applicable
3.	Full depth soil	☑ Yes	☐ No	☐ Not applicable
4.	Ground water	☑ Yes	☐ No	☐ Not applicable
5.	Soil vapour/sub slab	☐ Yes	☐ No	☑ Not applicable
6.	Sediments	☐ Yes	☐ No	☑ Not applicable
7.	Surface water	☐ Yes	☐ No	☑ Not applicable
8.	Indoor air	☐ Yes	☐ No	☑ Not applicable
9.	outside air	☐ Yes	☐ No	☑ Not applicable
10.		☐ Yes	☐ No	☐ Not applicable

Laboratory 2

Laboratory name
Maxxam Analytics

Address

Street number	Qualifier (e.g., A)	Street name	Type	Direction
6740		Campobello	Road	

Unit/Suite number	Rural route	PO box	Postal station	City/Town
				Mississauga

Province/State	Postal/Zip Code	Country
Ontario	L5N 2L8	Canada

Additional address information (if applicable)

Contact Person

Last name	First name
Cruz	Marijane
Telephone number (include country code if outside Canada)	**Email address**
905-817-5756 ext.	MCruz@maxxam.ca

Medium tested by laboratory

	Medium	Was Medium Tested?
1.	Surface soil layer	☐ Yes ☐ No ☑ Not applicable
2.	Subsurface soil layer	☐ Yes ☐ No ☑ Not applicable
3.	Full depth soil	☑ Yes ☐ No ☐ Not applicable
4.	Ground water	☑ Yes ☐ No ☐ Not applicable
5.	Soil vapour/sub slab	☐ Yes ☐ No ☑ Not applicable
6.	Sediments	☐ Yes ☐ No ☑ Not applicable
7.	Surface water	☐ Yes ☐ No ☑ Not applicable
8.	Indoor air	☐ Yes ☐ No ☑ Not applicable
9.	outside air	☐ Yes ☐ No ☑ Not applicable
10.		☐ Yes ☐ No ☐ Not applicable

5. Human Health Conceptual Site Model (HHCSM) – Potential Exposure Pathways for Proposed Property Use

Information in this section is intended to support the HHCSM, including any proposed barriers to exposure, as illustrated in diagrams attached to the PSF.

HHCSM *without* on site risk management measures – Receptors *on* the property

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Soil ingestion	☑	☑	☑	☑	☑	☑	☐	☐	☐
Soil inhalation	☑	☑	☑	☑	☑	☑	☐	☐	☐
Soil skin contact	☑	☑	☑	☑	☑	☑	☐	☐	☐
Ground water ingestion	☑	☑	☑	☐	☐	☐	☐	☐	☐
Ground water skin contact	☑	☑	☑	☐	☐	☐	☐	☐	☐
Surface water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Garden produce ingestion	☑	☑	☐	☐	☐	☐	☐	☐	☐
Livestock ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vapour inhalation	☑	☑	☑	☑	☑	☑	☐	☐	☐
Vapour skin contact	☑	☑	☑	☑	☑	☑	☐	☐	☐

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Other (specify) Vapour Inhalation - Trench	☐	☐	☑	☐	☐	☐	☐	☐	☐

HHCSM *without* on site risk management measures – Receptors *off* the property

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Soil ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil inhalation	☑	☑	☑	☑	☑	☑	☐	☐	☐
Soil skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ground water ingestion	☑	☑	☑	☐	☐	☐	☐	☐	☐
Ground water skin contact	☑	☑	☑	☐	☐	☐	☐	☐	☐
Surface water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Garden produce ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Livestock ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vapour inhalation	☑	☑	☑	☑	☑	☑	☑	☐	☐
Vapour skin contact	☑	☑	☑	☑	☑	☑	☑	☐	☐
Other (specify) Vapour Inhalation - Trench	☐	☐	☑	☐	☐	☐	☐	☐	☐

HHCSM *with* on site risk management measures – Receptors *on* the property

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Soil ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil inhalation	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ground water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ground water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Garden produce ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Livestock ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vapour inhalation	☑	☑	☑	☑	☑	☑	☐	☐	☐
Vapour skin contact	☑	☑	☑	☑	☑	☑	☐	☐	☐
Other (specify)	☐	☐	☐	☐	☐	☐	☐	☐	☐

HHCSM *with* on site risk management measures – Receptors *off* the property

Pathways	Resident – Adult	Resident – Child	Workers – Sub-surface	Workers – Long Term (Indoor)	Workers – Long Term (Outdoor)	Property Visitor – Recreational	Property Visitor – Trespassers	Other (specify)	Other (specify)
Soil ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil inhalation	☐	☐	☐	☐	☐	☐	☐	☐	☐
Soil skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ground water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Ground water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Surface water skin contact	☐	☐	☐	☐	☐	☐	☐	☐	☐
Garden produce ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Livestock ingestion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Vapour inhalation	☑	☑	☑	☑	☑	☑	☐	☐	☐
Vapour skin contact	☑	☑	☑	☑	☑	☑	☐	☐	☐
Other (specify) Vapour Inhalation - Trench	☐	☐	☑	☐	☐	☐	☐	☐	☐

6. Ecological Conceptual Site Model

Valued Ecological Components (VECs) and Potential Exposure Pathways for Proposed Property Use

List Endangered or Threatened Species on and off the property

	Common Name	Latin Name
1.	None identified, refer to Table H-1 in Attachment H	
2.		
3.		
4.		
5.		
6.		
7.		

	Common Name	Latin Name
8.		
9.		
10		
11		
12		

Habitat	Is the habitat present *on* the property?			Is the habitat present *off* the property?		
	Yes	No	Not determined	Yes	No	Not determined
Terrestrial						
Agricultural	☐	☑	☐	☐	☑	☐
Undisturbed natural	☐	☑	☐	☐	☑	☐
Man made	☑	☐	☐	☑	☐	☐
Aquatic						
Lakes/streams	☐	☑	☐	☑	☐	☐
Wetland	☐	☑	☐	☐	☑	☐
Bog (acid/alkaline)	☐	☑	☐	☐	☑	☐

Valued Ecological Components

☐ If Modified Generic Risk Assessment, the site specific Valued Ecological Components list is consistent with the list in the Approved Model.

Valued Ecological Components	List of Studied Species
Terrestrial Vegetation	
Crops	Not applicable
Trees/Shrubs	Limited quantities. To be represented by Manitoba Maple Trees.
Herbaceous	Limited quantities. To be represented by grasses.
Terrestrial Animals	
Invertebrates	Soil invertebrate community (for example, earthworms).
Mammals	To be represented by meadow vole, red fox, and short-tailed shrew.
Mammals with breeding habitat	To be represented by meadow vole, red fox, and short-tailed shrew.
Avian species	To be represented by the American Woodcock, Red-tailed Hawk, and Red-winged Blackbird.
Avian species with breeding habitat	To be represented by the American Woodcock, Red-tailed Hawk, and Red-winged Blackbird.
Reptiles/Amphibians	Various. Possible snakes (Eastern garter snakes).
Reptiles/Amphibians with breeding habitat	Various. Possible snakes (Eastern garter snakes).
Aquatic Vegetation	
Aquatic plant species	To be represented by sedges (Carex sp).
Trees/Shrubs/Bog plants	To be represented by sedges (Carex sp).
Aquatic Animals	

Valued Ecological Components	List of Studied Species
Invertebrates (water column)	To be represented by daphnia.
Invertebrates (benthic)	Not applicable.
Molluscs	Not applicable.
Amphibians	To be represented by Green Frog.
Amphibians with breeding habitat	To be represented by Green Frog.
Fish	To be represented by Common Shiner and Northern Pike.
Fish with spawning habitat	To be represented by Common Shiner and Northern Pike.

Terrestrial Ecological Pathways

Pathways	On the Property				Off the Property			
	Is this a potential pathway based on receptor characteristics, chemical characteristics and geological interpretation?		Is a man-made barrier or measure to interrupt this pathway present or anticipated?		Is this a potential pathway based on receptor characteristics, chemical characteristics and geological interpretation?		Is a man-made barrier or measure to interrupt this pathway present or anticipated?	
	Yes	No	Yes	No	Yes	No	Yes	No
Animals								
Dermal contact	☑	☐	☑	☐	☐	☑	☐	☑
Inhalation	☑	☐	☑	☐	☐	☑	☐	☑
Soil ingestion	☑	☐	☑	☐	☐	☑	☐	☑
Soil inhalation	☑	☐	☑	☐	☐	☑	☐	☑
Water ingestion	☐	☑	☐	☑	☐	☑	☐	☑
Ingestion of prey/food	☑	☐	☑	☐	☐	☑	☐	☑
Vegetation								
Root uptake of soil	☑	☐	☑	☐	☐	☑	☐	☑
Root uptake of surface water	☐	☑	☐	☑	☐	☑	☐	☑
Root uptake of ground water	☑	☐	☐	☑	☐	☑	☐	☑
Stem uptake of ambient air	☑	☐	☐	☑	☐	☑	☐	☑
Foliar uptake of ambient air	☑	☐	☐	☑	☐	☑	☐	☑
Other (specify) ▼								
	☐	☐	☐	☐	☐	☐	☐	☐

Aquatic Ecological Pathways

Pathways	On the Property		Off the Property	
	Is this a potential pathway based on receptor characteristics, chemical characteristics and geological interpretation?	Is a man-made barrier or measure to interrupt this pathway present or anticipated?	Is this a potential pathway based on receptor characteristics, chemical characteristics and geological interpretation?	Is a man-made barrier or measure to interrupt this pathway present or anticipated?

	Yes	No	Yes	No	Yes	No	Yes	No
Aquatic Animals								
Dermal contact	☐	☑	☐	☑	☑	☐	☐	☑
Gill uptake	☐	☑	☐	☑	☑	☐	☐	☑
Water ingestion	☐	☑	☐	☑	☑	☐	☐	☑
Prey/food ingestion	☐	☑	☐	☑	☑	☐	☐	☑
Aquatic Vegetation								
Root uptake from sediment	☐	☑	☐	☑	☑	☐	☐	☑
Root uptake of surface water	☐	☑	☐	☑	☑	☐	☐	☑
Stem/foliar uptake of surface water	☐	☑	☐	☑	☑	☐	☐	☑
Foliar uptake of ambient air	☐	☑	☐	☑	☑	☐	☐	☑
Other (specify) ▼								
	☐	☐	☐	☐	☐	☐	☐	☐

7. Conceptual Site Model (Schedule C, Subsection 3 (8) of O. Reg. 153/04)

Each regulatory requirement listed below must be met. It is recommended that the Conceptual Site Model follow the order below.

Subsection Reference No.	Description	Yes	Not Applicable
3 (8)	The pre-submission form must include information on the proposed conceptual site model that the qualified person intends to rely upon in the preparation of the parts of the Risk Assessment (RA) report described in Report Section 3, Report Section 4 and Report Section 5 of Table 1 of this Schedule including,		
3 (8)(a)	a description and assessment of,	☑	☐
3 (8)(a)(i)	areas of potential environmental concern, and	☑	☐
3 (8)(a)(ii)	any subsurface structures and utilities on, in or under the RA property that may affect contaminant distribution and transport;	☑	☐
3 (8)(a.1)	a description of and, as appropriate, figures illustrating, the physical setting of a RA property and any areas under it including,	☑	☐
3 (8)(a.1)(i)	stratigraphy from ground surface to the deepest aquifer or aquitard investigated,	☑	☐
3 (8)(a.1)(ii)	hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants is present at concentrations above the applicable site condition standards, lateral and vertical hydraulic gradients,	☑	☐
3 (8)(a.1)(iii)	approximate depth to bedrock,	☑	☐
3 (8)(a.1)(iv)	approximate depth to water table,	☑	☐
3 (8)(a.1)(v)	any respect in which section 41 or 43.1 of the regulation applies to the property,	☑	☐
3 (8)(a.1)(vi)	areas where soil has been brought from another property and placed on, in or under the RA property, and	☑	☐
3 (8)(a.1)(vii)	approximate locations, if known, of any proposed buildings and other structures;	☑	☐
3 (8)(a.2)	where a contaminant is present on, in or under a RA property at a concentration greater than the applicable site condition standard, identification of,	☑	☐

Subsection Reference No.	Description	Yes	Not Applicable
3 (8)(a.2)(i)	each area where a contaminant is present on, in or under a RA property at a concentration greater than the applicable site condition standard,	☑	☐
3 (8)(a.2)(ii)	the contaminants associated with each of the areas referred to in subclause (i), and	☑	☐
3 (8)(a.2)(iii)	each medium in which a contaminant associated with an area referred to in subclause (i) above is present;	☑	☐
3 (8)(a.3)	where a contaminant is present on, in or under a RA property at a concentration greater than the applicable site condition standard, a description of,	☑	☐
3 (8)(a.3)(i)	what is known about each of the areas referred to in subclause (a.2) (i),	☑	☐
3 (8)(a.3)(ii)	the distribution, in each of the areas referred to in subclause (a.2) (i), of each contaminant present in the area at a concentration greater than the applicable site condition standard, for each medium in which the contaminant is present, together with figures showing the distribution,	☑	☐
3 (8)(a.3)(iii)	anything known about the reason for the discharge into the natural environment of the contaminants present on, in or under the RA property at a concentration greater than the applicable site condition standard,	☑	☐
3 (8)(a.3)(iv)	anything known about migration away from any area of potential environmental concern of the contaminants present on, in or under the RA property at a concentration greater than the applicable site condition standard, including the identification of any preferential pathways,	☑	☐
3 (8)(a.3)(v)	climatic or meteorological conditions that may have influenced distribution and migration of the contaminants, such as temporal fluctuations in ground water levels, and	☑	☐
3 (8)(a.3)(vi)	if applicable, information concerning soil vapour intrusion of the contaminants into buildings including,	☐	☑
3 (8)(a.3)(vi)(A)	relevant construction features of a building, such as a basement or crawl space,	☐	☑
3 (8)(a.3)(vi)(B)	building heating, ventilating and air conditioning design and operation, and	☐	☑
3 (8)(a.3)(vi)(C)	Subsurface utilities;	☐	☑
3 (8)(a.4)	where contaminants on, in or under the RA property are present at concentrations greater than the applicable site condition standard, one or more cross-sections showing,	☑	☐
3 (8)(a.4)(i)	the lateral and vertical distribution of a contaminant in each area where the contaminant is present at a concentration greater than the applicable site condition standard in soil, ground water and sediment,	☑	☐
3 (8)(a.4)(ii)	approximate depth to water table in each area referred to in subclause (i),	☑	☐
3 (8)(a.4)(iii)	stratigraphy from ground surface to the deepest aquifer or aquitard investigated, and	☑	☐
3 (8)(a.4)(iv)	any subsurface structures and utilities that may affect contaminant distribution and transport in each area referred to in subclause (i);	☐	☑
3 (8)(b)	for each area where a contaminant is present on, in or under the RA property at a concentration greater than the applicable site condition standard for the contaminant, a diagram identifying, with narrative explanatory notes,	☑	☐
3 (8)(b)(i)	the release mechanisms,	☑	☐
3 (8)(b)(ii)	contaminant transport pathway,	☑	☐
3 (8)(b)(iii)	the human and ecological receptors located on, in, under and off the RA property,	☑	☐
3 (8)(b)(iv)	receptor exposure points, and	☑	☐

Subsection Reference No.	Description	Yes	Not Applicable
3 (8)(b)(v)	routes of exposure;	☑	☐
3 (8)(c)	with explanatory notes, showing the biota and food web relationships on and off the RA property which may be affected by contaminants on, in or under the RA property.	☑	☐

8. Risk Assessment Team (including sub-consultants)

Discipline	Name (Last, First Name)	Corporate Affiliation/Partnership/ Employer	Telephone	Email Address
Human Health	Appleby, Katherine Barfoot, Krista Wilson, Brandi	Jacobs Engineering Group Inc.	519-579-3500	katherine.appleby@jacobs.com
Ecology	Appleby, Katherine Kroetsch, James Pilgrim, Nicole	Jacobs Engineering Group Inc.	519-579-3500	katherine.appleby@jacobs.com
Hydrogeology	Meyer, Patty Brook, Jacqueline	Jacobs Engineering Group Inc.	416-499-9000	Patty.Meyer@jacobs.com
Engineering (as needed)	Cooley, Wayne	Jacobs Engineering Group Inc.	519-579-3500	wayne.cooley@jacobs.com
Other (specify) QPESA	Taves, Ed	Jacobs Engineering Group Inc.	519-579-3500	ed.taves@jacobs.com
Other (specify) QPRA	Appleby, Katherine	Jacobs Engineering Group Inc.	519-579-3500	katherine.appleby@jacobs.com

Supporting Information

Document Description	Document Name	Number of Copies Provided	Hard Copies Attached?	Electronic Version Attached?
Phase two conceptual site model (CSM)	Attachment B	4	☑ Yes ☐ No	☑ Yes ☐ No
Human health CSM and ecological CSM (with and without risk management measures)	Attachment E	4	☑ Yes ☐ No	☑ Yes ☐ No
Plan of survey, legal description/ lawyer's letter	Attachment G	4	☑ Yes ☐ No	☑ Yes ☐ No
Certificate of Status (Qualified Person (QP)/QP firm)	Attachment H	4	☑ Yes ☐ No	☑ Yes ☐ No
For non-potable groundwater: notification to the municipality and any correspondence	Not applicable	-	☐ Yes ☑ No	☐ Yes ☑ No
If soil texture is identified as Medium or Fine, please include grain size analysis, figure showing grain size sampling locations, and rationale for soil texture selection.	Not applicable	-	☐ Yes ☑ No	☐ Yes ☑ No
Other (specify) Phase One and Two Summaries	Attachment A	4	☑ Yes ☐ No	☑ Yes ☐ No
Other (specify) Sampling and Analysis Plan	Attachment C	4	☑ Yes ☐ No	☑ Yes ☐ No
Other (specify) Data Set	Attachment D	4	☑ Yes ☐ No	☑ Yes ☐ No

Document Description	Document Name	Number of Copies Provided	Hard Copies Attached?	Electronic Version Attached?
Other (specify) Toxicity Reference Values	Attachment F	4	☑ Yes ☐ No	☑ Yes ☐ No
Other (specify) Risk Assessment Team	Attachment H	4	☑ Yes ☐ No	☑ Yes ☐ No

9. Public Communication

Will there be public communication? . . . . . ☑ Yes ☐ No ☐ Not applicable

Has the appropriate ministry district office been notified? . . . . . ☑ Yes ☐ No ☐ Not applicable

10. Business Contact Information (Qualified Person conducting the Risk Assessment)

(Complete as applicable)

Note: It is an offence to submit false or misleading information.

Name of Qualified Person

Last name	First name
Appleby	Katherine

Employer/Business Name
Jacobs Engineering Group Inc.

Business Address

Street number	Qualifier (e.g., A)	Street name	Type	Direction
72		Victoria	Street	South

Unit/Suite number	Rural route	PO box	Postal station	City/Town
300				Kitchener

Province/State	Postal/Zip code	Country
Ontario	N2G 4Y9	Canada

Additional address information (if applicable)

Telephone number (include country code if outside Canada)	Fax number (include country code if outside Canada)
519-579-3500 ext. 73281	519-579-8986

Email address
katherine.appleby@jacobs.com

11. Modified Generic Risk Assessment (MGRA) Approved Model

This section to be completed only if intending to submit MGRA in respect of the Risk Assessment property.

☐ **Pathway Modifier: Modify Solubility Component Values (for Petroleum Hydrocarbons (PHC) F1 and PHC F2)**

1) Was ground water collected for PHC analysis using a low-flow sampling method? . . . . . ☐ Yes ☐ No

2) Was ground water collected for PHC analysis no more than 30 cm below the water table? . . . . ☐ Yes ☐ No

3) Has groundwater flow direction been determined based on the minimum requirements for ground water sampling (with respect to monitoring frequency) set out in Schedule E, Table 4, Assumption Category 4? . . . . . ☐ Yes ☐ No

4) If the contaminant source of the PHC exceedance has not been removed from the Risk Assessment property, how far apart were the monitoring wells used to delineate PHC F1 and/or F2?

☐ **Risk management measure: no ground water use**

Note: "Well" marked with an asterisk (*) in this measure, is defined in subsection 35 (1) of the Regulation. It does not include holes such as:

- a hole solely intended to test or to obtain information in respect of groundwater or an aquifer, or
- a hole solely made to lower or control the level of groundwater in the area of the hole or to remove material that may be in the groundwater.

This risk management measure applies only to wells as defined in subsection 35 (1).

1a) Is the GW1 (drinking water component value) component value (i.e., Ontario Drinking Water Quality Standard) met down-gradient of all known exceedances of the applicable generic standard at the Risk Assessment property? . . . . . ☐ Yes ☐ No

1b) Will the GW1 component value likely be met at the nearest off-site human receptors? . . . . . ☐ Yes ☐ No

1c) Are there any water well* records within a radius of 250 metres from the boundary of the Risk Assessment property, as identified in the phase 1 environmental site assessment report? . . . . ☐ Yes ☐ No

1d) Have you carried out any other activities to identify other potable wells* not captured by water well records? . . . . . ☐ Yes ☐ No

If yes, does the information identify other potable wells not captured by water well records? . . . ☐ Yes ☐ No

2) Are the Risk Assessment property and all other properties located, in whole or in part, within 250 metres of the boundaries of the Risk Assessment property, supplied by a municipal drinking water system, as defined in the *Safe Drinking Water Act, 2002*? . . . . . ☐ Yes ☐ No

3a) Is the Risk Assessment property in, or within, 250 m any of the following, as set out in the Assessment Report portion of the applicable Source Protection Plan under the *Clean Water Act, 2006* (as per source water protection mapping available through local Conservation Authorities):

Note: For definitions, see the *Clean Water Act, 2006*

- A designated well head protection area (WHPA) . . . . . ☐ Yes ☐ No

  If yes, identify the WHPA classification (A through F) **and** aquifer vulnerability score

  _____

- A significant groundwater recharge area (SGRA) . . . . . ☐ Yes ☐ No
- A highly vulnerable aquifer (HVA) . . . . . ☐ Yes ☐ No
- An issues contributing area (ICA) . . . . . ☐ Yes ☐ No
- A Source Water Intake Protection Zone (IPZ) . . . . . ☐ Yes ☐ No

3b) Have you attached a map showing the Risk Assessment property in relation any Source Water Protection Areas identified above? . . . . . ☐ Yes ☐ No

4) Have you consulted with the appropriate Ministry District Office on the proposal to use the "No Ground Water Use risk management measure" at the Risk Assessment property?. . . . . ☐ Yes ☐ No

Note: One of the outcomes of the Ministry's detailed review of the RA may still be the conclusion that ground water monitoring is warranted for the Risk Assessment property, and, therefore, the Risk Assessment cannot be classified as an Modified Generic Risk Assessment.

5a) Has the Municipality been notified that the Risk Assessment assumes that the ground water under the Risk Assessment property does not or will not serve as a raw water supply for a drinking water system, in accordance with Schedule C, subsection 4(5)? . . . . . ☐ Yes ☐ No

Location of notification

_____ Please attach the notification.

5b) Has Municipality responded? . . . . . ☐ Yes ☐ No

If yes, provide response

_____

Location of response

_____

☐ **Any pathway modifier or risk management measure that modifies the GW2 (the protection of indoor air from vapours originating from groundwater component) component value**

- ☐ Building with storage garage
- ☐ Building prohibition
- ☐ Building with no first storey residential use

☐ Soil vapour intrusion mitigation system

☐ Soil vapour screening level met for ground water source

☐ Building with minimum first storey ceiling height requirement

1) Will the applicable full depth site condition standards likely be met at the nearest off-site human receptors? . . . . . ☐ Yes ☐ No

2) Have you consulted with the appropriate Ministry of the Environment and Climate Change District Office regarding your assessment of the likelihood for vapour intrusion to occur off-site? . . . . . ☐ Yes ☐ No

☐ **Modified Subsurface Worker Protection (where the S3 pathway is modified for an inorganic chemicals of concern (COC)**

1) Did you do leachate testing for inorganics? . . . . . ☐ Yes ☐ No

If yes, what leachate test did you use?

☐ Synthetic Precipitation Leaching Procedure (SPLP)

☐ Toxicity Characteristic Leaching Procedure (TCLP)

2) Did the results meet the values generated by the Approved Model? ["Tier 2 Input" tab, Cell A61-C66] . . . . . ☐ Yes ☐ No

Attachment A
Phase One and Two ESA Summaries

Attachment A1
Phase One ESA Summary

ATTACHMENT A1

CH2M HILL Phase One Environmental Site Assessment Summary

This attachment summarizes the results and conclusions of the CH2M HILL Canada Limited (CH2M) Draft Phase One Environmental Site Assessment (ESA) document entitled *Phase One Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph, Ontario*, dated August 18, 2017 (CH2M, 2017).

City of Guelph (City) retained CH2M to complete a Phase One ESA in 2017 for the property identified as the former International Malleable Iron Company (IMICO) foundry facility, located at 200 Beverley Street in Guelph, Ontario (Site). The Site is approximately 5.2 hectares in size and is located east of the City's downtown. It is CH2M's understanding that the Phase One ESA has been requested in support of the potential redevelopment of the Site from an industrial use, to residential/ parkland/ institutional land use purposes. This change in land use required a Record of Site Condition (RSC). The Site and the Phase One Study Area (defined as lands located within 250 metres [m] of the Site) are shown on Figures 2-1 and 2-2. The Phase One Study Area was expanded beyond 250 m from the Site (as shown on Figure 2-1) to include the following land:

i) To the north to include entire industrial and commercial properties located on Elizabeth Street and Victoria Road South;

ii) To the east to include entire industrial and commercial properties located along Victoria Road South and York Road; and

iii) To the south to include entire properties which appear to be former industrial and commercial properties located along the east side of Morris Street and north side of York Road.

The purpose of the Phase One ESA was to assess the Site and the Phase One Study Area in accordance with the defined terms of Ontario Regulation (O.Reg.) 153/04, as amended, for potentially contaminating activities (PCAs) to identify areas of potential environmental concern (APECs). To accomplish these goals, CH2M used a combination of activities, (such as records review, site visits, and interviews) to identify areas on or near the Phase One Property that may warrant further investigation. The Phase One ESA included the following components:

- Records review
- Interviews
- Site reconnaissance
- Evaluation of the information gathered from the records review, interviews, and site reconnaissance
- Preparation of a Phase One ESA report
- Submission of the Phase One ESA report to the owner of the Phase One Property

The Phase One ESA was completed to satisfy the requirements for Phase One ESAs as specified within O. Reg. 153/04 (MECP, 2011a), to facilitate the potential redevelopment of the Site, including the development of a subsequent Phase Two ESA Program.

The Phase One ESA findings were used to support the development of a subsequent Phase Two ESA investigation for the Site to assess the subsurface environmental conditions and assist in the development of a recommended remedial or risk management strategy that may be considered for ongoing use or redevelopment of the Site.

Current and Past Uses

Based on information obtained from the records review and interviews, the Site was considered to be first developed in 1913 when it was acquired by IMICO for use as an iron-jobbing foundry. Historical onsite buildings/structures and areas were identified from fire insurance plans (FIPs) and site plans in previous reports including the foundry, annealing room, chipping room, galvanizing buildings, warehousing, storage (coal, sand, bricks, polychlorinated biphenyl [PCB] materials), paint shop and offices.

The foundry closed in 1989, and the site was generally vacant from that time on, with the exception of some reported community-type occupancy of the Site during the time of the Assembly of the Church of the Universe ownership (1993 to 1997). A number of fires occurred during this period, and in 1997 the City took over the Site. Demolition of the buildings and removal of various wastes from the Site (including some excavated soil and PCB materials and a large above-ground storage tank [AST]) occurred in 1998 through 1999. The Site is currently vacant with no onsite operations occurring. No buildings or structures are located onsite, however the majority of the concrete floors, foundations and footings of historical buildings remained onsite at the time of the site reconnaissance (June 21 and 29, 2017).

Table 7.1-1 summarizes the current and historical land uses at the Phase One Property, based on the results of the records review, and this table includes the inferred historical occupant or activity.

Environmental Reports

The City provided CH2M with the environmental reports that had been previously completed for the Phase One Property. The intent of the environment report review was to identify key environmental concerns regarding actual and potential areas of environmental concern within the Site and its adjacent properties.

The report list has been provided as Table 4.1.5-1, with a brief summary of each investigation or study.

Potentially Contaminating Activities

Based on a review of historical environmental reports, aerial photographs, FIPs, chain of title searches, city directories, interviews, an EcoLog Environmental Risk Information Service (ERIS) database search, and site reconnaissance, the Phase One ESA identified PCAs or historical land uses of potential environmental interest on the Site.

The following PCAs were identified on the Phase One Property, and resulted in an APEC:

- 8 – Chemical Manufacturing, Processing and Bulk Storage
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 30 – Importation of Fill Material of Unknown Quality
- 32 – Iron and Steel Manufacturing and Processing
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing and Bulk Storage
- 46 – Rail Yard, Tracks and Spurs
- 55 – Transformer Manufacturing, Processing and Use

The following PCAs were identified off the Phase One Property, but within the Phase One Study Area:

- 8 – Chemical Manufacturing, Processing and Bulk Storage
- 10 - Commercial Autobody Shops

- 11 - Commercial Trucking and Container Terminals
- 12 - Concrete, Cement and Lime Manufacturing
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 37 - Operation of Dry Cleaning Equipment (where chemicals are used)
- 39 – Paints Manufacturing, Processing and Bulk Storage
- 43 - Plastics (including Fibreglass) Manufacturing and Processing
- 45 - Pulp, Paper and Paperboard Manufacturing and Processing
- 47 – Rubber Manufacturing and Processing
- 49 - Salvage Yard, including automobile wrecking
- 54 - Textile Manufacturing and Processing
- 55 – Transformer Manufacturing, Processing and Use
- 57 - Vehicles and Associated Parts Manufacturing

Figure 7-2 shows the locations of the identified APECs as a result of the PCAs.

Areas of Potential Concern

The identified PCAs results in 33 APECs that CH2M considered to have the potential for subsurface environmental impacts to the Site. Of these, 29 APECs on the Site are considered to be attributable to onsite PCAs, and 4 APECs are considered attributable to offsite PCAs within the Phase One Study Area. The APEC locations are presented in Figure 7-2, and summarized in Table 7.3-1. Contaminants of potential concern (COPCs) have been identified for each APEC in Table 7.3-1 based on the historical operations and type of PCA associated with each APEC.

The identified APECs are summarized as follows:

1. Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS, 2014a). Foundry sands were predominantly located in the concrete pits and sumps of the main Foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech, 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the northwest corner of the building and drained to the truck bay (P&R, 1991).
2. Machine Shop - A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945 and 1960 showed this area changed operations to 'Shipping', and a 'Pattern Shop'.
3. Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the north wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't'. The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or underground storage tanks (USTs) for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of

fuel oil fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the north side of the Annealing Room.

4. Sand Storage - The 1916 FIP shows a 'Sand Shed'. The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand'. The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks', and an additional area to the north labeled 'Sand'. No information was identified to if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.

5. Galvanizing Building - A small free standing building for 'Galvanizing' was present on the southeast portion of the Site as shown on the 1916, 1929 and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.

6. Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946 and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior west side of the building.

7. Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil", and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the north building remaining, but is not labeled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R, 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech, 1999).

8. Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labeled as a 'time office'), but does not show the UST. The gasoline use is not known; however, it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R, 1991).

9. Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil". The building/structure is not on 1916 FIP where the area is shown as exterior yard area, and is not present on the 1960 FIP where the area is occupied.

10. Machine Shop - A machine shop is shown on the 1929, 1946 and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as

noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop.

11. Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed in wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS, 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product, but has had concentrations of petroleum hydrocarbons (PHCs) increasing since the annual monitoring at this location began in 2016, up to 850,000 micrograms per litre (µg/L) of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25 percent of the sampling events between 2005 and 2016.
12. Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.
13. Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929 and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.
14. Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.
15. Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) do not have an indication of the buildings use.
16. Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPs (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.
17. Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigation site plan, and later remediated as part of the Earth Tech demolition

(P&R, 1991; Earth Tech, 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 micrograms per gram (µg/g). Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated VOCs and PHCs (mainly F3) greater than the applicable potable water criteria (Table 6 Standards) (DCS, 2007b, 2014b; AECOM 2017a, 2017b)

18. Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R, 1991; DCS, 2007a).
19. Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.
20. Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the west side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.
21. Coal Storage - The 1960 FIP indicates coal storage south of the garage on the west side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labeled as coal.
22. Transformer - A 1200-volt transformer is shown on the 1991 Site Plan (P&R, 1991).
23. Paint Shop - First shown on the P&R Site plan, a paint shop was located at the north end of the site, between the shipping building and the storage area (P&R, 1991). Drums were stored against the north wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.
24. PCB Storage Area - An area located at the northeast corner of the finishing and annealing room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as 'storage' (P&R, 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech, 1999). Confirmatory samples below the pad were 0.63 µg/g and less than 0.05 µg/g. The soil was later excavated to bedrock as part of the soil remediation in the northeast corner of the property (see APEC-11).
25. Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities which occurred along the north property boundary (P&R, 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.
26. Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report

indicated non-detect concentrations of PCBs. Similarly, one location installed during the DCS Phase II ESA (2007b) indicated non-detect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.

27. Former Electrical Shop - A small electrical shop was noted to be on the southwest corner of the foundry (P&R, 1991). This addition was not shown on the FIPs from previous years, and was shown as the exterior yard area west of the foundry.
28. Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site Plan (P&R, 1991).
29. Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag and cinders (up to 1.0 m) was found across the site (P&R, 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS, 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R, 1991).
30. Potential Impacts from Adjacent Properties to the North – historical and current operations on properties to the north have the potential to impact the Phase One Property, including: rail lines, paper manufacturing, auto body repair shops, gasoline station, trucking company, concrete products manufacturing, plastic products manufacturing, electroplating company, window/door manufacturing, paint application and scrap yard.
31. Potential Impacts from Adjacent Properties to the East – historical operations on the property to the east have the potential to impact the Phase One Property, including: steel manufacturing, foundry operations, packing manufacturing, potential USTs, bulk fuel storage, scrap yard, chemical manufacturer/distribution, and transformer use,
32. Potential Impacts from Adjacent Properties to the South – historical operations on properties to the south have the potential to impact the Phase One Property, including: metal product manufacturing, potential USTs, and transportation company.
33. Potential Impacts from Adjacent Properties to the West – historical operations on properties to the west have the potential to impact the Phase One Property, including: window manufacturing, metal treatment, metal product manufacturing, former refractory facility, and motor vehicle part manufacturing.

Soil and Groundwater Quality from Previous Investigations

The Phase One ESA identified areas on the Site where previous subsurface investigations had identified contaminants of concern in soil and groundwater at concentrations exceeding the Ontario Ministry of the Environment, Conservation and Parks' (MECP's) *Table 6 Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* for Residential/ Parkland/ Institutional/ Industrial/ Commercial/ Community property use and coarse textured soils, which are specified in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* dated April 15, 2011 (Table 6 Standards) (MECP 2011b). Analytical results were summarized from previous investigations conducted by P&R (1991), Gartner Lee (1999), AECOM (2010 to 2016), Earth Tech (1999), DCS (2007 and 2014) and WSP (2016).

Soil Quality

Previous soil investigations were conducted on the Site by P&R (1991), Gartner Lee (1999), Earth Tech (1999), DCS (2007 and 2014) and WSP (2016) and indicated soil exceedances of the Table 6 Standards

for metals and inorganics, volatile organic compounds (VOCs), PHCs, polycylic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The following points summarize the findings of these investigations:

- Inorganic and metals exceedances were widespread across the Site. The predominant chemical found was zinc, with concentrations over 10,000 µg/g found in the northeast corner of the Site in the area of the former galvanizing/plating building. The area was excavated to bedrock in 1999 and backfilled with granular 'B' material (Earth Tech, 1999). Soil samples collected in the area after remediation indicate exceedances of zinc, cadmium, cyanide and lead. Exceedances over the remainder of the Site other than zinc were mostly due to lead and cadmium.
- VOC concentrations that were detected above the Table 6 Standards were limited to benzene, toluene, ethylbenzene, xylene (BTEX), tetrachloroethylene (PCE), and trichloroethylene (TCE) at five locations. Benzene, ethylbenzene and xylene had marginal exceedances in the area of the former maintenance garage; benzene had a marginal exceedance south of the PCB capacitor room; and TCE and PCE were detected at low concentrations (under 1 µg/g) at three locations near the northeast property line.
- Locations where PHCs were analyzed in accordance with current methodology were limited to five boreholes and ten test pits sampled by DCS in 2007 and 2014. Concentrations detected above the Table 6 Standards were found for F3 in two locations: southeast of the former capacitor room and south of the northeast excavation. Older hydrocarbon analyses showed elevated concentrations near the former maintenance garage, in the area of the former fuel ASTs, the paint shop, the southwest end of the foundry and at the northeast excavation area. Confirmatory wall samples of the excavation indicated remaining elevated TPH concentrations.
- PAHs were detected at concentrations above the Table 6 Standards at approximately 30 percent of the locations analyzed. Exceedances were found at various locations across the Site, including samples from the excavated soil at the northeast portion of the Site. The highest concentrations were found southeast of the former capacitor room at concentrations up to 900 µg/g.
- PCB concentrations above the Table 6 Standards were found in the area of the former maintenance garage, at confirmatory samples from the PCB remediation in the former capacitor room, and southwest of the former machine shop. Concentrations were found up to 10 µg/g.

Groundwater Quality

Previous investigations were conducted by P&R (1991), Gartner Lee (1999 and 2004), AECOM (2010 to 2016) and WSP (2016), and indicated groundwater exceedances of the Table 6 Standards for metals and inorganics, VOCs, PHCs, PAHs, and PCBs. Full site characterization for all monitoring wells and parameter groups has not been conducted since 1998. Subsequent sampling has focused on the east portion of the Site for the primary COCs, with annually sampling conducted by AECOM since 2010. The following points summarize the findings of the investigations:

- Metal and inorganic exceedances detected on the Site were mainly due to zinc which has exhibited exceedances over most of the Site. The highest concentrations of metals were generally found in the northeast corner of the property by the former galvanizing building. Prior to the excavation zinc was measured up to 42,000 µg/L; after remediation, concentrations of zinc were found up to 3,200 µg/L. Lead was found at four locations across the Site exceeding the Table 6 Standard with concentrations up to 32 µg/L. Thallium, arsenic, barium and cadmium were found in localized areas along the southeast and southwest property boundary. Other metal exceedances were limited samples collected within the northeast corner prior to excavation (antimony, beryllium, chromium, cobalt, copper, mercury, molybdenum, nickel and vanadium).

- VOC exceedances detected on the Site were mainly chlorinated VOCs and BTEX parameters. The chlorinated VOCs were found mainly on the eastern portion of the Site, with high concentrations for TCE, cis- and trans- 1,2-dichloroethylene (DCE), and vinyl chloride. Lower concentrations of TCE were found over most of the central and eastern portions of the Site. Other than historical detections prior to the northeast excavation, trichloroethane (TCA) and derivatives were found on the south portion of the Site with the highest concentrations downgradient of the former electrical shop at 140 µg/L. The highest concentrations of BTEX were measured in the northeast portion of the property, from sampling events prior to the soil excavation in the area. BTEX concentrations on the remainder of the property was below the Table 6 Standards with the exception of one location in the vicinity of the former UST.
- Of the samples where PHCs were analyzed in accordance with current methodology, seven locations had exceedances of the Table 6 standards. Most of these were located in the eastern portion of the Site, with the exception of one located in the vicinity of the former capacitor room. Free product has been observed at OW23S on multiple occasions. Older hydrocarbon analyses indicated elevated concentrations in the northeast area that was excavated, near the former maintenance garage, in the vicinity of the former ASTs, and near the south property corner
- PAHs were found exceeding the Table 6 Standards in 8 locations onsite. The greatest concentrations were from pre-excavation samples collected in the northeast area of the Site, up to 229,000 µg/L. Concentrations post-remediation were found up to 280 µg/L. Elevated concentrations were also found at OW23S where free product has been detected. Other areas across the Site reported detected concentrations below 3 µg/L.
- Of 16 locations where PCBs were analyzed, one location exceeded the Table 6 Standards, located southeast of the foundry. The PCB remediated area of the former capacitor room reported concentrations of 1.27 µg/L.

Phase One Conceptual Site Model

A conceptual site model (CSM) was prepared for the Site. The following bullets summarize the principal elements of the CSM:

- Buildings do not exist on the Phase One Property. Historical building foundations and other potential below grade structures remain. No buildings were known to have basements; however, based on historical reports, pits and sumps were present throughout the foundry.
- Waterbodies do not exist within the Phase One Study area. The closest water body to the Site is the Eramosa River which is approximately 0.5 km southeast of the Site and travels 1.4 km before running into Speed River as shown on Figure 2-1.
- There are no areas of natural and scientific interest within the Phase One Study Area based on presently available information.
- No existing drinking water wells were identified on the Phase One Property. Thirty wells indicated as water supply or domestic use wells were identified within 1 km of the Site. All wells were found to be located outside the Phase One Study Area. All water wells within 1 km of the Site are shown on Figure 4-4.
- Figure 6-1 presents the roadways and land use within the Phase One Study Area.
- Based on the Phase One ESA, a number of PCAs occurred in the Phase One Study Area which are summarized within the APECs in Table 7.3-1, and locations shown on Figure 7-1.

- Based on the Phase One ESA, 29 PCAs were identified onsite and have been identified as APECs. Four APECs associated with offsite PCAs within the Phase One Study Area have been interpreted to have the potential to impact the Phase One Property. The areas where these 33 APECs are interpreted to have potential impacts are shown on Figure 7-2.
- The COPCs identified within the Phase One Study Area include metals and inorganics, VOCs, PHCs, PAHs, PCBs, acid base neutral components (ABN) and CPs. This list includes COPCs that are confirmed to be present based on historical investigations. Based on previous reports and contaminant concentrations, there is a potential for free phase product to exist on the Site.
- Although utilities have been disconnected onsite, piping and bedding have not been removed and, therefore, there is a potential for utility corridors to be providing a preferential route of contaminant migration.
- The Site topography varies from approximately 315 and 316.5 masl based on topographic information and previous investigations completed at the Site. The Site and surrounding lands generally slope southeast to the Eramosa River.
- Geology from previous investigations indicate subsurface materials consisting of fill (varying from 0.3 to 3.2 m deep), underlain by native silty fine sand. The approximate bedrock depth based on past investigations on the Site was 2.0 mbgs (elevation of 313.5 masl), and ranged from approximately 0.7 m to 3.4 mbgs (elevation of 312.7 to 315.0 masl). The bedrock was described as dolostone, grey, porous and highly fractured with a rock quality index indicating it is highly weathered and fractured (GLL, 1999).

i) The regional geology indicates the Phase One Study Area consists of “silt to sandy silt matrix, becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward” (OGS, 2000), and bedrock of the Guelph Formation, consisting of sandstone, shale, dolostone, siltstone (OGS, 1991). The bedrock elevation is approximately 305 masl based on *OGS Preliminary Map P.2224, Guelph Area, Southern Ontario, Bedrock Topography Series* (Karrow, 1979).

- Groundwater levels at the Site have been measured during previous investigations between 2.02 and 4.13 mbgs (310.84 to 316.40 masl) with an inferred groundwater flow direction to the south, toward the Eramosa River.

This information has also been summarized in Table 7.4-1.

Based on the uncertainties documented in the Phase One ESA (CH2M, 2017), it is possible that a PCA/APEC or land use has not been identified within the individual components of the Phase One ESA. Information was gathered from numerous sources (including aerial photographs, City Directories, database searches, historical reports, interviews, and site reconnaissance), which decreases the chance that a major PCA or land use was not identified in the Phase One ESA. Many aspects of the CSM have been previously studied and verified through subsurface investigations (for example, groundwater flow direction); these aspects are not directly affected by the noted uncertainties.

Phase One ESA Conclusions

Based on the findings of the Phase One ESA investigation (CH2M, 2017), potential and confirmed impacts exist at Site, and a Phase Two ESA will be required before an RSC can be filed. Previous subsurface investigations have been completed onsite and have documented that its subsurface quality does not meet O. Reg. 153/04, as amended, standards for the proposed redevelopment with more sensitive land uses. Additional subsurface characterization and associated environmental work is required before an RSC is filed.

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Tables

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
Environmental Investigation, International Malleable Iron Company, 200 Beverley Street, Guelph Ontario	June 10, 1991	Proctor & Redfern Limited	The Bank of Montreal	An environmental investigation, including a background review, was conducted onsite that incorporated a preliminary investigation conducted by P&R in 1989. The background review included a title search, review of aerial photographs, FIPs, and building permits as supplied by the City of Guelph, discussions with municipal and MOECC personnel, and an interview with a former IMICO employee. The field program included excavating 55 test pits, advancing 5 boreholes (completed as monitoring wells) and completing 16 corehole locations in 1991. The test pit locations included central test pits (A to L in 1989, and 1 to 12) in areas of suspect soil contamination, excavated to clean native soil or bedrock, and an additional 31 shallow test pits to help delineate contaminants.
City of Guelph, Former IMICO Facility Demolition and Waste Removal Report	October 7, 1999	Earth Tech (Canada) Inc.	City of Guelph Works Department Engineering Services Division	Earth Tech (previously P&R) was retained to provide contract tendering and administration of the demolition of buildings and clean up of waste materials at the Site to address the Director's Order issued by the MOECC in 1994. Waste materials (ACM, PCB-containing material, liquid wastes, foundry sands, contaminated concrete) were removed from the Site and Remediation (excavation and disposal) was completed for two areas on the Site: the north east corner of the Site where a previous plating room was located, and the area of the capacitor rooms that formerly housed PCB capacitors. Removal activities in the capacitor room included removal of a concrete floor, a utility trench, a subfloor, and a sump that were all indicated as PCB-impacted; material was excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 µg/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capactor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil and grease in the northeast corner of the Site. The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated some zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines at the time. Groundwater monitoring programs were recommended for areas downgradient of the capacitor room and northeast corner of the Site.
Supplemental Hydrogeological Investigation Former IMICO Site	March 8, 1999	Gartner Lee Limited	The City of Guelph	A hydrogeological site assessment was conducted that consisted of drilling eleven boreholes, installing nine monitoring wells (four in the bedrock) and collecting soil and groundwater samples. The stratigraphy over most of the Site was defined as coarse fill materials underlain by native silty fine sand. The depth of the fill materials ranged from 0.3 to 3.2 m from the southern to the eastern portions of the Site. Shallow groundwater flow was observed from the south to southwest, with a high around OW2. The average lateral velocity was measured at 107 m/yr. Flow in the bedrock was generally to the south with a velocity of 14 m/yr. Vertical gradients were downwards, with the exception of OW9 and OW11 where measurements indicated occassional upward gradients. Soils were found to be impacted with metals (mainly zinc and lead), TPH, VOCs and PAH/phthalates in the area immediately east of the former annealing room, with impacts found up to the top of bedrock (1.5 to 2.0 mbgs). Groundwater was found impacted with TPH (heavy oil), zinc, and lead which were primarily found at the northeast portion of the Site. Some localized exceedances of PAHs were also reported. Elevated chlorinated VOCs (specifically TCE and VC) were observed on the east property boundary (OW18 and OW19). NAPL was identified at OW21-1 within the dolostone bedrock which was determined to be fuel oil comprised of PAHs/phthalates. Suspected free product was previously observed in monitoring wells in the same area (OWI-1). The development of a remedial action plan was recommended.
Contaminant Investigation 490 York Road, Guelph, Ontario	May 12, 2004	Gartner Lee Limited	The City of Guelph	An investigation of the adjacent property at 490 York was conducted in a response to an MOECC Provincial Order (No. 7616-5LAL3S) from 2003 to better define groundwater quality and source of the VOC contamination at the east end of the IMICO site. Three pairs of monitoring wells (OW28, OW29, and OW30) were installed (shallow at approximately 6 m and deep at approximately 12 m), developed and sampled for analysis of major ions, metals, TPH, VOCs, PAHs, and general chemistry. It was noted in the report that groundwater at the northeast corner of the IMICO site may be influenced by water takings (industrial) at Holody, located 500 m to the northeast. Shallow groundwater was noted to flow to the southeast within the investigation area, likely influenced by the presence of the bedrock ridge. Other factors affecting the flow include buried services such as storm drains, low permeable surfaces (asphalt, buildings, concrete), and surface topography. It was noted in the report that groundwater at the northeast corner of the IMICO site may also be influenced by water takings (industrial) at Holody, located 500 m to the northeast. The stratigraphy was found to be composed of fill (up to 0.4 mbgs), native soil, and dolostone bedrock. The depth to bedrock ranged from 2.2 to 4.3 mbgs. Vertical gradients at the newly installed well nests were found to be downward. Chlorinated VOCs (TCE and degradation products), lead, and zinc were found in the groundwater on 490 York Road.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
Phase I Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	December 20, 2007	Decommissioning Consulting Services Limited	The City of Guelph	DCS conducted a Phase I ESA of the Site to prepare for its redevelopment, which required a subsequent Phase II ESA, and remedial action plan activities. The Phase I ESA consisted of a historical review of past land use (ERIS, aerials, ownership information), review of previous reports, and a site reconnaissance. The IMICO Site was determined to be first developed in 1912 as a foundry and was closed/abandoned in September 1989. The site reconnaissance provided limited information as there were no buildings/structures present. Information that was gathered from reports reviewed by DCS that were not available to CH2M are as follows: Philip Environmental - Earthtech Remedial Program 1989/1999 - included the decomissioning of wells OW01-I, OW01-II, OW20 and OW21 in the northeast corner of the site in April 1999, before the excavation of soil in the area. Gartner Lee Investigations 2000/2001 - included the installation of six monitoring wells in three locations (OW22S/D, OW23S/D and OW24S/D) following the excavation of impacted soils in the northeast corner of the property, and an additional well (OW25) in the vicinity of the remediated capacitor room. Additionally, nine test pits were advances in the southwestern portion of the property because of anomalies detected on the geophysical survey conducted. The anomolies were determined to be buried ferrous material. Soil sample collected indicated elevated zinc and TPH concentrations. Free product was noted in two of the shallow monitoring wells (OW22S and OW23S), which was found to be highly weathered with a slight oil/diesel odour. It was noted that the soil and groundwater conditions did not meet the background standards for metals, PHCs, and PAHs at many locations. Additional subsurface investigations were recommended in the following areas: - Current concentrations of the residual contamination at the eastern property boundary in soil and groundwater (metals, VOCs, PHCs); volatiles may have degraded from original concentrations - Further definition of the residual PCB contamination in the soil and groundwater in the vicinity of the capacitor room - Delineation of metal and occasional VOC impacts on the western site boundary - Investigation of groundwater impacts downgradient of the Site on Kingsmill Avenue
Phase II Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	December 21, 2007	Decommissioning Consulting Services Limited	The City of Guelph	A total of 40 boreholes were advanced at the Site, with 10 locations completed with monitoring wells (BH07-40 through BH-71, OW07-31 through OW07-38). Two of the monitoring well locations had both a shallow (5 to 7 mbgs) and deep (10 mbgs) monitoring well installed at the location (OW-24 and OW36). Analytical results were compared to both the Table 1 and Table 2 Standards. Soil exceedances included metals (widespread), PHCs (eastern end of the property, in the vicinity of the former maintenance garage, and one sample south of the capacitor room; F3 the predominant fraction), limited VOC exceedances (BTEX, no chlorinated VOCs identified), PAHs, and PCBs (maintenance garage and south of the former capacitor room). Synthetic leach samples for metals, VOCs, PHCs, PAHs, and PCBs indicated concentrations of copper, lead, and zinc exceeding proposed criteria. Groundwater exceedances included metals (mainly zinc on the east property boundary), PHCs (northeast end of property and south of the capacitor room), VOCs (mainly chlorinated VOCs with the highest concentrations on the east end of the Site), PAHs, and PCBs (one south of the capacitor room). DCS concluded that given the nature of the soil and groundwater quality on the Site, an extensive soil remediation program would be required to clean up to generic standards for the property to be suitable for residential or parkland use. Additionally, they concluded if using a RA, the property boundaries would still need to meet MOECC potable groundwater standards.
Preliminary Remedial Action Plan Former IMICO Property 200 Beverley Street, Guelph, Ontario	March 6, 2008	Decommissioning Consulting Services Limited	The City of Guelph	Four main scenarios were considered for the preliminary remedial action plan: 1) Using applicable Table 1 Standards (background) 2) Completing a limited scope RA to allow for the use of Table 2 Standards (potable) 3) Completing a limited scope RA to allow for the use of Table 2 Standards and elevated zinc background values 4) Completing a full scope RA for the proposed site specific land use Option 1 required the remediation of approximately 80,000 cubic m3 of soil, Option 2 would reduce the remediation required to 54,000 m3 of soil, Option 3 would require 23,000 m3 of soil based on the evidence of elevated background zinc concentrations in the Guelph area. Option 4 assumes many soil impacts can be managed on site by risk management measures and limited soils would require removal. For groundwater, the western part of the Site indicated the most practical approach to be completing a limited scope RA to justify the use of Table 2 Standards and installation of recovery wells and a standby treatment system to prevent potential contamination migrating offsite. For the eastern portion of the Site, recommendations were for an ex situ groundwater remediation system, consisting of particle filter and granular activated carbon unit, was recommended to treat groundwater and discharge to the Guelph Sanitary Sewer. The particle filter would remove suspended particles that might contain metals, PAHs, PCBs, and PAHs, and the activated carbon would treat the VOCs. Further groundwater investigations were recommended as the potential for recontamination was likely high.
2010 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	April 23, 2012	AECOM Canada Limited	The City of Guelph	AECOM (formerly Gartner Lee Limited) has been conducting semi-annual groundwater sampling and quarterly water level monitoring since 1998. The 2010 monitoring events occurred in March, June, October and December with groundwater samples collected in March and October. The groundwater wells in the monitoring well network included those installed offsite on 490 York Road, on Beverley Road, along the CP Rail property and on Simcoe Street, for a total of 18 shallow wells and 13 deep wells. Groundwater flow in the shallow aquifer was determined to be south to southwest, toward the Eramosa River. Deeper groundwater was measured at similar elevations across the site indicating little to no horizontal groundwater flow. LNAPL was measured in OW23 at 0.06 to 0.15m over the four monitoring events. Groundwater chemistry was compared to the Table 2 Standards for industrial/commercial/community property use. Inorganics found exceeding the standards were zinc, chloride and sodium; the chloride and sodium only occuring offsite at the 490 York Road property, likely because of road salting. Zinc was found in six wells, all along the eastern property boundary. PAHs exceeded standards offsite at 490 York Road, and at one location in each the central (OW25) and west (OW16) portion of the Site. PHCs and PCBs were elevated downgradient of the former capacitor room (OW25 and OW26S, respectively) during the 2010 event. The PCB concentration met Table 2 Standards used for comparison, but does not meet current Table 6 Standards. PHCs were also elevated offsite at 490 York Road (specifically F1, differing from the F2-F4 concentrations historically found on the Site) and had not been measured at OW22S or OW23S since 2007. Elevated VOCs included TCE, cis-1,2-DCE, 1,1-DCE, VC, and TCA and were mainly found at the eastern property boundary and on 490 York Road. The highest concentrations of TCE were found offsite at OW30D. Trend analysis indicated that TCE concentrations had mostly stabilized over time, with some wells showing a decreasing trend.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
2011 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	August 15, 2013	AECOM Canada Limited	The City of Guelph	The 2011 monitoring events occurred in June, September, and December, with sampling occuring in the first two events. Groundwater flow in the shallow aquifer was similar to previous events, deeper groundwater indicated a hydraulic high near OW23D. LNAPL was measured in OW23S at 0.04 to 0.15 m the four events. Groundwater exceedances for inorganics were found for zinc at seven wells and lead in one well. Chlorinated VOCs were similar to concentrations found in 2011, and TCE was noted to be decreasing. PAHs and PHCs were similar to previous years concentrations. PCBs were not analyzed and removed from the program in 2011, despite the last measured concentrations being above Table 6 Standards.
2012 & 2013 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverley Street, Guelph, Ontario	March 21, 2014	AECOM Canada Limited	The City of Guelph	The 2012 and 2013 annual report included additional slug test for the offsite wells indicating hydraulic conductivities generally consistent with those measured onsite. Monitoring events reduced to semi-annually and occurred in June and December 2012 and August and October of 2013. Sampling reduced to annually and occurred in December 2012 and October 2013. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater indicated a hydraulic high presented near OW18-II. LNAPL was measured in OW23S between 0.03 to 0.08 m over the four events. Pressure transducers were installed in three well nests (OW18, OW27 and OW30) between August 23 and August 31, 2013 (Friday through Saturday) to observe any possible influence of the water takings from nearby wells. No precipication events occured during the period. Water fluctuations were measured in the shallow wells during 2 weekdays: up to 30 cm in OW27S and OW30S and up to 15 cm in OW18-I. Water levels remained steady in bedrock wells OW18-II and OW30D, but fluctuated daily beginning August 26 (Monday). The MOECC stated that Holody Electro Plating has a PTTW for up to 50 imperial gallons per minute, and the water taking occurs continuously during the work week. This pumping is likely affecting the water levels at the Site and may be influencing groundwater flow direction. Groundwater exceedances for inorganics were found for zinc at five wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011. Degredation products were plotted alongside the TCE concentrations plots. PHC exceedances occured onsite at OW25, OW22S, OW23S (product measured in this well) and offsite at OW36S and OW30D. PAHs were similar to previous years concentrations.
Phase One Environmental Site Assessment 200 Beverley Street, Guelph, Ontario	February 11, 2014	Decommissioning Consulting Services	The City of Guelph	A Phase One ESA was conducted by DCS to assess the existing site environmental conditions and identify environmental concerns that might affect the future use of the Site. A review of historical information including historical reports, aerials, MOECC documents, FIPs, chain of title information, historical databases were completed, as well as a site reconnaissance. Nine APECs were identified by DCS: 1) Fill of Unknown Quality 2) Former UST on the east portion of the Site 3a) Former Iron and Steel Processing including sand mixing and foundry sumps 3b) Former PCB-containing Capacitors in the Foundry 4) Former Metal Treatment, Coating and Finishing 5) Historical Garage, Maintenance and Repair Area on the western property boundary 6) Historical Use and Storage of PCBs in the northeastern portion of the property 7) Former Metal Treatment, Coating and Finishing 8) Chemical Manufacturing, Processing and Bulk Storage (North of the Site) 9) Guelph Rail Line Adjacent to the Site (North of the Site) COCs identified were metals, PHCs, BTEX, PCBs, PAHs, and VOCs. Previous investigations reviewed identified impacts from metals VOCs, PHCs, PAHs, and PCBs. Additional Phase Two work was recommended.
Phase Two Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	April 2, 2014	Decommissioning Consulting Services	The City of Guelph	The DCS investigation included excavation of 10 test pits, advancing three boreholes; two of those locations additionally installed a monitoring well. Soil samples were collected for metals, VOCs, PHCs, PAHs, and PCBs. Groundwater samples were collected from the newly installed wells as part of the annual monitoring (AECOM). Groundwater flow was determined to be to the south in the shallow bedrock/overburden, and flow in the deeper bedrock appears to be somewhat radial from the east property boundary. Groundwater velocities in the two units were measured at approximately 15 m/yr and 55 m/yr; an upward gradient was found to be present in some wells. Soil was compared to the MOECC Table 6 Standards and indicated elevated metals across the property and localized exceedances of PAHs and PCBs. Groundwater was found with elevated concentrations mainly on the eastern portion of the Site consiting of VOC, specifically TCE and degredation products, and some PAHs.
Preliminary Remedial Action Plan Former IMICO Property 200 Beverley Street, Guelph, Ontario	April 14, 2014	Decommissioning Consulting Services	The City of Guelph	DCS completed a preliminary remedial action plan for the Site to prepare for its redevelopment. Viable options for soil management included an RA or MGRA in combination with some excavation and offsite disposal. Options for the groundwater were an RA or MGRA with localized free product removal and potential VOC remediation. The source and extent of free product in OW23S would need to also be determined. The presence of offsite impacts were also reported to need further investigation and agreement amoung the City, MOECC, and stakeholders on appropriate remedial measures or management of groundwater impacts.
2014 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	April 30, 2015	AECOM Canada Limited	The City of Guelph	The 2014 annual monitoring included semi-annual events in July and October with groundwater sampling in October. Wells were re-surveyed accross the Site for top of pipe elevations, with some differences up to 0.45 m from original surveyed elevations, resulting in some minor changes in groundwater flow and hydraulic gradients. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater was reported as generally flat with a hydraulic high presented near OW18-II, as previously reported. LNAPL was measured in OW23S between 0.05 to 0.32 m during 2014. Vertical gradients were generally down, with the exception of OW9, OW11, OW30, OW07-34, and OW07-36, which had upwards hydraulic gradients in 2014. Groundwater exceedances for inorganics were found for zinc at four wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic degredation of TCE in bedrock. PHC and PAHs were similar to previous years' results.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
Vertical Delineation of the Extent of Groundwater Impacts at the Former IMICO Site, 200 Beverley Street, Guelph, Ontario	December 8, 2016	WSP Canada Inc.	The City of Guelph	WSP conducted a vertical delineation investigation at the Site to address the concern that over the years concentrations of TCE and related degredation products have been increasing at the northeastern wells. The presence of shalllow porous fractured bedrock (Guelph Formation) has contributed to the migration of TCE and degredation products to deeper depths. The investigation included the installation of a telescopic bedrock monitoring well within an area where identified dense NAPL (TCE and degredation products) were found in the groundwater, in the north east corner of the Site. The well was drilled, cored, and sealed to 29 m, with an open hole left at 29 to 33 m. Geologic features and competent bedrock formations were reported. The Site is underlain by the Lockport Group, consisting of the Guelph Formation, Eramosa Formation, Goat Island Formation, and the Gasport Formation. The Guelph Formation, which is noted to be a major regional aquifer, has a flow from the north to south and discharge points to the Speed and Eramosa Rivers. The Eramosa Formation is considered a regional aquitard and is a semi-confining unit because of vertical and horizontal fractures. The lower portion of this formation (the Vinemount Member) is considered a better aquitard. The region draws water from two major zones: the upper fractured weathered portion of the bedrock and the deeper highly fractured porous Gasport Formation. Groundwater samples were collected during the drilling and run through a handheld gas chromatograph as well as submitted to a lab for PHC and VOC analysis. TCE was found up to approximately 24 m within the Eramosa formation.The highest concentrations of TCE (432 µg/L) and cis-1,2-DCE (244 µg/L) were reported from approximately 9 to 12 m. Degradation products were found in the final investigated depth in the Goat Island Formation above the Table 1 Standards. PHC exceedances were also noted, but were noted to be likely related to the natural presence of hydrocarbons in the Guelph and Eramosa Formations.
2015 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	January 31, 2017	AECOM Canada Limited	The City of Guelph	The 2015 annual monitoring included semi-annual events in September and November with groundwater sampling in November. Groundwater flow in the shallow aquifer was southerly, similar to previous events; deeper groundwater is reported as generally flat with a hydraulic high presented near OW18-II, as previously reported. LNAPL was measured in OW23S between 0.032 to 0.05 m during 2015 and a total of 650 mL of product was purged from the well over two events. Vertical gradients are generally down, with the exception of upwards gradients observed at one or more events for OW9, OW11, OW26, OW07-34, and OW07-36. Groundwater exceedances for inorganics were found for zinc at five wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic degredation of TCE in bedrock. PHC and PAHs were similar to previous years results.
2016 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	June 26, 2017	AECOM Canada Limited	The City of Guelph	The 2016 annual monitoring included semi-annual events in August and October with groundwater sampling in October. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater is reported as generally flat with a hydraulic high presented near OW30D, where groundwater flows in a northeasterly direction. LNAPL was measured in OW23S between 0.04 and 0.02 m during 2016 and approximately 200 millilitres of product was purged from the well over two events. Vertical gradients are generally down, with the exception of upwards gradients observed at one or more events for OW9, OW11, OW26, OW30, OW07-34, OW07-36, and OW13-39. OW27S/D were not sampled, as there was significant damage to the well casing and PVC pipes by road construction on Simcoe Street. Groundwater exceedances for inorganics were found for zinc at three wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic deredation of TCE in bedrock. PAHs were similar to previous years results. PHCs were similar with the exception of OW22S, OW23D, and OW30D, which had an increase in concentrations.

Notes:

[a] Historical data from previous reports have been summarized in Sections 4.1.5.2 for Soil and Section 4.1.5.3 for Groundwater; Data is also presented on Figures 4-2a through 4-2f for soil, and 4-3a through 4-3f for groundwater.

µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
ACM = asbestos-containing material
APEC = area of potential environmental concern
BTEX = benzene, toluene, ethylbenzene, and xylene
cm = centimetre(s)
COC = contaminant of concern
DCE = dichloroethylene
ESA = environmental site assessment
FIP = fire insurance plan
IMICO = International Malleable Iron Company
LNAPL = light nonaqueous phase liquid
m = metre(s)
m^3 = cubic metre(s)
m/yr = metre(s) per year
mbgs = metre(s) below ground surface
MGRA = modified generic risk assessment
MOECC = Ministry of the Environment and Climate Change, formerly the Ministry of the Environment
NAPL = non-aqueous phase liquid
P&R = Proctor & Redfern
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbons
PTTW = permit to take water
RA = risk assessment
TCA = trichloroethane
TCE = trichloroethylene
TPH = total petroleum hydrocarbons
UST = underground storage tank
VC = vinyl chloride
VOC = volatile organic compound

Table 7.1-1. Current and Past Land Uses for Phase One Property

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Year	Name of Owner	Name of Occupant	Inferred Description of Property Use	Inferred Property Use (according to Regulatory Types)	Other Observations (for example, from Aerial Photograph and Fire Insurance Plans) [1]
1997 - present	City of Guelph	No occupant	Vacant	Industrial	Aerials show the Site buildings demolished between 1998 and 2006 and the Site vacant thereafter
1993 - 1997	The Assembly of the Church of the Universe	The Assembly of the Church of the Universe	Unknown	Institutional/ Industrial	Aerials during this time show damage (assumed from fires) to the buildings on Site
1992 - 1993	John H. Long	John H. Long/Unknown	Storage	Industrial	No additional information available for this time period
1913 - 1992	International Malleable Iron Company Limited	International Malleable Iron Company Limited	Iron-jobbing Foundry	Industrial	Aerials, FIPs show industrial use through this time period; previous reports indicate operations ceased in 1989
1834 - 1913	Various	Owner or unknown	Agricultural or Residential	Agricultural or Residential	Private individuals were listed in the Title Search; no aerials were available before 1930, and no FIP coverage was available for the area prior to 1916

Notes:

[1] Additional information was obtained from the City Directories, Title Search, site observations, interviews and aerial photographs documented in this report.

FIP = fire insurance plan

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[1]		Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
APEC-1	Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS, 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main Foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech, 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the north west corner of the building and drained to the truck bay (P&R, 1991).	Central portion of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	VOCs, PHCs, PAHs, ABNs, CPs, metals	Soil and Groundwater
APEC-2	Machine Shop - A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945 and 1960 showed this area changed operations to 'Shipping' and a 'Pattern Shop'.	East end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-3	Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the north wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't'. The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or USTs for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel oil fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the north side of the Annealing Room.	East end of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-4	Sand Storage - The 1916 FIP shows a 'Sand Shed'. The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand'. The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks', and an additional area to the north labeled 'Sand'. No information was identified to if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.	Central portion of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	PAHs, ABNs, CPs, metals	Soil and Groundwater
APEC-5	Galvanizing Building - A small free standing building for 'Galvanizing' was present on the south east portion of the Site as shown on the 1916, 1929 and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.	Southeast end of the Site	33	Metal Treatment, Coating, Plating and Finishing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-6	Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946 and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior west side of the building.	Central portion of the Site	34	Metal Fabrication	Onsite	Metals	Soil and Groundwater
APEC-7	Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil", and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the north building remaining, but is not labeled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R, 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech, 1999).	Central portion of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	BTEX, PHCs	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Areas of Potential Environmental Concern (APEC) ID	Location of APEC	Potentially Contaminating Activity (PCA)[1]		Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
APEC-8	Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labeled as a 'time office'), but does not show the UST. The gasoline use is not known, however it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R, 1991).	Southeast end of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	VOC, PHCs, PAHs, metals	Soil and Groundwater
APEC-9	Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil". The building/structure is not on 1916 FIP where the area is shown as exterior yard area, and is not present on the 1960 FIP where the area is occupied.	Southeast end of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	BTEX, PHCs	Soil and Groundwater
APEC-10	Machine Shop - A machine shop is shown on the 1929, 1946 and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop.	East end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-11	Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS, 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product, but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 ug/L of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25% of the sampling events between 2005 and 2016.	Northeast end of the Site	33	Metal Treatment, Coating, Plating and Finishing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-12	Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.	Central portion of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-13	Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929 and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.	Central to northeast end of the Site	46	Rail Yards, Tracks and Spurs	Onsite	PAHs, metals	Soil and Groundwater
APEC-14	Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.	South end of the Site	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-15	Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) do not have an indication of the buildings use.	Central portion of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PHCs, PAHs, ABNs, CPs, metals	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Areas of Potential Environmental Concern (APEC) ID	Location of APEC	Potentially Contaminating Activity (PCA)[1]		Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
APEC-16	Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.	Central portion of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-17	Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigationsite plan, and later remediated as part of the Earth Tech demolition (P&R, 1991; EarthTech, 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 ug/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 ug/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 ug/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated VOCs and PHCs (mainly F3) above the applicable potable water criteria (Table 6 Standards) (DCS, 2007b, 2014b; AECOM, 2017a and 2017b).	Central portion of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PCBs, PHCs	Soil and Groundwater
APEC-18	Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R, 1991, DCS, 2007a).	Northeast end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-19	Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.	Southeast end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-20	Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the west side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.	West end of the Site	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Onsite	VOCs, PHCs, PAHs, metals, PCBs	Soil and Groundwater
APEC-21	Coal Storage - The 1960 FIP indicates coal storage south of the garage on the west side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labeled as coal.	West end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-22	Transformer - A 1200-volt transformer is shown on the 1991 Site Plan (P&R, 1991).	Southwest end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-23	Paint Shop - First shown on the P&R Site plan, a paint shop was located at the north end of the site, between the shipping building and the storage area (P&R, 1991). Drums were stored against the north wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.	Northeast end of the Site	39	Paints Manufacturing, Processing and Bulk Storage	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-24	PCB Storage Area - An area located at the northeast corner of the finishing and annealing room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as 'storage' (P&R, 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech, 1999). Confirmatory samples below the pad were 0.63 and <0.05 ug/g. The soil was later excavated to bedrock as part of the soil remediation in the northeast corner of the property (see APEC-11).	Northeast end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-25	Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities which occurred along the north property boundary (P&R, 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.	North end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[1]		Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
APEC-26	Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated non-detect concentrations of PCBs. Similarly one location installed during the DCS Phase II ESA (2007) indicated non-detect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.	West end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-27	Former Electrical Shop - A small electrical shop was noted to be on the southwest corner of the foundry (P&R, 1991). This addition was not shown on the FIPs from previous years, and was shown as the exterior yard area west of the foundry.	Southwest end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-28	Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site Plan (P&R, 1991).	Southwest end of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-29	Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag and cinders (up to 1.0 m) was found across the site (P&R, 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS, 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R, 1991).	Entire Site	30	Importation of Fill Material of Unknown Quality	Onsite	BTEX, PHCs, PAHs, ABNs, CPs, metals, PCBs	Soil and Groundwater
APECs from Offsite PCAs to the North							
APEC-30 (Offsite North)	Rail Lines - Bordering the north side of the Site, rail lines are present (owned by Guelph Rail Line) and have existed since at least the early 1900s. Has historically been indicated as the Canadian Pacific Railway (1916, 1929, 1946, 1960 FIPs and P&R [1991]), Guelph Junction Railway (EarthTech, 1999; DCS, 2007a).	Along Northern Property Boundary	46	Rail Yards, Tracks and Spurs	Offsite	VOCs, PHCs, PAHs, ABNs, CPs, metals	Groundwater
	Paper Manufacturing - Companies at 309 Elizabeth Street have been listed in the Scott's Manufacturing Directory for paper related manufacturing: Trinity Graphics was established in 1977 and 1978 with a plant sizes of 3,000 and 50,000 m^3 for paper bag and coated and treated paper manufacturing, all other converted paper product manufacturing, platemaking and related services; Independent Paper Converters was established in 1978 with a plant size of 56,000 m^3 for manufacturing including paper bag, coated and treated paper, plastic film and sheet. The 1960 FIP indicated gummed paper manufacturing (Top Paper Products).	309 Elizabeth Street	45	Pulp, Paper and Paperboard Manufacturing and Processing	Offsite		Groundwater
	Auto Body Repair Shop - An automobile wrecking and recycling record was listed in the ERIS report for Sutton Auto Collision at 349 Elizabeth Street, which is an autobody repair facility. Additionally Top Gun Auto Painting & Collision is listed at this address from the City Directory.	349 Elizabeth Street	10	Commercial Autobody Shops	Offsite		Groundwater
	Automobile Repair - Two automotive repair shops are listed in the City Directory at 349 Elizabeth Street from approximately 2005.	349 Elizabeth Street	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Offsite		Groundwater
	Gasoline Station - A private fuel outlet with a 2,250 L liquid fuel double walled AST for gasoline is listed in the ERIS report for Oaks Precast Ind. Div. Standard Ind. at 351 Elizabeth Street with a license issue date of 1990. An additional record indicates a tank capacity of 36,500 L.	351 Elizabeth Street	28	Gasoline and Associated Products Storage in Fixed Tanks	Offsite		Groundwater
	Trucking Company - A general freight trucking company (Polymer Distribution Inc.) is listed at 351 Elizabeth Street.	351 Elizabeth Street	11	Commercial Trucking and Container Terminals	Offsite		Groundwater
	Concrete Products Manufacturing - Lafarge Canada Inc. is listed at 351 Elizabeth Street, with a Scott's Manufacturing directory listing indicating an established date of 1933 and plant size of 50,000 ft^3.	351 Elizabeth Street	12	Concrete, Cement and Lime Manufacturing	Offsite		Groundwater
	Plastic Products Manufacturing - ERIS and the City Directory searches indicate plastic products manufacturing at 53 Victoria Rd S. Scott's Manufacturing directory listings indicate Sterling Creations was established in 1983 with a 5,000 ft^2 plant size, as well as Clear Choice Window Manufacturing established in 1990 with a 1,600 ft^2 plant size.	53 Victoria Rd S	43	Plastics (including Fibreglass) Manufacturing and Processing	Offsite		Groundwater
	Wire/Spring Manufacturing - ERIS searches list records for Guelph Wire Products which was established in 1974, plant size of 4,000 ft^2 and manufactures steel springs, wire springs and miscellaneous fabricated wire products.	53 Victoria Rd S	34	Metal Fabrication	Offsite		Groundwater
	Metal Valve Manufacturing - ERIS searches list records for DeNardis Industrial Sales Ltd. at 61 Victoria Rd S Unit C for metal valve manufacturing, established in 1985, plant size 4000 ft^2.	61 Victoria Rd S	34	Metal Fabrication	Offsite		Groundwater
	Former Spill - Spill records from ERIS indicated a release of diesel fuel in 2005 at 65 Victoria South.	65 Victoria Rd S			Offsite		Groundwater
	Electro-plating company - Holody Electro-Plating Limited is listed at 66 Victoria associated with metal product coating, iron and steel mills and ferro-alloy manufacturing since at 1955, with a plant size of 40,000 ft^2 according to available records from ERIS. The 1960 FIP showed labeled buildings for plating, polishing, and an office.	66 Victoria Rd S	33	Metal Treatment, Coating, Plating and Finishing	Offsite		Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Areas of Potential Environmental Concern (APEC) ID	Location of APEC		Potentially Contaminating Activity (PCA)[1]	Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
	Window and Door Manufacturing - Clear Choice Window Manufacturing Inc. and Richview Doors Ltd are listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size. A spill at 75 Victoria Road South of a polymer emulsion (100lbs) in 2016 was reported.	75 Victoria Rd S	43	Plastics (including Fibreglass) Manufacturing and Processing	Offsite		Groundwater
	Scrap Yard - B&F Scrap Dealers are listed at 100 Victoria Road South, with an automobile wrecking and recycling record in ERIS and listings in the city directory search from 1970 to 2011. A spill was reported at the property of a gasoline and water mixture (quantity not specified) in 2006 from cargo leaking to the ground.	100 Victoria Rd S	49	Salvage Yard, including automobile wrecking	Offsite		Groundwater
APECs from Offsite PCAs to the East							
APEC-31 (Offsite East)	Steel Valve Manufacturing - Guelph Engineering Co. was shown located at 10 Kingsmill Avenue, buildings on the 1960 FIP indicate steel valve manufacturing with a machine shop, pattern shop and oil house. Previous FIPs (1916, 1929 and 1946) show residences in this area.	10 Kingsmill Avenue	32	Iron and Steel Manufacturing and Processing	Offsite	VOCs, PHCs, PAHs, ABNs, CPs, metals, PCBs	Groundwater
	Former Stove Manufacturer/Foundry - Guelph Stove Company was shown at 490 York Road on the 1916, 1929, 1946 and 1960 FIPs. Buildings included a foundry, storage (coke, coal, sand), milling room, pattern shops, plating and buffing, offices, warehouses, steel mounting room & blacksmith, crating, stove mounting, and oil. Transformers are shown on the enamel building. Operations existed until approximately the mid-1960s where the city directory listings indicate Franklin Manufacturing Co (Canada) LTD and then Resco Refrigeration Supplies Co LTD from approximately 1970. The facility became a multi-tenant commercial companies from the 1990s to present.	490 York Road	32	Iron and Steel Manufacturing and Processing	Offsite		Groundwater
	Box Manufacturing - Packing manufacturers are listed at 136 Victoria Road South: Ellis Packing West Inc. listed as a corrugated and solid fibre box manufacturer; and ABCO Box and Carton Ltd. listed as a folding paperboard box manufacturer, established in 1946 with a plant size of 40,000 ft^2. The 1960 FIP shows ABCO Box and Carton Co. Ltd with buildings labeled for office, pattern making, cutting, raw stock, stripping, gluing and finished stock. ABCO was present until approx. 2000 when Ellis Packing West replaced them as listed in the city directory.	136 Victoria Rd S	45	Pulp, Paper and Paperboard Manufacturing and Processing	Offsite		Groundwater
	Potential USTs - On the 1960 FIP, McGregor Sportswear of Canada was shown to have 2 fuel oil USTs (2,500 gal each) on the property at 136 Victoria Rd S.	136 Victoria Rd S	28	Gasoline and Associated Products Storage in Fixed Tanks	Offsite		Groundwater
	Scrap Yard - Joe Brown & Son Ltd, a junk yard, is shown on the 1960 FIP at 150 Victoria; ERIS records include Hendersons Disposal Systems Ltd as the owner, and list the facility as a transfer service from 2000 to 2004, and 2005 as an Ontario numbered company.	150 Victoria Rd S	49	Salvage Yard, including automobile wrecking	Offsite		Groundwater
	Former Fuel Storage Facility - Multiple companies have been listed at 154 Victoria Rd S (Shell Canada Products, Doug Pollock Fuels Ltd, Granger Fuels) as an expired TSSA fuel storage facility with gasoline and diesel. A spill was reported in 1988 due to container overflow of 150 L of gasoline to the gravel surface. The 1946 FIP shows 6 gasoline USTs, and the 1960 FIP shows 13 gasoline USTs and an oil warehouse; both listed as Canadian Oil Companies Ltd.	154 Victoria Rd S	28	Gasoline and Associated Products Storage in Fixed Tanks	Offsite		Groundwater
	Former Paint Application - A cabinet manufacturer was shown on the 1960 FIP, Gilson Manufacturing Co. Ltd. Cabinet Division at 57 Victoria Rd S with buildings labeled for steel storage, tubing room, steel room, washer, dryer, office, paint spray, transformer.	53 Victoria Rd S	39	Paints Manufacturing, Processing and Bulk Storage	Offsite		Groundwater
	Chemical Manufacturer or Distributor - Robert On Guard Products was listed in the chemical facilities records.	490 York Road	8	Chemical Manufacturing, Processing and Bulk Storage	Offsite		Groundwater
	Transformers - The National PCB records list up to 7 transformers on 490 York Road associated with Sherwood Forest Investments (formerly Hamril Investments). The volumes listed total approximately 1,600 L. Transformers (7 total) are shown on the 1960 FIP on the enameling building of Guelph Stove Co. Ltd.	490 York Road	55	Transformer Manufacturing, Processing and Use	Offsite		Groundwater
APECs from Offsite PCAs to the South							
APEC-32 (Offsite South)	Screw Manufacturing - Linread Canada Ltd. is shown on the 1960 FIP as a screw manufacturer, and is listed in ERIS reports as a industrial fastener at 24 Hayes with records until 1998. "Jet" is listed as a manufacturer of metal dies at this location with records between 1993 and 1998. Multiple Scott's Directory listings are reported for this address for machinery/equipment/ industrial fan and fabricated metal tools/product manufacturing (Daltec Industries, Allen Simpson Marketing and Design) with established dates of 1984 and 1975, and records up to 2006. A spill was reported of slurry to the road in 2014.	24 Hayes	34	Metal Fabrication	OffSite	VOCs, PHCs, PAHs, metals	Groundwater
	Former USTs - One gasoline UST is shown on the 1960 FIP on the south side of the building at Traders' Plumbing and Heating Supplies Limited at 150 Stevenson Street South.	150 Stevenson St S	28	Gasoline and Associated Products Storage in Fixed Tanks	OffSite		Groundwater
	Former Transportation Company - The 1960 FIP indicates a transportation company (Direct Winter's Transport) at 101 Beverley and city directories the company was present from the early 1950s to 1960s.	101 Beverley Street	11	Commercial Trucking and Container Terminals	Offsite		Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Areas of Potential Environmental Concern (APEC) ID	Location of APEC		Potentially Contaminating Activity (PCA)[1]	Location of PCA [2]	Contaminants of Potential Concern (based on AP method groups) [3]	Media Potentially Impacted (groundwater and/or soil)
APECs from Offsite PCAs to the West							
APEC-33 (Offsite West)	Window Manufacturing - Clear Choice Window Manufacturing Inc. is listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size.	145 Stevenson St S	43	Plastics (including Fibreglass) Manufacturing and Processing	Offsite	VOCs, PHCs, PAHs, metals	Groundwater
	Metal Treatment - Choice Enterprises is listed in the Scott's Manufacturing Directory; as coating, engraving, heat treating, and allied activities; established in 1998.	147 Stevenson St S	33	Metal Treatment, Coating, Plating and Finishing	Offsite		Groundwater
	Spring Manufacturing - ERIS records indicate heavy gauge spring manufacturing at 60 Johnston Street as Steele Bros. Ltd., the Scott's manufacturing directory record indicates the company was established in 1986 with a plant size of 6,500 ft^2. The 1960 FIP shows the H.I. Thompson Co. of Canada Limited (Aircraft Insulation) with a factory, spring room, spray room, transformer, and cement storage.	60 Johnston Street	34	Metal Fabrication	Offsite		Groundwater
	Former Refractory Facility - Former Foundry Services of Canada (FOSECO) facility operated at 201 Alice Street until approximately the late 1990s, had a known contaminated plume in the shallow groundwater occurring at the bedrock/overburden interface, migrating northward and a groundwater treatment system for toluene (P&R, 1991). A certificate of approval record was issued in 1989 to Foseco for the toluene stripper for groundwater. The 1960 FIP indicates the following buildings: tablet making, lab, shipping, mixing, warehouse, ball mill, elevator, transformer, oil storage, blending, mouldable exothermic feeding compound, incinerator.	201 Alice Street	34	Metal Fabrication	Offsite		Groundwater
	Motor Vehicle Parts Manufacturing - BP Canada Energy Company is listed in ERIS operating at 201 Alice Street.	201 Alice Street	57	Vehicles and Associated Parts Manufacturing	Offsite		Groundwater
	Former Spill - A spill was reported at the corner of Alice and Stevensons Street of 15 L of windshield washer fluid and antifreeze to a catch basin a motor vehicle accident in 2016.	Stevenson and Alice Street	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Offsite		Groundwater

Notes:

1 PCA – potentially contaminating activity (as defined by O.Reg. 153/04)

2 Refer to Figure 7-1 for PCA locations

3 As noted in the "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* " March 9, 2004, amended as of July 1, 2011.

% = percent

"-" = Unknown or data not readily available for review
< = less than
ug/g = microgram per gram
ug/L = microgram per litre
% = percent
APN = Acid Base Neutral compounds
APEC = Area of Potential Environmental Concern
AST = Aboveground storage tank
BTEX = Benzene, toluene, ethylbenzene, and xylenes

CDL = City Directory Listings
CP = Chlorophenols
ELE = EcoLog ERIS Database Search
FIP = Fire insurance plan
ft = foot
ft^2 = square foot
ft^3 = cubic foot
HER = Historical Environmental Reports
ID = Identification

mbgs = metres below ground surface
kg = kilogram
L = litre
lb = pound
m = metre
m^3 = cubic metres

MOECC = Ontario Ministry of the Environment and Climate Change
offsite = Within Phase One Study area, outside the Phase One Property
onsite = Phase One Property

P&R = Proctor & Redfern

PAH = Polycyclic aromatic hydrocarbon
PCA = Potentially contaminating activity
PCB = Polychlorinated biphenyl
PHC = Petroleum hydrocarbon
UST = Underground storage tank
VOC = Volatile organic compound

Table 7.4-1. Phase One Conceptual Site Model

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Phase One CSM Element	Summary
Existing Buildings and Structures	No buildings or structures
Identify Water Bodies in the Phase One Study Area	Waterbodies within the Phase One Study area include a portion of the Hanlon Creek and Mill Creek Swamp located off Site, but in the south/central portion of the Phase One Study Area as shown on Figure 2-1.
Areas of Natural Significance	No identified areas of natural significance are located wholly or partly within the Phase One Study Area.
Presence of Drinking Water Wells	No drinking water wells were identified on the Phase One Property. Thirty water wells are located within the Phase One Study Area as shown on Figure 4-4.
Identify Roads within the Phase One Study Area	Figure 6-1 presents the roadways and land use within the Phase One Study Area.
Adjacent Property Uses	Figure 6-1 presents the current adjacent property use: • To the north: residential, industrial and commercial • To the east: residential, industrial and commercial • To the south: residential, industrial and commercial • To the west: residential
Identify PCAs in the Phase One Study Area	The following PCA types were found in the Phase One Study Area: • 8 – Chemical Manufacturing, Processing and Bulk Storage • 10 - Commercial Autobody Shops • 11 - Commercial Trucking and Container Terminals • 12 - Concrete, Cement and Lime Manufacturing • 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles • 28 – Gasoline and Associated Products Storage in Fixed Tanks • 30 – Importation of Fill Material of Unknown Quality • 32 – Iron and Steel Manufacturing and Processing • 33 – Metal Treatment, Coating, Plating and Finishing • 34 – Metal Fabrication • 37 - Operation of Dry Cleaning Equipment (where chemicals are used) • 39 – Paints Manufacturing, Processing and Bulk Storage • 45 - Pulp, Paper and Paperboard Manufacturing and Processing • 46 – Rail Yard, Tracks and Spurs • 47 – Rubber Manufacturing and Processing • 49 - Salvage Yard, including automobile wrecking • 54 - Textile Manufacturing and Processing • 55 – Transformer Manufacturing, Processing and Use • 57- Vehicles and Associated Parts Manufacturing Table 7.2-1 summarizes the details of the PCAs identified in the Phase One Study area, and locations are shown on Figure 6-1.
Identify APECs	Thirty-three (33) APECs are identified for the Phase One Property.

Table 7.4-1. Phase One Conceptual Site Model

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Phase One CSM Element	Summary
COPCs	The COPCs identified within the Phase One Study Area include metals and inorganics, VOCs, PHCs, PAHs, PCBs, ABNs and CPs. This list includes COPCs that are confirmed to be present based on historical investigations. Based on previous reports and contaminant concentrations, there is a potential for free phase product to exist on the Site.
Presence of Underground Utilities	Although utilities have been disconnected on Site, piping and bedding have not been removed and therefore there is a potential for utility corridors to be providing a preferential route of contaminant migration.
Regional/Local Geology	The Site topography varies from approximately 315 and 316.5 masl based on topographic information and previous investigations completed at the Site. The Site and surrounding lands generally slope southeast to the Eramosa River Geology from previous investigations indicate subsurface materials consisting of fill (varying from 0.3 to 3.2 m deep), underlain by native silty fine sand. The approximate bedrock depth based on past investigations on the Site was 2.0 mbgs (elevation of 313.5 masl), and ranged from approximately 0.7 m to 3.4 mbgs (elevation of 312.7 to 315.0 masl). The bedrock was described as dolostone, grey, porous and highly fractured with a rock quality index indicating it is highly weathered and fractured (GLL, 1999). The regional geology indicates the Phase One Study Area consists of "silt to sandy silt matrix, becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward" (OGS, 2000), and bedrock of the Guelph Formation, consisting of sandstone, shale, dolostone, siltstone (OGS, 1991). The bedrock elevation is approximately 305 masl based on *OGS Preliminary Map P.224, Guelph Area, Southern Ontario, Bedrock Topography Series* (Karrow, 1979).
Regional/Local Hydrogeology	Groundwater levels at the Site have been measured during previous investigations between 2.02 and 4.13 mbgs (310.84 to 316.40 masl) with an inferred groundwater flow direction to the south, toward the Eramosa River.
Uncertainties Affecting the Validity of Phase One CSM	On the basis of the uncertainties presented within the Phase One ESA report, it is possible that a PCA/APEC or land use has not been identified within the individual components of the Phase One ESA. Information was gathered from numerous sources (that is, aerial photographs, City Directories, database searches, historical reports, interviews, and site reconnaissance), which decreases the chance that a major PCA or land use was not identified in this Phase One ESA. Many aspects of the CSM have been previously studied and verified through subsurface investigations (for example, groundwater flow direction); these aspects are not directly affected by the noted uncertainties: • Quality of aerial photographs may not allow some features to be clearly identified, and professional judgment was used to relate the historical features identified in the aerial photographs to present day locations • Municipal addresses are known to change • Information provided by interviewed individuals, could be based on hearsay or personal opinion

Table 7.4-1. Phase One Conceptual Site Model

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Phase One CSM Element	Summary

Notes:

APEC – Area of Potential Environmental Concern

COPC – contaminant of potential concern

CSM – conceptual site model

ESA – Environmental Site Assessment

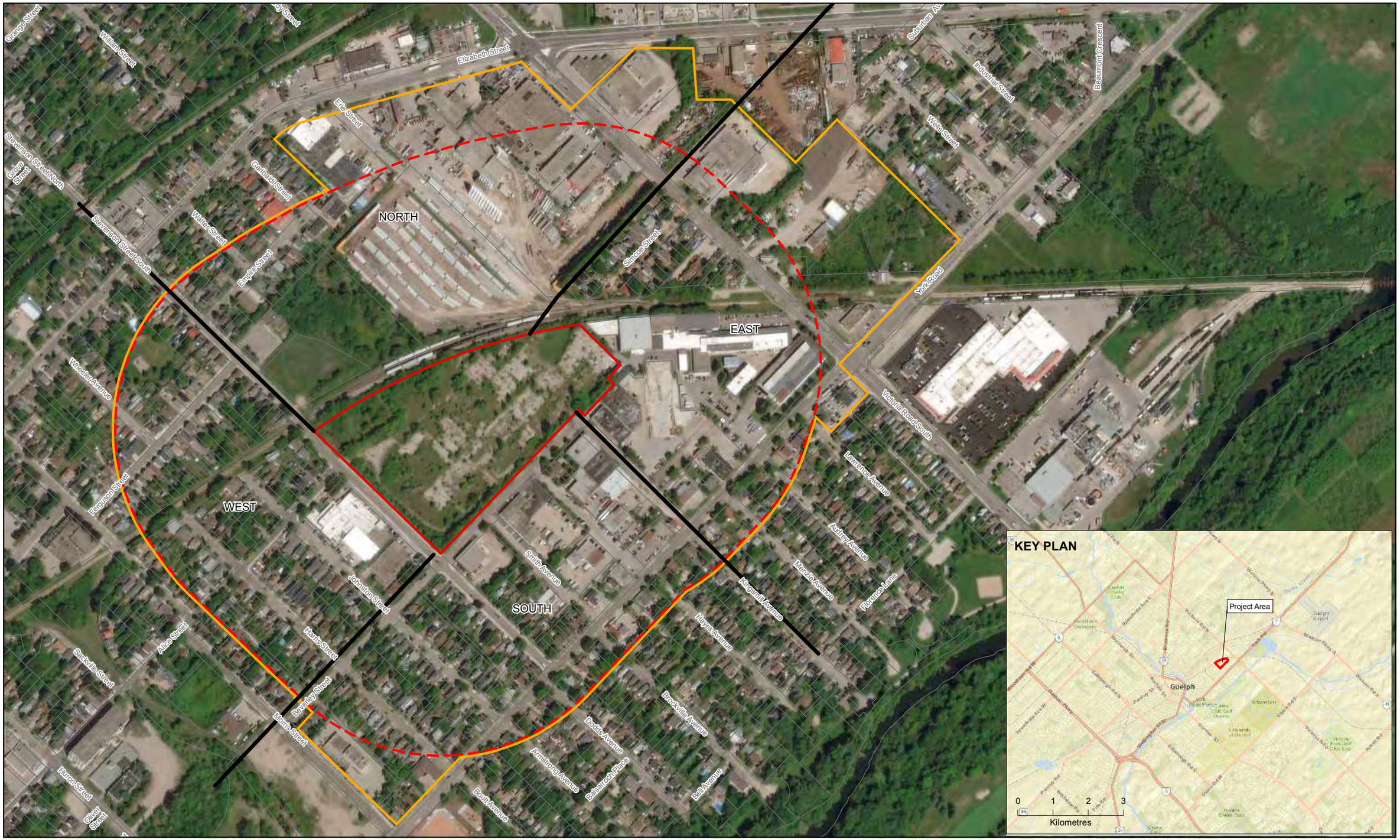
m – metre(s)

masl – metres above sea level

mbgs – metre(s) below ground surface

PCA – potentially contaminating activity

Figures



Notes:
1. Source of Imagery: Esri, dated Sept. 11, 2016.
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 2-1
Site Location

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

ch2m

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N

0 10 20 30
Metres

Reporting Cardinal Directions
Sanitary Sewer (Approximate)
Storm Sewer (Approximate)
Railway
Catch Basin
Dry Well
Former Sumps
Former IMICO Property Boundary
Property Parcels

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. Sewer locations and sump locations obtained from DCS, 2014.

Figure 2-2
Site Plan

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

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N

0 100 200 300
Metres

Water Supply Well Location (Within 1km of Property Boundary)
Railway
Former IMICO Property Boundary
Lands within 250m of Phase One Property
Phase One Study Area

Notes:
1. Source of Imagery: Esri, 2016
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 4-4
Water Wells

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

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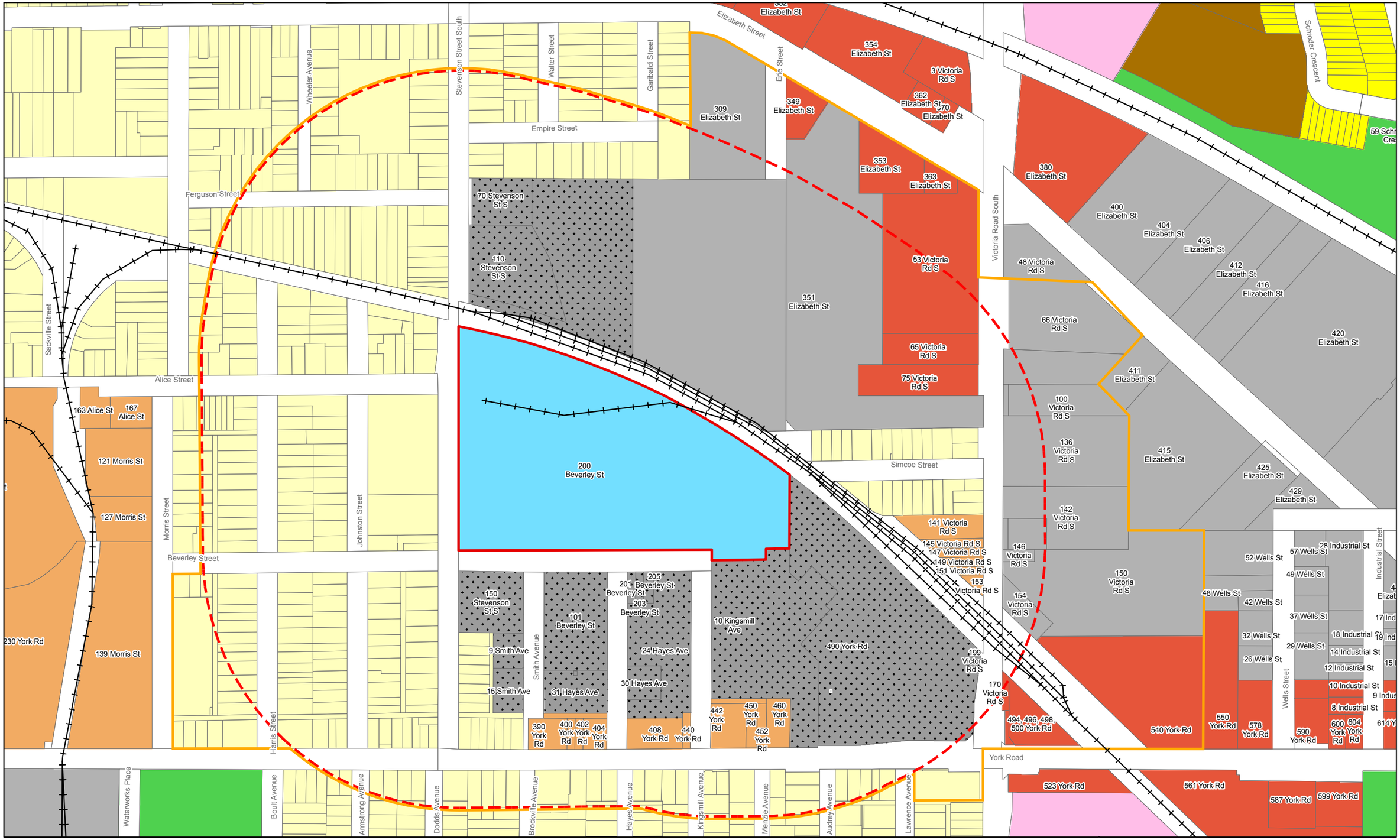

Railway
Former IMICO Property Boundary
Lands within 250m of Phase One Property
Phase One Study Area

LandUse
High Density Residential
Medium Density Residential
Low Density Residential
Industrial
Mixed Business
Mixed Office Commerical
Neighbourhood Commercial Centre
Open Space and Park
Service Commericial
Special Study Area

0 25 50 75
Metres

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Source of Land use: City of Guelph Official Plan, Schedule 2.
3. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-1
Land Use

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

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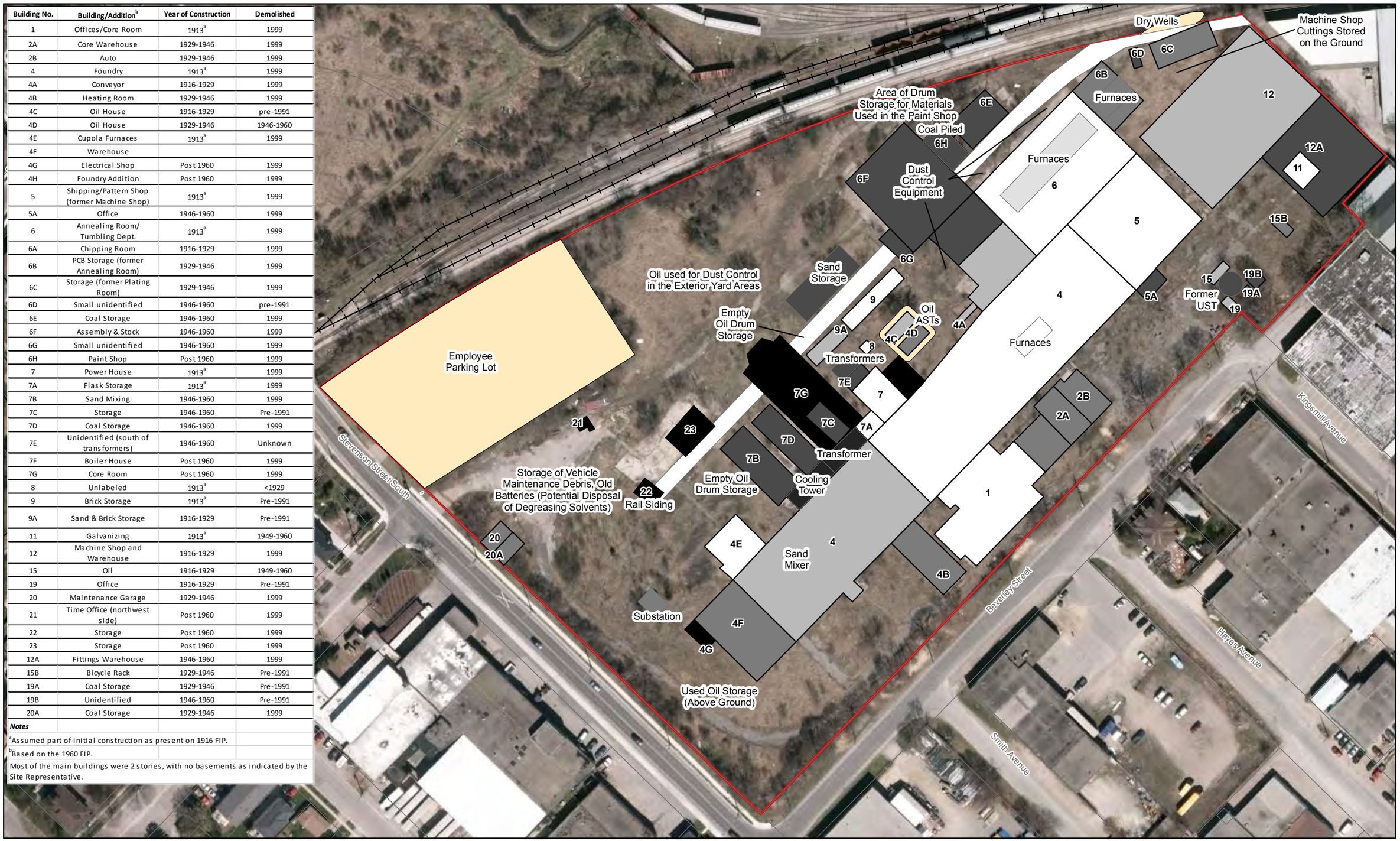
Building No.	Building/Addition[b]	Year of Construction	Demolished
1	Offices/Core Room	1913[a]	1999
2A	Core Warehouse	1929-1946	1999
2B	Auto	1929-1946	1999
4	Foundry	1913[a]	1999
4A	Conveyor	1916-1929	1999
4B	Heating Room	1929-1946	1999
4C	Oil House	1916-1929	pre-1991
4D	Oil House	1929-1946	1946-1960
4E	Cupola Furnaces	1913[a]	1999
4F	Warehouse		
4G	Electrical Shop	Post 1960	1999
4H	Foundry Addition	Post 1960	1999
5	Shipping/Pattern Shop (former Machine Shop)	1913[a]	1999
5A	Office	1946-1960	1999
6	Annealing Room/ Tumbling Dept.	1913[a]	1999
6A	Chipping Room	1916-1929	1999
6B	PCB Storage (former Annealing Room)	1929-1946	1999
6C	Storage (former Plating Room)	1929-1946	1999
6D	Small unidentified	1946-1960	pre-1991
6E	Coal Storage	1946-1960	1999
6F	Assembly & Stock	1946-1960	1999
6G	Small unidentified	1946-1960	1999
6H	Paint Shop	Post 1960	1999
7	Power House	1913[a]	1999
7A	Flask Storage	1913[a]	1999
7B	Sand Mixing	1946-1960	1999
7C	Storage	1946-1960	Pre-1991
7D	Coal Storage	1946-1960	1999
7E	Unidentified (south of transformers)	1946-1960	Unknown
7F	Boiler House	Post 1960	1999
7G	Core Room	Post 1960	1999
8	Unlabeled	1913[a]	<1929
9	Brick Storage	1913[a]	Pre-1991
9A	Sand & Brick Storage	1916-1929	Pre-1991
11	Galvanizing	1913[a]	1949-1960
12	Machine Shop and Warehouse	1916-1929	1999
15	Oil	1916-1929	1949-1960
19	Office	1916-1929	Pre-1991
20	Maintenance Garage	1929-1946	1999
21	Time Office (northwest side)	Post 1960	1999
22	Storage	Post 1960	1999
23	Storage	Post 1960	1999
12A	Fittings Warehouse	1946-1960	1999
15B	Bicycle Rack	1929-1946	Pre-1991
19A	Coal Storage	1929-1946	Pre-1991
19B	Unidentified	1946-1960	Pre-1991
20A	Coal Storage	1929-1946	1999

Notes

[a]Assumed part of initial construction as present on 1916 FIP.

[b]Based on the 1960 FIP.

Most of the main buildings were 2 stories, with no basements as indicated by the Site Representative.



N

0 10 20 30
Metres

Railway
Former IMICO Property Boundary
Historical Building Location (Approximate)
Historical Excavation area, EarthTech, 1999

Reference to Date Building Built

Fire Insurance Plan, 1916
Fire Insurance Plan, Maar. 1922, Reprinted Oct 1929
Fire Insurance Plan, Mar. 1922, Reprinted 1946
Fire Insurance Plan, June 1960
From Procter & Redfern Draft Report, June 10, 1991
Post 1960
Unknown Date
Unknown Date, Extent

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 6-2
Site Operations

Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 7-1
Potentially Contaminating Activities

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

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N

0 10 20 30
Metres

- Railway
- Former IMICO Property Boundary

Area of Potential Concern

- Annealing Room
- Auto
- Chipping/Grinding
- Coal Storage
- Drum Storage
- Former Electrical Shop
- Former PCB Storage
- Former Rail Line
- Former SubStation
- Former UST
- Former Waste Oil Storage
- Foundry
- Galvanizing
- Garage
- Machine Shop
- Off-Site APEC
- Oil House
- PCB Capacitors
- Paint Shop
- Plating
- Sand Mixing/Storage
- Sand Storage
- Transformers
- Unknown Fill Quality

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 7-2
Areas of Potential Concern

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

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Attachment A2
Phase Two ESA Summary

ATTACHMENT A2

Phase Two Environmental Site Assessment

This attachment provides an overview of the site investigation for the CH2M HILL Canada Limited (CH2M) draft Phase Two Environmental Site Assessment (ESA) document for the property identified as the former International Malleable Iron Company (IMICO) foundry facility, in Guelph, Ontario, currently in progress. The Phase Two is based on the current investigation, which began in September 2017, and historic investigations conducted by P&R (1991), Gartner Lee (1999; 2004), Earth Tech (1999), DCS (2007; 2014), AECOM (2012; 2013; 2014; 2015; 2016; 2017), and WSP (2016).

This Phase Two Summary provides an overview for the scope of work and results of the current investigations based on available data up to December 2018. Attachment B provides the Phase Two Conceptual Site Model (CSM), as documented in the draft Phase Two ESA. CH2M is in the process of completing an updated Phase Two ESA for the RA property, which will include additional subsurface investigations currently proposed for the Phase Two Property. The Phase Two ESA with updated analytical results and the finalized Phase Two CSM will be presented as part of a forthcoming risk assessment (RA) submission. The sample and analysis plan for the proposed additional work is provided as Attachment C.

The City of Guelph (City) retained CH2M to provide environmental services for the property located at 200 Beverley Street in Guelph, Ontario, hereafter referred to as the “Phase Two Property” or “Site” (refer to Figure 2-1 [Attachment A1]). The Site is approximately 5.2 hectares in size and is located east of the City’s downtown. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place.

The Site has undergone several subsurface environmental investigations between 1999 and 2018. CH2M has conducted field work to support and update these previous investigations at the Site; to meet current Ontario Regulation (O. Reg.) 153/04 (Ontario Ministry of the Environment, Conservation and Parks [MECP], 2011a), regulatory requirements; and to investigate or further investigate areas of potential environmental concern (APECs) identified during the Phase One ESA (CH2M, 2017). The Phase Two ESA is also being completed to support the future filing of a Record of Site Condition (RSC) for the Site to support the planned redevelopment of the Site.

Proposed Future Land Use

It is CH2M’s understanding that the City of Guelph is considering the property for potential redevelopment of the Site from industrial to one or more of residential, parkland, community, or commercial land use purposes.

Overview of Site Investigation

The Site has undergone several subsurface environmental investigations between 1999 and 2018. The current Phase Two ESA activities on the Site were completed between September 2017 and December 2018. Additional minor sampling and delineation activities are pending. The proposed scope of work is included in an sampling analysis plan (SAP) (Attachment C). Phase Two ESA activities on the Phase Two Property consisted of soil borings, test pits, and installation of groundwater monitoring wells. Analytical data from a total of 134 investigative locations advanced previously across the Site as part of historical Phase Two ESA investigations were considered reliable for use in the current Phase Two ESA. An additional 89 investigative locations, 32 boreholes and test pits, and 57 monitoring wells, were advanced as part of the Phase Two ESA investigation in 2017 and 2018. Analytical data from a total of 158 soil sampling locations and 93 groundwater sampling locations were used for the evaluation of contaminants of concern COCs as part of the Phase Two ESA.

The purpose of the Phase Two investigations were to support and update previous studies; to meet current O. Reg. 153/04, as amended (MECP, 2011a), regulatory requirements; to investigate or further investigate areas of potential environmental concern (APECs) identified during the Phase One ESA (CH2M, 2017); and to provide data to support future remedial activities or an RA that will need to be conducted prior to site redevelopment. In addition, the report is intended to support the eventual filing of an RSC and future redevelopment of the Phase Two Property.

During the Phase One ESA, CH2M identified areas where potentially contaminating activities (PCAs) have occurred on the Phase Two Property and on lands within 250 m of the Phase Two Property. PCAs occurring on the Phase Two Property were subsequently carried through the investigation as APECs, as required by O. Reg. 153/04, as amended. When offsite PCAs were identified as having the potential to impact the Phase Two Property, they were also carried through the investigation as APECs.

As summarized in the Phase One ESA (CH2M, 2017), 33 APECs were identified on the Phase Two Property, of which 29 were attributable to onsite PCAs and 4 were attributable to offsite PCAs (located within 250 m of the Phase Two Property). These APECs and PCAs were the focus of the Phase Two ESA activities. Figure 4-1 (Attachment B) shows the APECs identified in the Phase One ESA for the Phase Two Property, as well as the historical and recent Phase Two ESA borehole and monitoring well locations.

The principal objective of the Phase Two ESA is to enable the assessment and updating of current site conditions (considering previous findings and Site work), to identify general and current subsurface impacts that will need to be managed during site redevelopment. The Phase Two ESA included multiple soil and groundwater site investigations, as follows:

- Review of historical reports for previous subsurface investigations. A total of 106 boreholes, test pits, and confirmatory samples, and 38 monitoring wells were advanced or installed as a part of the historical investigations, resulting in 172 historical soil samples considered reliable for use in the Phase Two ESA. Groundwater samples were collected in 2007, and 2011 to 2016 by AECOM as part of an annual groundwater monitoring program, resulting in 186 historical groundwater samples that were considered reliable for use in the Phase Two ESA.
- Drilling 30 boreholes, and advanced 20 test pits for the collection of selected soil samples analyzed for COCs to address data gaps identified while reviewing the current and historical data, and to assess and determine subsurface stratigraphy. Boreholes and test pits were advanced as follows:
  - October 2017: 16 boreholes were advanced (BH17-200 through BH17-203, and MW17-100S, MW17-101D, MW17-102D, MW17-103D, MW17-104D, MW17-105D, MW17-106D, MW17-107S, MW17-108S, MW17-109S, MW17-110S, and MW17-111S) to depths of 0.89 to 3.2 metres below ground surface (mbgs).
  - October 2017: 9 test pits were advanced (TP17-300 through TP17-308) to depths of 1.22 to 2.59 mbgs.
  - June-July 2018: 14 boreholes were advanced (BH18-204 through BH18-208, and MW18-117S, MW18-120D, MW18-121S, MW18-122D, MW18-123D, MW18-124S, MW18-125S, MW18-126D, and MW18-129D) to depths of 2.29 to 3.66 mbgs.
  - July 2018: 11 test pits were advanced (TP18-309 through TP18-319) to depths of 1.21 to 2.89 mbgs.
- Installing 57 groundwater monitoring wells, and sampled from an additional 36 historical monitoring well locations, as follows:
  - September 2017: Sampled 26 existing monitoring wells (OW02, OW03-I, OW03-II, OW07-31, OW07-32, OW07-33, OW07-34D, OW07-34S, OW-07-37, OW07-38S, OW11-I, OW11-II, OW12, OW13-39D, OW13-39S, OW15, OW16, OW17, OW19, OW22D, OW22S, OW23D, OW24D, OW24S, OW25, and OW31).

  - October 2017: 17 monitoring wells were installed to depths ranging from 3.66 to 15.29 mbgs. Thirteen wells were installed in the overburden and bedrock contact zone: MW17-100S, MW17-101S, MW17-103S, MW17-104S, MW17-104D, MW17-105S, MW17-106S, MW17-106D, MW17-107S, MW17-108S, MW17-109S, MW17-110S, and MW17-111S. Screen depths ranged from 1.22-3.66 mbgs to 7.01-8.53 mbgs. Four wells were installed in the Eramosa Formation bedrock unit: MW17-101D, MW17-102D, MW17-103D, and MW17-105D. Screen depths ranged from 6.3-7.82 mbgs to 13.76-15.29 mbgs. Groundwater samples were collected in October and November 2017.
  - March 2018: sampled from 12 existing monitoring wells (MW17-101D, MW17-108S, OW07-31, OW07-33, OW09-II, OW11-II, OW12, OW13, OW14, OW19, OW22S, and OW23S).
  - April 2018: Sampled from five existing monitoring wells (MW17-101D, OW07-33, OW09-II, OW11-II, OW22S).
  - July 2018: Sampled from two existing monitoring wells (MW17-100S, MW17-104D).
  - July 2018: 27 monitoring wells were installed to depths ranging from 4.04 to 20.32 mbgs. Fourteen wells were installed in the overburden and bedrock contact zone : MW18-112S, MW18-113S, MW18-114S, MW18-115S, MW18-116S, MW18-117S, MW18-118S, MW18-119S, MW18-123S, MW18-124S, MW18-125S, MW18-121S, MW18-127S, and MW18-131S. Screen depths ranged from 2.51-4.03 mbgs to 4.26-5.79 mbgs. Thirteen wells were installed in the Eramosa Formation bedrock unit: MW18-107D, MW18-112D, MW19-116D, MW18-120D, MW18-121D, MW18-122D, MW18-123D, MW18-126D, MW18-128D, MW18-129D, MW18-130D, MW18-132D, and MW18-133D. Screen depths ranged from 6.4-9.49 mbgs to 12.44-20.32 mbgs. Groundwater samples were collected in July and August 2018.
  - October 2018: Sampled from seven existing monitoring wells (MW18-128D, MW18-130D, MW18-131S, MW18-132D, MW18-133D, OW25, and OW31).
  - November-December 2018: 13 monitoring wells were installed to depths ranging from 4.27 to 25.32 mbgs. Two wells were installed in the overburden and bedrock contact zone (MW18-134S and MW18-135S). Screen depths ranged from 2.74-4.27 mbgs to 9.75-11.28 mbgs. Eleven wells were screened in the Eramosa Formation (MW18-105G, MW18-112G, MW18-113D, MW18-114D, MW18-115D, MW18-119D, MW18-122G, MW18-134D, MW18-135D, MW18-136D, and MW18-136G). Screen depths ranged from 4.27-5.79 to 23.8-25.32. Groundwater samples were collected from all newly-installed wells and two existing wells were resampled (MW17-102D and MW18-112D).

- Collecting groundwater levels using an oil/water interface probe from the recently installed wells to determine groundwater elevations and to determine whether free-phase product was present.
- Conducted single-well hydraulic tests on 14 monitoring wells to improve the understanding of hydraulic properties of the subsurface materials across the Phase Two Property.
- Determining the applicable SCS.
- Surveying newly installed boreholes and new and existing monitoring wells, to a geodetic benchmark.

Figure 6-1 (Attachment B) shows the locations of the borings and wells, advanced as part of this Phase Two ESA, as well as during historical investigations. Environmental studies were conducted at the Site in the past, and the historical results were used as a screening method to focus the current Phase Two ESA work. Where reliable, as evaluated through a data quality evaluation (DQE), the historical results were used to supplement the Phase Two ESA results. In general, the historical data used are considered valid for inclusion in this Phase Two ESA.

Quality Assurance and Quality Control

Soil and groundwater sampling was preformed by CH2M staff with experience in intrusive field investigation techniques and with the COCs encountered at the Phase Two Property, under the guidance of the Qualified Person for ESAs according to MECP (O. Reg. 153/04) (QPESA). CH2M collected soil and groundwater samples in accordance with the standard operating procedures (SOPs) and field forms, which were developed in accordance with O. Reg. 153/04, as amended (MECP, 2011a).

The following sample packaging storage and transportation procedures were followed during the investigation:

1. Reviewed the project sampling plan to verify that samples for the required chemical parameters were collected and submitted for analysis.
2. Verified that the samples listed in the chain of custody (CoC) form were included in the sample shipment, and that the correct analysis was requested.
3. Included one laboratory-prepared trip blank in each cooler containing volatile organics (VOCs, BTEX, and PHC F1) samples.
4. Dispersed ice throughout the cooler to surround the sample bottles and to maintain a proper temperature of less than 10 degrees Celsius (°C) throughout the trip to the laboratory. Sample containers were packed upright, never lying on their sides, and at least one third of the cooler space was taken up by ice.
5. Placed a copy of the original CoC form in a resealable plastic bag in the cooler.
6. Kept a copy of the CoC form for the project records.
7. Samples marked “HOLD” were analyzed within the required holding time and holding temperature, if analyzed.

Quality assurance (QA)/quality control (QC) samples were collected as required by O. Reg. 153/04, as amended (MECP, 2011a).

Duplicate soil and groundwater samples were collected at a frequency of one duplicate for each 10 samples submitted. Duplicate soil samples were collected by vertically splitting core samples into two equal volumes prior to placing them in the appropriate sample containers. Duplicate groundwater samples were submitted ‘blind’ to the laboratory, and field staff documented in the field books each duplicate sample location.

Trip blanks were collected for coolers containing samples being submitted for volatile analysis at a frequency of one per day, regardless of the number of samples. Dedicated sampling equipment was used for groundwater sampling.

Samples were analyzed by ALS Laboratory Group (ALS), a laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. ALS, and subcontractor laboratories overseen by ALS, performed the chemical analysis in compliance with the MECP, Laboratory Services Branch, *Protocol for Analytical Methods Used in the Assessment of Properties under Past XV.1 of the Environmental Protection Act,* as amended (MECP, 2011b).

CH2M received soil and groundwater certificates of analysis from ALS electronically to reduce the possibility of transcription errors. The analyses were compiled into a database. The automation of data transfers from laboratory instruments to laboratory information management systems (LIMSs) also reduced the possibility of transcription errors. The results reported by ALS were quality-checked

internally by a project chemist before being uploaded to the database. Analytical results were reviewed and validated by the project chemist.

The data review and validation performed by the project chemist are documented in the DQE reports provided in the Phase Two ESA. The DQE assessed the quality of the analytical results for the samples submitted in batches with the Phase Two Property investigation samples.

The goals of the DQE were to demonstrate that a sufficient number of representative samples were collected, and that the resulting analytical data can be used to support the decision-making process. Based on the data validation findings, all CH2M data are valid and can be used for making project decisions with the limitations described in the DQE.

In consultation with the project chemist, the QP_{ESA} concluded that the data met the data quality objectives, the decision-making was not affected, and the overall objectives of the investigation and assessment were met.

Applicable Site Condition Standards

O. Reg. 153/04 (MECP, 2011a) under Part XV.1 of the *Environmental Protection Act* addresses the assessment, cleanup, and filing of an RSC for brownfield sites in Ontario and is applicable to the Phase Two Property. CH2M evaluated the Site based on a number of criteria to decide which of the generic SCS provided in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MECP, 2011c)*,* were applicable for a comparison of soil and groundwater results from the Phase Two ESA investigation.

The items in Table 2-3 were considered during the selection of the SCS, as outlined in O. Reg. 153/04, as amended (MECP, 2011a).

The special conditions for environmentally sensitive areas under Section 41 of O. Reg. 153/04 are potentially applicable to the Phase Two Property, as soil pH was found to range from 6.6 to 10.64 based on 91 soil samples. As discussed in Table 2-3, with the exception of two samples, the remainder of the soil samples were found to have a pH value within the Ministry's acceptable range (that is, a pH value in surface soil between 5 and 9, or a pH value in subsurface soil between 5 and 11). The soil from one borehole was determined to be "isolated fill" as concrete foundations were encountered both above and below the soil layer, isolating it from the overburden soils at the Site. For this reason, the soil pH from this sample was not considered representative of Site soils and was removed from consideration in determining soil pH at the Site. Therefore, the maximum pH concentration in soil is 9.45. A proposed sampling program is included in Attachment C to address the remaining pH value through the approved averaging techniques outlined in O. Reg 153/04 and to determine if the Table 1 SCS are potentially applicable or not. Based on the overall available pH data for the Site as noted above, it is currently assumed that, as a whole, pH will be confirmed within the acceptable range; therefore, Table 1 will not be applicable. The CSM and associated Phase Two report will be revised accordingly once the additional pH data is available, but currently assumes the Table 6 SCS is applicable.

The special conditions for land within 30 metres of a water body under Section 43.1 of O. Reg. 153/04 do not apply to the Phase Two Property; however, as bedrock has been encountered in the past at less than 2 metres below ground surface (DCS, 2014), the special condition for shallow soil properties cited under Section 43.1 of O. Reg. 153/04 applies to the Phase Two Property.

The Phase Two Property, and adjacent properties within 100 m are serviced by a municipal water source. As the groundwater in the vicinity of the Property does and will serve as a raw water supply for a drinking water system, the potable groundwater condition was applied. Based on this information, the *Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* for coarse-grained soil and residential/parkland/institutional property use (Table 6 SCS) was applied to the Site.

Additional Data Screening

As part of the Phase Two ESA, a thorough review of the soil and groundwater results was conducted as part of the screening and identification of COCs. Select soil and groundwater results, such as elevated laboratory reported detection limits or historical groundwater results where more recent data were available, were determined to not be representative of Site conditions. At the discretion of the QPESA for the Site, these data points have been excluded from the analytical database. The rationale for the removal of each of the data points is presented in Table 6-7b (soil) and Table 6-10b (groundwater).

Phase Two Environmental Site Assessment Results and Conclusions

Soil environmental conditions were characterized based on evaluation of historical samples, in addition to the recent investigations conducted for the Phase Two ESA.

Soil conditions were characterized using the Phase Two ESA sampling and reliable historical data, comprising 307 soil samples from 157 locations across the Phase Two Property. Refer to Figure 4-1 (Attachment B) for sample locations. The Phase Two Property was found to be generally impacted with the following parameters:

- Metals
- Petroleum hydrocarbons (PHCs)
- Volatile organic compounds (VOCs)

These types of impacts are consistent with the historical and industrial land use of the Phase Two Property, which included:

- Former Foundry (APEC-1)
- Machine Shop (APEC-2, APEC-12)
- Annealing Room (APEC-3)
- Sand Storage (APEC-4, APEC-15)
- Plating and Galvanizing (APEC-5, APEC-11)
- Chipping and Grinding (APEC-6)
- Former USTs (APEC-8)
- Former Rail Line (APEC-13)
- Former Auto Repair and Garage (APEC-14, APEC-20)
- Coal Storage (APEC-21)
- Paint Shop (APEC-23)
- Drum Storage (APEC-25)
- Former Electrical Shop (APEC-27)
- Waste Oil Storage (APEC-28)
- Unknown Fill Quality (APEC-29)

Localized soil impacts from polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, and xylenes (BTEX), and polychlorinated biphenyls (PCBs)were also identified in limited areas at the Phase Two Property. The presence of these parameters is consistent with the historical and industrial land use of the Site, including the use and storage of PCBs (APECs 16, 17, 22, 24, and 26).

Soil Exceedances of the Table 6 Site Condition Standards

The following soil quality summary is provided for the soil samples that exceeded the Table 6 SCS:

- Concentrations of metals in soil greater than the Table 6 SCS soil were identified in 143 samples (of 222) from 95 locations to a depth of 2.9 mbgs. Soil exceedances for metals were widespread across the Phase Two Property.
- Concentrations of PAHs in soil greater than the Table 6 SCS in 28 samples (of 112) from 20 locations, and were found along the western border, in the south-central area, and the eastern third of the Site. PAH exceedances were identified to a depth of 2.13 mbgs.
- Concentration of PHCs in soil greater than the Table 6 SCS in a total of 28 samples (of 122) from 22 locations. Exceedances were found to be localized to three areas along the western border, in the south-central area, and the eastern third of the Site. PHC exceedances were identified to a depth of 3.2 mbgs.
- Concentrations of BTEX in soil greater than the Table 6 SCS in a total of 3 soil samples (of 120) from 2 locations in the central and western areas of the Site. BTEX exceedances were identified to a depth of 1.22 mbgs.
- Concentrations of PCBs in soil greater than the Table 6 SCS in 6 samples (of 72) from 5 locations in three different areas to a depth of 1.3 mbgs.
- Concentrations of VOCs (specifically trichlorethylene) in soil greater than the Table 6 SCS in a total of 7 samples (of 100) from 5 locations within two areas along the southern and eastern borders of the Site. VOC exceedances were identified to a depth of 2.44 mbgs.
- Inorganics (that is, sodium adsorption ratio, electrical conductivity, and cyanide) were not detected at concentrations greater than the Table 6 SCS.
- Acid, base, and neutrals (ABNs), chlorophenols (CPs), and organochlorine pesticides (OCPs) were not detected at concentrations greater than the Table 6 SCS; however, reporting limits (RLs) were raised for some parameters resulting in RL exceedances of the Table 6 SCS.

Refer to the CSM for additional details (Attachment B) regarding soil quality and delineation.

Groundwater Exceedances of the Table 6 Site Condition Standards

Groundwater across the Phase Two Property was evaluated using data from 93 permanent monitoring wells screened in the overburden and bedrock contact zone, the competent Eramosa Formation bedrock unit, or the Goat Island Formation bedrock unit. Groundwater within the overburden and contact zone aquifer unit was identified to be generally impacted with VOCs, with localized impacts of metals (arsenic, lead, and zinc), BTEX, PAHs, and PHCs. Groundwater within the competent Eramosa Formation bedrock unit was identified to be generally impacted with VOCs, with localized impacts of metals (arsenic, lead, and zinc), benzene, and PHCs (F2 and F3). One well is installed in the deep Goat Island Formation aquifer unit and was found to be impacted with cis-1,2-dichloroethene.

The following groundwater quality summary is provided for the groundwater samples exceeding the Table 6 SCS:

- Concentrations of VOCs in groundwater were greater than the Table 6 SCS in 155 samples (of 259) in 52 locations. Exceedances of chloroethenes (specifically, 1,1-dichloroethene; cis-1,2-dichloroethene; tetrachloroethene; trans-1,2-dichloroethene; trichloroethylene; and vinyl chloride) were found to be

spread throughout the Site (mainly to the south and east) at all depth intervals. A total of 152 samples (of 258) from 50 locations had exceedances of the Table 6 SCS for chloroethenes. Exceedances of chloroethanes (specifically, 1,1,1-trichloroethane and 1,1-dichloroethane) were found to be localized to the southwestern area of the Phase Two Property primarily in the overburden and bedrock contact zone. One well screened within the competent Eramosa Formation aquifer (MW18-122D) had an exceedance of 1,1-dichloroethane.

- Concentrations of metals (primarily arsenic, lead, and zinc) in groundwater were greater than the Table 6 SCS in 71 samples (of 248) from 22 locations. Arsenic exceedances were localized to the north-central area of the Site. Lead exceedances were localized to OW09-II and OW07-33, however OW07-33 has had subsequent sampling results less than the Table 6 SCS. Many of the zinc exceedances were located on the eastern third of the Phase Two Property.
- Concentrations of BTEX in groundwater were greater than the Table 6 SCS in 56 samples (of 271) from 17 locations. Of these samples, concentrations of benzene were elevated in 55 samples from 16 locations, and exceedances of ethylbenzene were identified in 3 samples from 3 locations. Exceedances were localized to the eastern third of the Site and the south-central area along the southern boundary.
- Concentrations of PAHs in groundwater were greater than the Table 6 SCS in 24 samples (of 189) from 8 locations. Exceedances were localized to the eastern third, the north-central, and south-central portions of the Phase Two Property. All exceedances were found in wells screened in the overburden and contact zone aquifer; no PAHs impacts were reported in wells screened in the Eramosa Formation bedrock unit or the Goat Island bedrock unit.
- Concentrations of PHCs in groundwater were greater than the Table 6 SCS in 26 samples (of 207) from 8 locations. Light nonaqueous phase liquid (LNAPL) was observed at OW23S, MW17-108S, and MW18-135S. Exceedances were localized to the eastern third and the south-central area of the Phase Two Property which are limited to the overburden and contact zone aquifer. Two locations screened in the Eramosa Formation bedrock unit (OW18-II and MW23D) have generally have PHC concentrations less than the Table 6 SCS, with isolated exceedances occurring in 2015 and 2016. PHC concentrations have meet the Table 6 SCS in the most recent sampling events at these locations.
- Of the 25 samples analyzed in groundwater for PCBs, one location, OW26S, had an exceedance of the Table 6 SCS in 2010. Subsequent samples collected in 2011 and 2017 met the Table 6 SCS for PCBs; therefore, PCBs are not considered a groundwater COC for the Site.
- Inorganics (that is, sodium, chloride, and cyanide) were not detected at concentrations greater than the Table 6 SCS.
- ABNs were not detected at concentrations greater than the Table 6 SCS in 52 samples; however, reporting limits (RLs) were raised for 1,1'-biphenyl at OW23S resulting an RL exceedance of the Table 6 SCS.
- CPs and OCPs were not detected at concentrations above the method detection limits, and, therefore, did not exceed the Table 6 SCS.

Refer to the CSM for additional details (Attachment B) regarding groundwater quality and delineation.

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Tables

A2 Tables

Table 2-3. Items Considered for Site Condition Standards Selection

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Condition	Evaluation
Land use	The current land use is industrial, and the proposed future land use may include residential/parkland and commercial, provided an RSC acknowledged by the MECP is obtained.
Potable or non-potable groundwater	The Site and adjacent properties within 100 m are serviced by a municipal water source. As the groundwater in the vicinity of the Property does and will serve as a raw water supply for a drinking water system, the potable groundwater condition will be applied.
Proximity to surface water body	The Phase Two Property is not located within 30 m of a water body.
Proximity to areas of natural significance or environmentally sensitive areas	The Site is not considered to be within the proximity of an environmentally sensitive area based on the information reviewed as part of the Phase One ESA (CH2M, 2017).
Depth to bedrock	A property is considered a shallow soil property if one-third or more of the area consists of soil depths of 2 mbgs or less, excluding non-soil surface treatment (that is, asphalt, concrete, or aggregate) (MECP, 2011).The depth to bedrock is considered to be less than 2 m, and shallow soil was observed on one-third or more of the Phase Two Property.
pH of soil	Based on the results of the CH2M and historical investigations comprised of 91 analyses for pH, soil pH was found to range from 6.6 to 10.64. Two soil samples collected at BH17-204 and MW17-100S were measured with a pH value outside of the MECP's acceptable upper limit of 9 for surface soils. A review of the borehole logs from these locations indicated that concrete rubble or dust was likely present in the submitted samples which had pH values of 9.45 and 10.64. The soil from BH17-204 was determined to be "isolated fill" as concrete foundations were encountered both above and below the soil layer, isolating it from the overburden soils at the Site. For this reason, the soil pH from this sample was not considered representative of Site soils and was removed from consideration in determining soil pH at the Site. Therefore, the maximum pH concentration in soil is 9.45 from MW17-100s. All other pH values collected during the CH2M and historical investigations were within the MECP's acceptable range. A proposed sampling program is included in Attachment C, to address the remaining elevated pH value through the approved averaging techniques outlined in O. Reg. 153/04.
Soil texture	For this evaluation, due to the extensive presence of heterogeneous fill materials across the Site, the standards for coarse-grained soils were used to be conservative.

Sources:

CH2M. 2017. *Phase One Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverly Street, Guelph, Ontario*. August.

MECP. 2011. O. Reg. 153/04, made under the Environmental Protection Act, Records of Site Condition – Part XV.1 of the Act. As amended.

CH2M = CH2M HILL Canada Limited

m = metre

mbgs = metre(s) below ground surface

MECP = Ontario Ministry of the Environment, Conservation and Parks

Table 6-7b. Rationale for the Removal of Soil COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Rationale
ABN	1,1'-Biphenyl 1,2,4-Trichlorobenzene 2,4 & 2,6-Dinitrotoluene 3,3'-Dichlorobenzidine 4-Chloroaniline Bis (2-chloroethyl) ether Diethylphthalate Dimethylphthalate	Parameters with existing SCS but RL exceedances only	Two surface samples (original and field duplicate) collected at TP17-300 in 2017 (Lab report L2003037)	The laboratory report indicates adjusted detection limits due to sample matrix effects (i.e., chemical interference, colour, and turbidity), preventing the determination of the presence or absence of the parameters (greater or less than regular detection limits), which may be due to the nature of the fill materials. Concentrations of these ABNs have not been detected elsewhere on the Site, including the 11 other locations where ABNs were analyzed as a COPC and RLs met the SCS. Additionally, a sample collected from a deeper interval at TP17-300 did not have raised RLs and met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Site.
ABN	2,4 & 2,6-Dinitrotoluene 3,3'-Dichlorobenzidine Dimethylphthalate	Parameters with existing SCS but RL exceedances only	Six surface samples from 1991 (lab report 91-4281/P&R_E.O.90K2)	Parameters were run as part of older BNA laboratory scans alongside VOCs and PAHs, and were not targeted COCs. Historical laboratory RLs may not have had capabilities to meet current SCS. Concentrations of these ABNs have not been detected elsewhere on the Site, including the 11 locations where ABNs were analyzed as a COPC and RLs met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Site.
ABN	2,4-Dinitrophenol	Parameters with existing SCS but RL exceedances only	Seven surface samples from three locations (MW17-105D, TP17-300 and TP17-301) in 2017, including 2 duplicates (lab report L2003037).	Lab indicated matrix effects as the reason for an RL increase, which may be due to the nature of the fill materials. No detected concentrations of 2,4-dinitrophenol have been reported at the Site, including the 9 other locations where ABNs were analyzed as a COPC and RLs met the SCS. Additionally, a sample collected from a deeper interval at MW17-105D did not have raised RLs and met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Site.
CP	2,4-Dichlorophenol Pentachlorophenol	Parameters with existing SCS but RL exceedances only	Seven surface samples from three locations (MW17-105D, TP17-300 and TP17-301) in 2017, including 2 duplicates (lab report L2003037).	Lab indicated matrix effects as the reason for an RL increase, which may be due to the nature of the fill materials. No detected concentrations of 2,4-dichlorophenol and pentachlorophenol have been reported at the Site, including the 9 other locations where ABNs were analyzed as a COPC and RLs met the SCS. Additionally, a sample collected from a deeper interval at MW17-105D did not have raised RLs and met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Site.
CHEMISTRY	Phosphorus	Parameters with no Table 6 SCS but exceeds the OTR value	Two samples from TP13-11 (TP11-6 and DUP2) in 2013 (Lab report B3K9090)	Two of 43 samples analyzed for phosphorus were above the OTR value of 1635 µg/g. The remaining 41 samples had concentrations of phosphorus below the OTR value. Samples were from 1991, 2007 and 2013 as phosphorus was analyzed as part of the historical laboratory metal suites; it was not targeted as a COC. As phosphorus is considered a nutrient and is not a COPC associated with any APEC on Site, and at the discretion of the QPESA, phosphorus is not considered to be a COC for the Site.
METALS	Chromium, Hexavalent (Cr6+)	Parameters with existing SCS but RL exceedances only	24 RL exceedances from 1991 (Lab reports P&R_E.O.90K26, 91-4543/P&R_E.O.90K2, 91-4281/P&R_E.O.90K2, 91-4543/91-4281)	All 24 samples collected in 1991 for hexavalent chromium had RL exceedances. Historical laboratory RLs may not have had capabilities to meet current SCS. Recent sampling conducted in 2007, 2017, and 2018 do not show concentrations detected on the Site above the SCS (65 results with non detect concentrations below the SCS and 6 samples with detected concentrations below the SCS). Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Site.
METALS	Cyanide	Parameters with existing SCS but RL exceedances only	All historical samples (five from 1991 and 20 from 2007) (Lab reports 91-281/P&R_E.O.90K2, P&R_E.O.90K26, 91-4281, 07T209831, 07T211735)	All samples analyzed for cyanide in 1991 and 2007 had RL exceedances. Historical laboratory RLs may not have had capabilities to meet current SCS. Recent sampling conducted in 2017 and 2018 have 51 results with nondetect concentrations below the SCS. No concentrations of cyanide have been detected at the Site. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Site.
METALS	Bismuth	Parameters with no Table 6 SCS and no OTR value	12 samples from 2013 (Lab report B3K9090)	Samples collected as part of historical testpitting activities in 2013 included a full metals scan including bismuth. All other metals without an SCS had an OTR value to compare concentrations except for bismuth. Concentrations ranged from non detect values to 150 µg/g. Bismuth was not a targeted COC. Based on the available information, and at the discretion of the QPESA, bismuth is not considered to be a COC for the Site.
METALS	Calcium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	20 samples from 18 locations collected between 2007 and 2013.	20 of a total of 43 samples from between 2007 and 2013 had results with detected concentrations greater than the OTR value of 53,508 µg/g. Calcium was analyzed as part of the historical laboratory metal suites and was not targeted as a COC. As the bedrock in the region is limestone and dolostone which typically abundant with calcium and magnesium, it is likely that soils in the region would also contain naturally elevated calcium concentrations. As calcium is considered a naturally occurring element and not a COPC associated with any APECs on Site, and at the discretion of the QPESA, calcium is not considered to be a COC for the Site.

Table 6-7b. Rationale for the Removal of Soil COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Rationale
METALS	Iron	Parameters with no Table 6 SCS but detected concentrations above the OTR value	7 samples from 1991, 1 sample from 2007, and 1 sample from 2013	9 of a total of 43 samples had detected concentrations exceeding the OTR value of 37808 µg/g. The remaining 36 samples all had detected concentrations below the OTR value. Iron was analyzed as part of the historical laboratory metal suites and was not targeted as a COC. As iron is considered a naturally occurring element and is not a COPC associated with any APECs on Site, and at the discretion of the QPESA, iron is not considered to be a COC for the Site.
METALS	Magnesium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	9 samples from 1991, 4 samples from 2007, and 6 samples from 2013	19 of a total of 43 samples had results with detected concentrations greater than the OTR value of 17,400 µg/g. The remaining 24 samples had detected concentrations below the OTR value. Magnesium was analyzed as part of the historical laboratory metal suites and was not targeted as a COC. As the bedrock in the region is limestone and dolostone which typically abundant with calcium and magnesium, it is likely that soils in the region would also contain naturally elevated magnesium concentrations. As magnesium is considered a naturally occurring element and not a COPC associated with any APECs on Site, and at the discretion of the QPESA, magnesium is not considered to be a COC for the Site.
METALS	Sodium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	6 samples from 1991, and 4 samples from 2013	10 of a total of 43 samples had detected concentrations greater than the OTR value of 215 µg/g. 29 of the remaining 33 samples had detected concentrations of sodium below the OTR value, and 4 samples had non detected concentrations of sodium. Sodium was analyzed as part of the historical laboratory metal suites, and current methods analyze Sodium risks using SAR analysis. All SAR results are below the SCS. Based on the available information, including SAR results below the SCS, at the discretion of the QPESA, sodium is not considered to be a COC for the Site.
METALS	Strontium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	7 samples, 2 from 1991 and 5 from 2013	7 of a total of 43 samples had detected concentrations greater than the OTR value of 87.5 µg/g, with a maximum of 190 µg/g. The remaining 36 samples had detected concentrations of strontium below the OTR value. Strontium was analyzed as part of the historical laboratory metal suites and was not targeted as a COC. As strontium is considered a naturally occurring element and is not a COPC associated with any APEC on Site, and at the discretion of the QPESA, strontium is not considered to be a COC for the Site.
OCP	Hexachlorobutadiene Hexachloroethane	Parameters with existing SCS but RL exceedances only	6 historical samples from 1991 with RL exceedances in soil.	All samples analyzed for hexachlorobutadiene and hexachloroethane in 1991 had RL above the SCS. Historical laboratory RLs may not have had capabilities to meet current SCS. These individual OCP parameters (including hexachlorobenzene and hexachloropentadiene) were run as part of older BNA laboratory scans alongside VOCs and PAHs, and were not targeted COCs. OCPs are not considered to be a COPC on Site, and therefore were not analyzed in the 2017/2018 environmental investigations. Based on the available information, at the discretion of the QPESA, these parameters are not considered to be COCs for the Site.
VOC	1,1,2,2-Tetrachloroethane	Parameters with existing SCS but RL exceedances only	One sample from MW17-108S in 2017 (2.74 to 2.9 mbgs) (Lab report L2007635)	One sample of 100 analyzed contained an RL exceedance. Laboratory report indicated adjusted detection limits due to co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 99 samples, including one sample collected at a deeper interval at the same location, had non detected concentrations of this parameter which met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be a COC for the Site.
VOC	Bromomethane Vinyl Chloride	Parameters with existing SCS but RL exceedances only	One sample from BH07-67 in 2007 (Lab report 07T209831)	One sample of 100 contained RL exceedances for the noted VOCs. Laboratory report indicated adjusted detection limits due to co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 99 samples, including one sample collected at a deeper interval at the same location, had non detected concentrations of these parameters. Additionally, for vinyl chloride, the occurrence of the raised RL is at a location 150m away from the closest detections of a potential parent compound (trichloroethylene) which was detected in two locations on Site in soil (at a max of 1 µg/g). All other locations and chlorinated parameters have not been detected in soil on Site. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be a COC for the Site.
VOC	Dichloromethane	Parameters with existing SCS but RL exceedances only	MW17-107S-0.5-2 RL exceedance in soil (Lab report L2007635)	One sample of 100 contained RL exceedances for the noted VOCs. Laboratory report indicated adjusted detection limits due to co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 99 samples had non detected concentrations of this parameter. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be a COC for the Site.

Table 6-7b. Rationale for the Removal of Soil COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Rationale

Notes:

The rationale for exclusion of COCs listed in this table is based on the data collected as part of the ESA and only applies to this ESA.

µg/g = microgram per gram
ABN = acid, base, and neutral compound
APEC = area of potential environmental concern
COC = contaminant of concern
COPC = contaminant of potenical concern
CP = chlorophenol
ESA = Environmental Site Assessment
mbgs = metre(s) below ground surface
RL = laboratory reporting limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
No. = number
OCP = organochlorine pesticide
PAH = polycyclic aromatic hydrocarbon
PCA = potentially contaminating activity
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
QPESA = MECP Qualified Person for Environmental Site Assessment
RSC = Record of Site Condition
SCS = Site Condition Standards
VOC = volatile organic compound

Table 6-10b. Rationale for the Removal of Groundwater COCs

200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
ABN	1,1'-Biphenyl	Parameters with existing SCS but RL exceedances only	OW23S RL exceedance in 2014 (Lab report B4J8984 from Maxxam)	1,1-Biphenyl was run as part of a historical PAH laboratory scan, and was not a targeted as a COC for the area. No detected concentrations of 1,1'-biphenyl have been reported at the Site. The raised RL is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. The remaining 44 locations where 1,1-biphenyl was analyzed did not report detected concentrations and RLs met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.
BTEX	Benzene Ethylbenzene	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW22S exceedance in 2016, subsequent two events in 2017 and 2018 meet SCS	Benzene was measured at 1.1 µg/L and toluene at 7.1 µg/L in 2016 at OW22S. Historical analyses from seven sampling events and two sampling events in 2017 and 2018 at this location met the SCS of 0.5 and 2.4 µg/L, respectively. Based on the available information, these parameters were determined to likely not be present at OW22S at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
BTEX	Benzene Ethylbenzene	Parameters with existing SCS and both RL and detected exceedances	OW24D RL exceedances in 2010, 2011, 2012, 2014, and 2015.	The VOC parameters noted had RLs exceeding the SCS at OW24D from samples collected between 2010 and 2015. Laboratory reports indicated that detection limits were adjusted as the sample required dilution due to high concentrations of other target analytes (review indicated PHC F1 and chlorinated VOCs were up to 5,400 µg/L). Samples collected in 2017 and 2018 from OW24D had non-detect concentrations reported with RLs meeting the SCS. Based on the available information, these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
BTEX	Toluene Xylenes	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances in 2010, 2011, 2012, 2014, and 2015.	Groundwater samples from OW24D had raised RLs for six events between 2010 and 2015. Toluene RLs exceeded the SCS. All raised xylene RLs met the SCS. Laboratory reports indicated that detection limits were adjusted as the sample required dilution due to high concentrations of other target analytes (review indicated PHC F1 and chlorinated VOCs were up to 5,400 µg/L). Samples from this location taken in 2016 and 2017 did not have raised RLs which met the SCS. Toluene and xylenes met the SCS at all other locations on the Phase Two Property. Based on the available information these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, these parameters were not considered to be COCs for the Phase Two Property.
CHEMISTRY	Alkalinity, Bicarbonate (as CaCO3), Alkalinity, Total (as CaCO3), Calcium, Fluoride, Iron, Manganese, Potassium	Parameters with no Table 6 SCS but exceeds the PGMIS value	All samples analyzed (range from 2012 to 2016)	Chemistry parameters (pH, conductivity, alkalinity, specific conductance) and major ions (fluoride, chloride, nitrate, nitrite, bromide, phosphate, sulfate, calcium, potassium, manganese, sodium) were introduced into the annual groundwater monitoring program in 2010 and analyzed for until 2016. Iron was included in analytical suites in 2012 to 2014 and 2016. Alkalinity (both bicarbonate and total) exceeded the PGMIS value of 55,000 µg/L in all 134 samples and ranged from 250,000 to 550,000 µg/L. Calcium exceeded the PGMIS value of 431,000 µg/L in one of 134 samples with a concentration of 440,000 µg/L. Fluoride exceeded the PGMIS value of 2090 µg/L in 11 of 77 samples with concentrations up to 3,900 µg/L. Iron exceeded the PGMIS value of 4090 µg/L in 7 of 58 samples with concentrations up to 8900 µg/L. Manganese exceeded the PGMIS value of 717 µg/L in 4 of 58 samples with concentrations up to 1200 µg/L. Potassium exceeded the PGMIS value of 20,700 µg/L in one of 134 samples with a concentration of 30,600 µg/L. Rationale was not provided for the analyses of these parameters, as they were not required under the MOE Provincial Order that the annual groundwater monitoring was conducted under. Parameters analyzed were those typically collected for monitoring geochemical conditions in groundwater for potential remediation options or the occurrence of degradation or attenuation of contaminants. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.

Table 6-10b. Rationale for the Removal of Groundwater COCs

200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
CHEMISTRY	Ammonia, Electrical Conductivity, Specific conductance, Bromide	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	All samples analyzed (range from 2012 to 2016)	Chemistry parameters (pH, conductivity, alkalinity, specific conductance) and major ions (fluoride, chloride, nitrate, nitrite, bromide, phosphate, sulfate, calcium, potassium, manganese, sodium) were introduced into the annual groundwater monitoring program in 2010 and analyzed for until 2016. Ammonia was included in the analytical suites from 2012 to 2014. Ammonia had detected concentrations in 41 of 57 samples collected with concentrations up to 1,750 µg/L. Bromide had detected concentrations in one of 77 samples collected with a concentration of 1,000 µg/L (at the detection limit). Electrical conductivity ranged from 0.5 to 2.0 mS/cm. Specific conductance ranged from 500 to 1,800 umhos/cm. Rationale was not provided for the analyses of these parameters, as they were not required under the MOE Provincial Order that the annual groundwater monitoring was conducted under. Parameters analyzed were those typically collected for monitoring geochemical conditions in groundwater for potential remediation options or the occurrence of degradation or attenuation of contaminants. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.
CHEMISTRY/METALS	Silica (as SIO2), Sulfur, Cesium (Cs), Lithium, Rubidium (Rd), Silicon, Tin	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	One sample from OW31 from September 2016 (Lab report L1830739)	A full metals suite was run for the groundwater sampling completed in 2016 at OW31. A number of parameters did not have SCS values or PGMIS values to compare concentrations. Detected concentrations can occur naturally, however background concentrations for these parameters in groundwater have not been documented in Ontario. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.
METALS	Antimony	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	MW18-114D exceedance in December 2018, subsequent event in December 2018 meets SCS	Antimony was measured at a concentration of 6.2 µg/L in December 2018 at the newly installed MW18-114D. Antimony was not detected at concentrations greater than the SCS in the shallower MW18-114S nested with MW18-114D. A subsequent sample event in December 2018 had a concentration less than the SCS at 1.54 µg/L. A second sampling event is planned to confirm this result. All other samples in groundwater (100 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.
METALS	Arsenic	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	MW17-101D exceedance in 2017, subsequent two events in 2018 meet SCS	Arsenic was measured at 44.8 µg/L in 2017 at MW17-101D. Subsequent two sampling events in 2018 are significantly below the SCS of 25 µg/L, at 6.87 and 6.19 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however was carried through as a COC due to detected concentrations exceeding the SCS at another location on the Phase Two Property.
METALS	Cobalt	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW11-II exceedance in 2017, subsequent two events in 2018 meet SCS	Cobalt was measured at 5.79/5.74 µg/L in 2017 at OW11-II. No historical analyses at this location analyzed for cobalt. Subsequent two sampling events in 2018 are less than the SCS of 3.8 µg/L, at 1.36 and <0.10 µg/L. All other samples in groundwater (90 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.
METALS	Lead	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW07-33 exceedance in 2017, subsequent two events in 2018 meet SCS	Lead was measured at 15/15.6 µg/L in 2017 at OW07-33. A sample collected in 2007 met the SCS of 10 µg/L with a concentration of 4.07 µg/L along with two subsequent sampling events in 2018, at 8.9 and 7.37/7.68 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however was carried through as a COC due to detected concentrations exceeding the SCS at another location on the Phase Two Property.
METALS	Uranium	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW22S exceedance in 2017, subsequent two events in 2018 meet SCS	Uranium was measured at 25.9 µg/L in 2017 at OW22S. No historical analyses at this location analyzed for uranium. Subsequent two sampling events in 2018 were less than the SCS of 20 µg/L , at 7.24 and 6.05 µg/L. All other samples in groundwater (84 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.

Table 6-10b. Rationale for the Removal of Groundwater COCs

200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
METALS	Zinc	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW26S exceedance in 2012, subsequent three events meet SCS; OW12 exceedance in 2010, subsequent three events meet SCS.	Zinc was measured at concentrations of 900 µg/L and 910 µg/L at OW26S and OW12, respectively. Historical analyses at these locations had zinc concentrations less than the SCS. Three subsequent sampling events at each location (in 2013, 2014, and 2017 for OW26S; and in 2011 [two samples] and 2017 for OW12) had concentrations of zinc less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at these locations; however, was carried through as a COC due to detected concentrations exceeding the SCS at another location on the Phase Two Property.
PAH	Acenaphthylene	Parameters with existing SCS but RL exceedances only	OW23S and OW22S with RL exceedances from 2012 to 2016.	Groundwater samples from OW23S (5 samples) and OW22S (1 sample) had raised RLs for up to five events between 2012 and 2016. Laboratory reports noted that detection limits were adjusted as the sample required dilution due to the nature of the sample matrix. The raised RL at OW23S is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. Samples taken at OW23S (parent and duplicate) in 2018 reported detected concentrations less than the SCS. All other samples collected at OW22S met the SCS (2012 to 2015, and 2018). The remaining 170 samples collected from other locations on the Site had concentrations less than the SCS (7 samples) or non detected concentrations, with RLs meeting the SCS of 1 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be COCs for the Phase Two Property.
PAH	Benzo(g,h,i)perylene Dibenzo(a,h)anthracene Indeno(1,2,3-Cd)Pyrene	Parameters with existing SCS but RL exceedances only	8 samples from 3 locations (OW22S, OW23S, OW25) with RL exceedances of the SCS from between 2011 to 2016.	Groundwater samples from OW23S (5 samples), OW22S (2 samples) and OW25 (one sample) had raised RLs for up to five events between 2011 and 2016. Some of the laboratory reports noted that detection limits were adjusted as the sample required dilution due to the nature of the sample matrix, and it is likely that all 8 samples required dilution, causing the detection limits to be adjusted accordingly. The raised RL at OW23S is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. Samples taken at OW23S in 2018 reported detected concentrations less than the SCS. All other samples collected at OW22S (2013 to 2015, and 2018) and OW25 (2010 to 2017) met the SCS. The remaining 160 samples collected from other locations on the Site had concentrations less than the SCS (6 samples) or non detect concentrations with RLs meeting the SCS of 0.2 µg/L. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Phase Two Property.
PCB	PCBs, Total	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW26S exceedance in 2010, subsequent two events in 2018 meet SCS	PCBs were measured at 1.27 µg/L in 2010 at OW26S. Subsequent sampling events in 2011, 2017 and 2018 and were reported with non-detect concentrations, and RLs less than the SCS of 0.20 µg/L. All other samples in groundwater (24 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be COCs for the Phase Two Property.
PHCs	PHC F2	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW18-II exceedance in 2015, subsequent two events meet SCS	PHC F2 was measured at 210 µg/L in 2015 at OW18-II in November 2015. Six previous sampling events (2010, 2011 [two samples], 2012, 2013, and 2014) and two subsequent sampling events (2016 and 2017) reported concentrations less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however was carried through as a COC due to detected concentrations exceeding the SCS at another location on the Phase Two Property.
SVOC	Benzo(e)pyrene	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	1 sample from OW22S with a detected concentration in 2013	One of 15 samples (only analyzed in 2013) had a detected concentration of 0.065 µg/L of benzo(e)pyrene. Benzo(e)pyrene was run as part of a historical PAH laboratory scan, and was not a targeted as a COC for the area. The remaining 14 locations where benzo(e)pyrene was analyzed did not report detected concentrations. As this parameter was not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, it was not considered to be COCs for the Phase Two Property.

Table 6-10b. Rationale for the Removal of Groundwater COCs

200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
VOC	1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,2-Dibromoethane 1,2-Dichlorobenzene 1,2-Dichloroethane 1,2-Dichloropropane 1,3-Dichloropropene 1,4-Dichlorobenzene Bromoform Bromomethane Carbon tetrachloride Styrene	Parameters with existing SCS but RL exceedances only	All samples with RL exceedances between 2010 and 2015	VOC parameters noted had RL exceedances in a number of samples between 2010 and 2015. All locations were resampled in 2017 and 2018 and had reported non-detect concentrations with RLs meeting the SCS. No other locations reported exceedances of the SCS for these parameters. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Phase Two Property.
VOC	1,3-Dichlorobenzene 2-Butanone Acetone Chlorobenzene	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances in 2015	One sample collected at OW24D had RL exceedances for each of the noted VOCs in 2015. All other samples collected from this location between 2010 and 2018 (seven events) reported non detect concentrations with RLs meeting the SCS. All other samples collected on the Phase Two Property had non detected concentrations of the noted VOCs, with the exception of 2 samples that had detected concentrations of acetone less than the SCS. Laboratory reports indicated that detection limits were adjusted as the sample required dilution due to high concentrations of other target analytes. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Phase Two Property.
VOC	4-Methyl-2-Pentanone Chlorodibromomethane Bromodichloromethane Dichloromethane Methyl tert-butyl ether (MTBE)	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances of the SCS in 2010, 2011, 2012, 2014, and 2015.	6 samples collected from OW24D had RL exceedances for each of the noted VOCs between 2010 and 2015. Samples from 2016 and 2017 reported non detect concentrations with RLs meeting the SCS. The remaining samples on the Phase Two Property also had non detected concentrations of the noted VOCs less than the SCS. Laboratory reports indicated that detection limits were adjusted as the sample required dilution due to high concentrations of other target analytes. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Phase Two Property.
VOC	1,1,1-Trichloroethane 1,1-Dichloroethane	Parameters with existing SCS and both RL and detected exceedances	Samples from OW24D with RL exceedances between 2010 and 2015	VOC parameters noted had RLs exceeding the SCS at OW24D from samples collected between 2010 and 2015. Detected exceedances were noted elsewhere on the property: 1,1,1-trichloroethane exceeded the SCS at OW12; 1,1-dichloroethane exceeded the SCS at OW26S; both more than 200 metres away (downgradient) on the western portion of the property. Samples collected in 2017 and 2018 from OW24D had non-detect concentrations reported with RLs meeting the SCS. Based on the available information, these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, the elevated RLs were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
VOC	n-Hexane Tetrachloroethene	Parameters with existing SCS and both RL and detected exceedances	Samples with RL exceedances between 2010 and 2015	N-hexane had noted RLs exceeding the SCS from several samples collected between 2010 and 2015. Detected exceedances were only noted at MW17-105S for n-hexane and OW19 and MW17-107S for tetrachloroethene. Locations with RLs only exceeding the SCS had samples meeting the SCS in two or more other sampling events. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS at the locations with the elevated RLs; therefore at the discretion of the QPESA, the elevated RLs were not carried through for the dataset for the Risk Assessment. These parameters were retained as a COC for the Phase Two Property based on other locations exceeding the SCS.
VOC	1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,2-Dibromoethane	Parameters with existing SCS but RL exceedances only	Two samples from OW22S has RL exceedances of the SCS in 2017 and 2018.	These VOCs had elevated RLs in two samples collected in 2017 and 2018. Both the laboratory reports noted that the detection limits were adjusted due to "to interference from volatile hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits)." The RLs for these VOCs met the SCS in three prior sampling events at this location. Based on the available information, these parameters were determined to likely not be present at OW22S at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, were not considered to be COCs for the Phase Two Property.

Table 6-10b. Rationale for the Removal of Groundwater COCs

200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
VOC	Chloroform	Parameters with existing SCS but RL exceedances only	14 samples from 5 locations had RL exceedances of the SCS from 2010 to 2015.	14 of 232 samples analyzed for chloroform had RL exceedances of the SCS. 200 of the remaining 218 samples had non detected concentrations below the SCS, 8 had detected concentrations below the SCS. Some of the laboratory reports noted that detection limits were adjusted as the sample required dilution due to high concentrations of other target analytes. Due to the presence of high concentrations of VOCs on the Site, it is likely that the samples required dilution, causing the detection limits to be adjusted accordingly. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.
VOC	Chloroform	Parameter with "introduced" exceedance	1 sample from MW18-112G had a detected exceedance of the SCS from December 2018.	The initial groundwater sample collected on November 22, 2018 from MW18-112D after drilling/bedrock coring, purging, and well development had a concentration of 5.8 µg/L greater than the SCS of 2 µg/L. The source of the chloroform exceedance was believed to be related to the municipal water that was used during the bedrock coring process. Two samples, one from the water truck and one from the water truck hose that was used during the coring activities were analyzed for VOCs. All VOCs were non detect in these samples apart from bromodichloromethane (12.5 to 12.9 µg/L), dibromochloromethane (11.5 to 11.8 µg/L), and chloroform (9.8 to 10.1 µg/L). These analytes are trihalomethanes that are typically present in municipally-treated water. Two subsequent groundwater samples were collected on November 29 and December 3, 2019 with non detect concentrations of chloroform less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, was not considered to be a COC for the Phase Two Property.

Notes:

The rationale for exclusion of COCs listed in this table is based on the data collected as part of the ESA and only applies to this ESA.

µg/L = micrograms per gram
ABN = acid, base, and neutral compound
APEC = area of potential environmental concern
COC = contaminant of concern
COPC = contaminant of potenical concern
CP = chlorophenol
ESA = Environmental Site Assessment
mbgs = metre(s) below ground surface
RL = laboratory reporting limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
No. = number
OCP = organochlorine pesticide
PAH = polycyclic aromatic hydrocarbon
PCA = potentially contaminating activity
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
QPESA = MECP Qualified Person for Environmental Site Assessment
RSC = Record of Site Condition
SCS = Site Condition Standards
VOC = volatile organic compound

Attachment B
Phase Two Conceptual Site Model

Phase Two Conceptual Site Model

Based on recent and historical Phase Two Environmental Site Assessment (ESA) work completed at 200 Beverley Street (Phase Two Property or Site) in Guelph, Ontario, a Phase Two CSM is provided and discussed in this attachment, as required under Ontario Regulation (O. Reg.) 153/04 (MECP, 2011a). The Site is located east of downtown Guelph, Ontario, and is approximately 5.2 hectares (ha) in size. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place. Further details regarding the Phase Two Property are provided in Attachments A1 and A2. The location of the Phase Two Property is shown on Figure 2-1 (Attachment A1), and a more detailed Site Plan is shown on Figure 2-2 (Attachment A1).

Potentially Contaminating Activities

The Phase One ESA (CH2M, 2017) identified 77 potentially contaminating activities (PCAs) resulting in 33 areas of potential environmental concern (APECs). The following PCAs were identified during the Phase One ESA (CH2M, 2017) on the Phase Two Property, and resulted in an APEC:

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 30 – Importation of Fill Material of Unknown Quality
- 32 – Iron and Steel Manufacturing and Processing
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing or Bulk Storage
- 46 – Rail Yard, Tracks, and Spurs
- 55 – Transformer Manufacturing, Processing and Use

The following PCAs were identified during the Phase One ESA (CH2M, 2017) outside the Phase Two Property, but within the Phase One Study Area:

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 10 – Commercial Autobody Shops
- 11 – Commercial Trucking and Container Terminals
- 12 – Concrete, Cement and Lime Manufacturing
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing or Bulk Storage
- 43 – Plastics (including Fiberglass) Manufacturing and Processing
- 45 – Pulp, Paper and Paperboard Manufacturing and Processing
- 46 – Rail Yard, Tracks, and Spurs
- 49 – Salvage Yard, including Automobile Wrecking
- 55 – Transformer Manufacturing, Processing and Use
- 57 – Vehicles and Associated Parts Manufacturing

Areas of Potential Environmental Concern

As indicated, the Phase One ESA (CH2M, 2017) identified several PCAs that resulted in APECs for the Phase Two ESA. As summarized from the Phase One ESA, 33 APECs were identified on the Site, with

29 attributable to onsite PCAs, and 4 APECs attributable to offsite PCAs located within 250 metres (m) of the Phase Two Property.

The following APECs were identified for the Phase Two Property:

1) Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS, 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main Foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech, 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the north west corner of the building and drained to the truck bay (P&R, 1991).

2) Machine Shop - A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945 and 1960 showed this area changed operations to 'Shipping' and a 'Pattern Shop'.

3) Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the north wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't'. The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or USTs for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel oil fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the north side of the Annealing Room.

4) Sand Storage - The 1916 FIP shows a 'Sand Shed'. The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand'. The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks', and an additional area to the north labeled 'Sand'. No information was identified to if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.

5) Galvanizing Building - A small free-standing building for 'Galvanizing' was present on the south east portion of the Site as shown on the 1916, 1929 and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.

6) Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946 and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing

Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior west side of the building.

7) Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil", and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the north building remaining, but is not labeled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R, 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech, 1999).

8) Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labeled as a 'time office'), but does not show the UST. The gasoline use is not known, however it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R, 1991).

9) Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil". The building/structure is not on 1916 FIP where the area is shown as exterior yard area, and is not present on the 1960 FIP where the area is occupied.

10) Machine Shop - A machine shop is shown on the 1929, 1946 and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop.

11) Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS, 2007a). Borehole logs for OW22S/D indicate the presence

of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product, but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 µg/L of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25% of the sampling events between 2005 and 2016.

12) Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.

13) Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929 and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.

14) Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.

15) Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) do not have an indication of the buildings use.

16) Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.

17) Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigationsite plan, and later remediated as part of the Earth Tech demolition (P&R, 1991; EarthTech, 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 µg/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated VOCs and PHCs (mainly F3) above the applicable potable water criteria (Table 6 Standards) (DCS, 2007b, 2014b; AECOM, 2017a and 2017b).

18) Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R, 1991, DCS, 2007a).

19) Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.

20) Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the west side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.

21) Coal Storage - The 1960 FIP indicates coal storage south of the garage on the west side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labeled as coal.

22) Transformer - A 1200-volt transformer is shown on the 1991 Site Plan (P&R, 1991).

23) Paint Shop - First shown on the P&R Site plan, a paint shop was located at the north end of the site, between the shipping building and the storage area (P&R, 1991). Drums were stored against the north wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.

24) PCB Storage Area - An area located at the northeast corner of the finishing and annealing room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as 'storage' (P&R, 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech, 1999). Confirmatory samples below the pad were 0.63 and <0.05 ug/g. The soil was later excavated to bedrock as part of the soil remediation in the northeast corner of the property (see APEC-11).

25) Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities which occurred along the north property boundary (P&R, 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.

26) Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated non-detect concentrations of PCBs. Similarly, one location installed during the DCS Phase II ESA (2007) indicated non-detect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.

27) Former Electrical Shop - A small electrical shop was noted to be on the southwest corner of the foundry (P&R, 1991). This addition was not shown on the FIPs from previous years, and was shown as the exterior yard area west of the foundry.

28) Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site Plan (P&R, 1991).

29) Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag and cinders (up to 1.0 m) was found across the site (P&R, 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS, 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R, 1991).

30) Potential Offsite Impacts from the North – Historical and current operations on properties to the north have the potential to impact the Phase Two Property, including the following:

- Rail lines
- Paper manufacturing
- Auto body repair shop
- Automobile repair
- Gasoline station
- Trucking company
- Concrete products manufacturing
- Wire/spring manufacturing
- Metal valve manufacturing
- Former spill
- Electroplating company
- Window and door manufacturing
- Scrap yard

31) Potential Offsite Impacts from the East – Historical and current operations on properties to the east have the potential to impact the Phase Two Property, including the following:

- Steel valve manufacturing
- Former stove manufacturer/foundry
- Box manufacturing
- Potential USTs
- Scrap yard
- Former fuel storage facility
- Former pain application
- Chemical manufacturer or distributor
- Transformers

32) Potential Offsite Impacts from the South – Historical and current operations on properties to the south have the potential to impact the Phase Two Property, including the following:

- Screw manufacturing
- Former USTs
- Former transportation company

33) 33) Potential Offsite Impacts from the West – Historical and current operations on properties to the west have the potential to impact the Phase Two Property, including the following:

- Window manufacturing
- Metal treatment
- Spring manufacturing
- Former refractory facility
- Motor vehicle parts manufacturing
- Former spill

Table 6-4 describes the APECs and associated PCAs. Figure 4-1 presents the location of the APECs on the Phase Two Property along with the locations of boreholes, test pits, and monitoring wells advanced as part of the Phase Two ESA investigations. As summarized in Table 6 4, the APECs occurring on the Phase Two Property have been thoroughly investigated for all associated contaminants of concern (COCs). Additional investigations were initiated in November 2018, the sampling and analysis plan (SAP) for this work is included as Attachment C.

Subsurface Structures and Utilities

Some concrete foundations, slabs and footings from the former buildings are present on Site, below grade, along with associated building demolition debris (for example, crushed concrete, industrial fill). Although utilities have been disconnected on Site, piping and bedding have not been removed and, therefore, there is a potential for utility corridors to act as preferential route of contaminant migration. The specific locations of former utility corridors are not known. Former building outlines are shown on Figure 2-2 (Attachment A1).

Physical Setting

Stratigraphy

The geology at the Phase Two Property was investigated through historical investigations and the 169 sampling locations (that is, boreholes, monitoring wells, and test pits) advanced as part of the Phase Two ESA activities and historical investigations. The geology beneath the site characterized during the Phase Two field investigations is summarized in Exhibit 1.

Exhibit 1: Site Stratigraphy

Geologic Unit	Description/ Bedrock Member	Approximate Thickness (m)	Lithology
Fill		0.1 to 4.3	Dark brown to black silty sands (like foundry sand) with black ash, brick, cinders, metal and wood debris
Silty Fine Sand		0 to 3.0	Silty fine sand
Guelph Formation		1.7 to 5.8	Dolostone: Medium to thickly bedded crinoidal grainstones and wackestones with reefal complexes
Eramosa Formation	Stone Road Member		Cream coloured coarsely crystalline dolostone
	Reformatory Quarry Member	6.4 to 9.6	Light brown to cream, thinly to thickly bedded, coarsely crystalline dolostone
	Vinemount Member	6.4 to 9.6	Dark grey to black, thin bedded, finely crystalline dolostone with shaley beds
Goat Island Formation		> 8.5	Medium to ash grey, chert-rich, finely crystalline dolostone

Notes:

m = metre

> = greater than

The Guelph, Eramosa, and Goat Island Formations underlie the Phase Two Property and the top of bedrock surface was encountered at depths ranging from approximately 1.0 m to 3.4 metres below ground surface (mbgs) (approximately 312.6 to 314.6 metres above sea level [masl]). The upper few metres of bedrock in the area are highly weathered and fractured, and the bedrock becomes increasingly more competent and less fractured with depth below surface.

Seven geologic cross sections were generated to illustrate the stratigraphy beneath the Site. The cross-section locations are shown on Figure 6-1 and cross sections A-A' through G-G' are presented on Figures 6-1a through 6-1g, respectively.

During the Phase Two ESA, the fill, native silty fine sands and all units of the bedrock from the Guelph Formation to the Goat Island Formation (Exhibit 1) were investigated. Monitoring wells were

instrumented in the upper sands and fractured Guelph Formation and Stone Road Member bedrock to characterize the water table, and monitoring wells were also installed in the Reformatory Quarry and Vinemount Members of the Eramosa Formation, to characterize the lower bedrock beneath the site. The deepest well onsite extends approximately 33 mbgs (OW31) into the top of the Goat Island Formation.

Hydrogeological Characteristics

The Phase Two Property is located in the City of Guelph, within the Speed River Subwatershed of the Grand River Watershed. Regional topography (Figure 3-1) is characterized by broad and oblong drumlins (hills) with gentle slopes, with poorly drained till plain valley that are part of the Guelph Drumlin Field (Chapman and Putnam, 1984). The property area lies at an elevation of approximately 315.5 masl, with a topographic high of approximately 316.5 masl at OW13, which lies in the southeastern portion of the site (Figure 6-1).

On a regional scale, groundwater flows from areas north of the city to the south towards Cambridge. Within the City, groundwater flow is influenced by groundwater pumping from municipal water supply wells, as well as creek and rivers, including the Speed and Eramosa Rivers. The site lies approximately 0.5 kilometres (km) north of the Eramosa River, and 1.1 km east of the Speed River, and flow in both rivers is supported by groundwater discharge. The nearest municipal wells to the Site include the Clythe Creek Well (approximately 2.5 km northeast of the Site), the Water Street Well (approximately 2.5 km southwest of the Site), and the Park and Emma Wells (approximately 2 km north/ northwest of the Site). Review of the Permit to Take Water database identified 4 Permits to Take Water within one kilometer of the Site, which include an industrial water user north of the Site, remediation wells east of the Site, and dewatering and commercial uses located south-southeast of the Site.

Hydrostratigraphic Units: To evaluate groundwater flow directions onsite, the geologic units beneath the site were subdivided into the following three hydrostratigraphic units.

- *Overburden and bedrock contact zone*. This unit is characterized by wells completed in the Guelph Formation, and the Stone Road Member of the Eramosa Formation. This hydrostratigraphic unit acts as a local and regional groundwater aquifer with groundwater flow in the upper fractured bedrock influenced by secondary porosity features, such as fractures and solution enhanced vugs and cavities.
- *Eramosa Formation.* Reformatory Quarry and Vinemount Members. Based on review of onsite drill core and our regional understanding of the bedrock formations in the area, the Reformatory Quarry and Vinemount Members of the Eramosa Formation are notably less fractured, and more competent than the overlying Guelph Formation and Stone Road Member of the Eramosa Formation, and they act as a regional aquitard.
- *Goat Island Formation*. The Goat Island Formation is interpreted on a regional scale to act as a regional aquifer beneath the City of Guelph; however, in some areas, the upper member of the Goat Island Formation (Ancaster Member) contains low permeability shaley beds that have similar hydrogeologic properties of the overlying Vinemount Member, and acts as a local aquitard. To be conservative, we have assumed the Goat Island Formation bedrock beneath the site behaves as an aquifer and lies in contact with the underlying Gasport Formation aquifer, which is the City of Guelph's primary water supply aquifer.

The characterization of the hydrostratigraphic units was based on data collected from 93 locations across the Site, which included 36 wells installed in previous investigations, and 57 wells drilled and instrumented in the current investigation between August 2017 and December 2018. The current investigation also included drilling of 10 boreholes and digging of 20 test pits that assessed the nature of the subsurface from ground surface to a maximum depth of approximately 25 mbgs.

Of the 93 monitoring wells onsite, 56 wells are completed in the uppermost hydrostratigraphic unit (Overburden and bedrock contact zone), 36 in the middle hydrostratigraphic unit (Competent Eramosa Formation) and one in the Goat Island Formation.

Approximate Depth to Bedrock

Depth to bedrock onsite ranges from 1.0 to 3.4 mbgs. The elevation at the top of bedrock is deepest onsite at MW18-127S (312.6 masl) in the central portion of the site and rises to a high of 314.6 masl at OW23D in the eastern portion of the site where the bedrock rises slightly (less than 2 m) in comparison to the bedrock surface observed in the surrounding wells.

Approximate Depth to Water Table

The measured depth to water table collected in August 2018 ranged from 2.6 to 4.8 mbgs (312.5 to 313.3 masl) for wells screened in the overburden and contact zone unit. Depth to water in December 2018 was comparable, ranging from 2.2 to 4.6 mbgs (312.7 to 313.8 masl). Water level measurements have been collected in onsite monitoring wells since 2010, and aside from seasonal variability, the depth to water table elevation has remained consistent across the site throughout this period. Considering 22 water level events (2010 to 2018), the depth to groundwater ranged from 0.93 to 4.97 mbgs, with an average of 2.82 mbgs.

Water table elevations collected in August and December of 2018 were mapped and are illustrated on Figures 6-2a and 6-2b, respectively. Within the overburden and contact zone aquifer unit, groundwater flows from a high in the northeastern portion of the Site, to lower water level elevations in the southern and southwestern portions of the site (Figures 6-2a and 6-2b). Horizontal hydraulic conductivity values estimated from slug tests conducted in monitoring wells screened in this upper hydrostratigraphic unit yielded averaged values of 2.4 x 10-5 metres per second (m/s). The average horizontal hydraulic gradients within this unit were estimated to range from 0.006 to 0.027 m/m in August and December 2018, which together with the estimated horizontal geometric mean, and a porosity value in the fractured rock of 0.10 yielded a horizontal velocity that ranged from 42 to 200 metres per year (m/yr).

The water level elevations observed in the ***competent Eramosa Formation bedrock unit*** beneath the Site in August and December of 2018 were mapped and are illustrated on Figures 6-2c and 6-2d, respectively. Groundwater level elevations were observed to be highest in the western portions of the site near MW18-120D and decrease slightly (approximately 0.2 m) to the east to a low elevation at OW13-39D (Figure 6-2c and 6-2d). A representative horizontal hydraulic conductivity value of 4×10^{-8} m/s was estimated from a slug test result conducted on a monitoring well screened in the Vinemount Member. This estimate is consistent with the understanding that the Vinemount Member of the Eramosa Formation is a regional aquitard.

Assuming a horizontal hydraulic gradient between 0.0003 and 0.009 m/m, a porosity value of 0.05 and a geometric mean hydraulic conductivity value of 3×10^{-5} m/s, groundwater in this lower bedrock unit was calculated to move horizontally at a velocity of less than 1 m/yr through this aquitard unit.

Within the Goat Island Formation bedrock unit, horizontal hydraulic conductivity values estimated from hydraulic tests conducted in June 2018 in OW31, screened across this unit, was estimated to be 3.8×10^{-7} m/s. As only two wells are screened across the Goat Island Formation, groundwater flow directions and gradients were not characterized for this unit.

Vertical gradients were calculated onsite using twenty nested monitoring wells present on the Site. Downward gradients were noted at all wells across the Site on multiple occasions, except MW18-112S and MW18-112D. In August and December 2018, the well pair exhibited a slight (4 and 3 cm) upward (negative) gradient.

Within the upper aquifer, groundwater flow onsite is conceptualized to flow from the north to the south and southwest towards the Eramosa River, a groundwater discharge location. Drill cores collected from

the Site also showed that horizontal fractures were most common in the upper portions of the bedrock and decreased with depth. The combination of the predominant horizontal fracturing onsite, and the nearby (500 m) Eramosa River groundwater discharge location lead to the horizontal gradients beneath the Site.

Applicable Site Condition Standards

O. Reg. 153/04 (MECP, 2011a) under Part XV.1 of the Environmental Protection Act addresses the assessment, cleanup, and filing of an RSC for brownfield sites in Ontario and is applicable to the Phase Two Property. CH2M evaluated the Site based on a number of criteria to decide which of the generic SCS provided in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011c), were applicable for a comparison of soil and groundwater results from the Phase Two ESA investigation.

The items in Table 2-3 (Attachment A2) were considered during the selection of the SCS, as outlined in O. Reg. 153/04, as amended (MECP, 2011a).

The special conditions for environmentally sensitive areas under Section 41 of O. Reg. 153/04 are potentially applicable to the Phase Two Property, as soil pH was found to range from 6.6 to 10.64 based on 91 soil samples. As discussed in Table 2-3, with the exception of two samples, the remainder of the soil samples were found to have a pH value within the Ministry's acceptable range (that is, a pH value in surface soil between 5 and 9, or a pH value in subsurface soil between 5 and 11). One of these soil samples with elevated pH has been classified as "isolated fill" and is not considered to be representative of soil conditions at the Site. At this location, concrete foundations were noted to be present both above and below the sample, essentially isolating this fill from other overburden soils. As such, this pH result was not considered further for the determination of pH at the Phase Two Property. A proposed sampling program is included in Attachment C to address the remaining single elevated pH value in soil through the approved averaging techniques outlined in O. Reg 153/04 and to determine if the Table 1 Standards are potentially applicable or not. Based on the overall available pH data for the Site as noted above, it is currently assumed that, as a whole, pH will be confirmed within the acceptable range; therefore, the Table 1 Standards will not be applicable. The CSM and associated Phase Two report will be revised accordingly once the additional data is available, but currently assumes the Table 6 SCS is applicable.

The special conditions for land within 30 metres of a water body under Section 43.1 of O. Reg. 153/04 do not apply to the Phase Two Property; however, as bedrock has been encountered at less than 2 metres below ground surface (DCS, 2014), the special condition for shallow soil properties cited under Section 43.1 of O. Reg. 153/04 applies to the Phase Two Property.

The Phase Two Property, and adjacent properties within 100 m are serviced by a municipal water source. However, as the groundwater in the vicinity of the Property does and will serve as a raw water supply for a drinking water system, a potable groundwater condition was applied. Based on this information, the Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition for coarse-grained soil and residential/parkland/institutional property use (Table 6 SCS) was applied to the Site.

Imported Soil

Fill was found to be present across the Phase Two Property and extending from ground surface to a depth of approximately 0.1 to 3.1 mbgs (typically 316.3 to 313.4 masl). The fill materials were defined as coarse, and predominantly comprised of dark brown to black silty sands (like foundry sand) with black ash, brick, cinders, metal and wood debris. The depth of the fill materials ranged from 0.15 m at OW6 to 3.1 m at OW31 in the eastern portion of the Site. As discussed in the Phase One ESA (CH2M, 2017), two remedial excavations historically occurred at the Phase Two Property. An area in the northeast corner of

the Site (associated with the former galvanizing/plating building) was excavated to bedrock in 1999 and backfilled with granular 'B' material (Earth Tech, 1999) (Figure 6-1). The former capacitator room area in the south-central potion of the Site was also remediated for polychlorinated biphenyls (PCBs) as part of the Earth Tech (1999) demolition activities. Granular "B" material was used to backfill this excavation along with former pits and sumps across the Site.

Locations of Proposed Buildings and Structures

All buildings onsite have been razed; however, the majority of the concrete floors, foundations and footings of historical buildings remain in place. The approximate locations of the former buildings are show on Figure 2-2 (Attachment A1). Historically, approximately 23 buildings were present onsite.

The Site is proposed to be redeveloped for a combination of one or more of residential, parkland, commercial, and community land uses. The configuration of the buildings associated with the proposed redevelopment is not known at this time.

Contaminants Exceeding Applicable Site Condition Standards in Soil

Soil environmental conditions were characterized based on evaluation of historical samples, in addition to the recent investigations conducted for the Phase Two ESA. A total of 158 soil sampling locations and 307 soil samples were used to characterize the soil and identify COCs. Additional Phase Two activities are proposed at select locations at the Phase Two Property (Sampling and Analysis Plan provided in Attachment C), specifically for VOCs and pH. As previously stated, a finalized Phase Two CSM will be produced following the conclusion of this work and will be included in the RA submission. A summary of the soil analytical results is provided in this attachment as Table 6-5.

Soils on the Phase Two Property were found to be generally impacted with elevated soil concentrations of metals and petroleum hydrocarbons (PHCs). These types of activities are consistent with the historical, industrial nature of the Phase Two Property including:

- Former Foundry (APEC-1)
- Machine Shop (APEC-2, APEC-12)
- Annealing Room (APEC-3)
- Sand Storage (APEC-4, APEC-15)
- Plating and Galvanizing (APEC-5, APEC-11)
- Chipping and Grinding (APEC-6)
- Former USTs (APEC-8)
- Former Rail Line (APEC-13)
- Former Auto Repair and Garage (APEC-14, APEC-20)
- Coal Storage (APEC-21)
- Paint Shop (APEC-23)
- Drum Storage (APEC-25)
- Former Electrical Shop (APEC-27)
- Waste Oil Storage (APEC-28)
- Unknown Fill Quality (APEC-29)

Localized soil impacts from polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs) were also identified in limited areas of the Phase Two Property. The presence of these parameters is consistent with the historical and industrial land use of the Site, including the use and storage of PCBs (APECs 16, 17, 22, 24, and 26).

The analytical results of the investigation are summarized in Table 6-5 along with a comparison to the Table 6 SCS (MECP, 2011). Figures 6-3 through 6-11 present the soil concentrations exceeding the Table

6 SCS by analytical group. Where there are exceedances of the Table 6 SCS, at least one cross-section presenting the inferred vertical extent of soil impacts by analytical group, has been prepared and follow the plan view figure. Maximum concentrations of each detected parameter have been provided in Table 6-6, and are shown in red text on the respective plan view and cross-sectional figures. COCs in soil have been identified in Table 6-7c.

The following subsections present a description of the soil conditions for each analytical group investigated.

Metals and Inorganics

Exceedances of the Table 6 SCS in soil for metals were widespread across the Site, with the majority of samples having detected exceedances for lead and zinc. These impacts are consistent with the historical use of the Site as a foundry (APEC-1), with associated machine shop uses (APECs 2 and 10), annealing uses (APEC-3), galvanizing uses (APECs 4 and 11), imported fill (APEC-29), and sand storage (APEC-4). Lead was detected at concentrations greater than the Table 6 SCS in 71 samples. Detected exceedances of lead greater than 5,000 µg/g were localized to the area surrounding BH07-65, near the western boundary of the site within APEC-26 (Former Substation). Zinc was detected in concentrations greater than the Table 6 SCS in 131 samples. Detected exceedances of zinc greater than 5,000 µg/g were found in 10 samples, with 6 of those at concentrations greater than 10,000 µg/g. These locations were localized to areas on the southeastern corner of the Site, all within APEC-5 (Galvanizing Building), with the exception of TP13-09 which is located 6 m west of the APEC boundary. The maximum zinc concentration of 67,200 µg/g occurred at MW17-108S. Overall, zinc was generally seen to increase in concentration with increasing depth, indicating that elevated zinc concentrations may also be attributable to naturally occurring zinc levels in the till or the bedrock below. Metals impacts were horizontally delineated by the Site's boundaries. Vertically, metals impacts were found in both the upper fill and deeper native silt overburden units, including at the contact with the shallow bedrock surface. The results of the soil investigation for metals are shown in plan view on Figure 6-3 (Part 1 and 2) and in cross-section view on Figures 6-3a through 6-3f.

Inorganic parameters, including cyanide, electrical conductivity (EC), and sodium adsorption ratio (SAR), were not detected at concentrations greater than the Table 6 SCS in the 93 samples analyzed from 67 locations. The results of the soil investigation for inorganics are shown in plan view on Figure 6-4.

Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)

Concentrations of BTEX (specifically, benzene, ethylbenzene, and xylenes) in soil greater than the Table 6 SCS occurred in 3 samples from 2 locations of the 120 samples analyzed from 78 locations. Exceedances were localized to two areas of the Site. The first area, is along the western boundary within APECs for a former garage (APEC-20) and coal storage (APEC-21). Concentrations of benzene, ethylbenzene, and xylenes of 0.26, 4.1, and 3.9 µg/g, respectively were measured at BH07-66. Another exceedance occurred in the south-central area of the site within APECs for a former foundry (APEC-1) and unknown fill quality (APEC-29), with a concentration of benzene of 0.23 µg/g (duplicate sample concentration of 0.25 µg/g) at TP13-11. Neither of these locations had deeper samples collected due to the presence of shallow bedrock. The results of the soil investigation for BTEX are shown in plan view on Figure 6-5 and in cross-section view on Figures 6-5a and 6-5b.

Petroleum Hydrocarbons (PHCs)

PHC concentrations were found greater than the Table 6 SCS in 28 samples from 22 locations of the 122 samples analyzed from 85 locations. Exceedances of the Table 6 SCS for PHCs in soil were localized to three general areas. The west near the boundary of the Site including areas of APECs for former garage (APEC-20), extending north to include BH07-68, west towards APEC-25 and APEC-13 for drum storage and former rail lines, respectively, including MW18-117S, and south towards APEC-26 for a former substation to include TP18-312. The central southern area of the Site including areas of APECs for

former foundry (APEC-1), sand mixing and storage (APEC-15), oil house (APEC-7), transformers (APEC-16, APEC-22), PCB capacitors (APEC-17), former waste oil storage (APEC-28), and unknown fill quality (APEC-29). The eastern third of the Site including areas of APECs for a former machine shop (APEC-2, APEC-10), oil house (APEC-9), annealing room (APEC-3), galvanizing (APEC-5), and plating (APEC-11). No PHC F1 exceedances were identified. The maximum concentrations for F2 of 3,600 µg/g at BH07-46 and for F3 of 23,000 µg/g at BH07-40 are both located in the northwestern corner of the Site, within and downgradient of the area historically remediated (for metals and PHC impacts). The maximum concentration for F4 was 7,300 µg/g at BH07-67, within an APEC for a former garage (APEC-20). Five samples from four locations analyzed for PHCs exhibited concentrations greater than the MECP Free Phase Threshold values (MECP, 2011b) for F3 (BH07-40, BH07-41, BH07-67, and MW17-108S), and one sample had concentrations greater than the free phase threshold for F4 (BH07-67). Vertically, PHC impacts were found in both the upper fill and deeper native silt overburden units, including at the contact with the shallow bedrock surface. The results of the soil investigation for PHCs are shown in plan view on Figure 6-6 and in cross-section view on Figures 6-6a through 6-6e.

Polycyclic Aromatic Hydrocarbons (PAHs)

Concentrations of PAHs in soil greater than the Table 6 SCS occurred in 28 samples from 20 locations of the 112 samples analyzed from 80 locations. PAHs impacts (including all O. Reg. 153/04-regulated PAHs analytes) in soil were localized to three general areas. To the west, near the boundary of the Site, within APECs -20 and -21 for a former garage and coal storage, respectively, including BH07-68 just north of the APEC boundary. The south-central area of the Site including APECs for the former foundry (APEC-1), sand storage (APEC-4, APEC-15), coal storage (APEC-12), rail lines (APEC-13), former waste oil storage (APEC-28), and unknown fill quality (APEC-29). The eastern third of the Site including areas of APECs for coal storage (APEC-18, APEC-19), paint shop (APEC-23), former rail line (APEC-13), machine shop (APEC-2, APEC-10), and former UST (APEC-8).

The maximum concentrations of the majority of PAH analytes were located at OW07-34D, at a maximum depth of 1.22 mbgs, located within APECs for the former foundry (APEC-1) and for fill of unknown quality (APEC-29). Concentrations of PAHs at this location were consistently one or two orders of magnitude greater than other detected exceedances on the Phase Two Property. Borehole logs indicate that the material sampled at this location for PAHs was the upper fill materials. Deeper samples (that is, greater than 1.22 mbgs) collected just above the bedrock surface at nearby TP18-315 and MW17-102D also had concentrations of PAHs greater than the Table 6 SCS, however fewer analytes had exceedances and the reported concentrations were lower than at OW07-34D. Vertically, the PAHs impacts were primarily located in the fill, with decreasing concentrations in the deeper native silt overburden unit. The results of the soil investigation for PAHs are shown in plan view on Figure 6-7 and in cross-section view on Figures 6-7a through 6-7c.

Volatile Organic Compounds (VOCs)

Exceedances of VOCs occurred in 7 samples from 5 locations of the 100 samples analyzed from 67 locations. Trichloroethylene (TCE) was the only parameter detected at concentrations greater than the Table 6 SCS of 0.061 µg/g. Exceedances of the Table 6 SCS for VOCs were localized to two areas of the Phase Two Property: the eastern boundary including areas of APECs for a machine shop (APEC-10), and galvanizing (APEC-5), and towards the southwest corner of the Site including areas of APECs for a former foundry (APEC-1). The maximum TCE concentration of 1 µg/g was detected at OW13-39S,at a depth of 2.29 to 2.52 mbgs along the eastern property boundary. In this area, BH18-204 had a shallow soil sample (1.52-2.13 mbgs) that exceeded the SCS for TCE, and a deeper sample (3.04-3.65 mbgs) met the Table 6 SCS, however, there was no deeper sample collected at OW13-39S. MW17-102D in the southwest area of the Site had an exceedance at a depth of 0.15 to 0.3 mbgs, which is vertically delineated by a deeper sample collected from 1.83 to 2.13 mbgs that met Table 6 SCS. Additional horizontal and vertical delineation of the TCE impacts in soil in each impacted area are proposed (refer

to Attachment C). The results of the soil investigation for VOCs are shown in plan view on Figure 6-8 and in cross-section view on Figures 6-8a through 6-8c.

Chlorophenols (CPs)

CPs were not detected at concentrations greater than the Table 6 SCS in the 22 samples analyzed from 12 locations. CPs were potentially associated with the former foundry (APEC-1), sand storage and mixing (APEC-4; APEC-15), fill of unknown quality (APEC-29), offsite rail lines (APEC-30), and offsite steel valve manufacturing (APEC-31). As CPs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The results of the soil investigation for CPs are shown in plan view on Figure 6-9.

Polychlorinated Biphenyls (PCBs)

Concentrations of PCBs in soil greater than the Table 6 SCS occurred in 6 samples from 5 locations of the 72 samples analyzed from 53 locations. PCB exceedances were localized to three general areas: near the western boundary within APECs for a former garage (APEC-20) and unknown fill quality (APEC-29); to the east within APECs for a former machine shop (APEC-2, APEC-10) and unknown fill quality (APEC-29); and in the south-central area of the Site with APECs for former PCB capacitors (APEC-17) and unknown fill quality (APEC-29). The maximum PCB concentration of 1.65 µg/g occurred in the western area at the surface in TP17-300. An adjacent location, BH07-67 had a sample from 0.05 to 0.91 mbgs with a concentration of 1.5 µg/g for total PCBs. The maximum concentration at TP17-300 was vertically delineated by a deeper sample from 0.3 to 0.61 mbgs that meets the Table 6 SCS. The exceedance at BH07-67 was delineated by a deeper sample at 1.22 to 1.37 mbgs with concentrations of PCBs less than the SCS. Other areas of PCB contamination at SS-41 and TP17-306 in the south-central portion of the Site did not have deeper samples as they were collected right above the bedrock. Shallow PCB impacts at TP13-08 in the eastern area were vertically delineated by deeper samples collected from TP18-316 and BH07-52. The results of the soil investigation for PCBs are shown in plan view on Figure 6-10 and in cross-section view on Figures 6-10a and 6-10b.

Acid, Base, and Neutral Compounds (ABNs)

ABNs were not detected at concentrations greater than the Table 6 SCS in the 73 sampes analyzed from 52 locations. ABNs were potentially associated with the former foundry (APEC-1), sand storage and mixing (APEC-4; APEC-15), fill of unknown quality (APEC-29), offsite rail lines (APEC-30), and offsite steel valve manufacturing (APEC-31). As ABNs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The results of the soil investigation for ABNs are shown in plan view on Figure 6-11.

Contaminants Exceeding Applicable Site Condition Standards in Groundwater

Groundwater across the Phase Two Property was evaluated via 93 groundwater monitoring wells screened in the overburden and bedrock contact zone, the Eramosa Formation, or the Goat Island Formation. Additional Phase Two groundwater sampling activities are proposed at select existing monitoring wells (Attachment C). As previously stated, a finalized Phase Two CSM will be produced following the conclusion of this work and will be included in the RA submission. A summary table of groundwater analytical results is provided in this attachment as Table 6-8.

Three hundred and thirty-one groundwater samples were collected from 93 locations across the Phase Two Property. Groundwater was generally found to be impacted with chlorinated VOCs (specifically, chloroethenes), with localized impacts of chloroethanes, BTEX, metals, PAHs, and PHCs.

The analytical results of the investigation are summarized on Table 6-8 along with a comparison to the Table 6 SCS (MECP, 2011). Figures 6-12 through 6-20 present the groundwater concentrations exceeding the Table 6 SCS by analytical group. Where there are exceedances of the Table 6 SCS, at least one cross-

section presenting the inferred vertical extent of groundwater impacts by analytical group, has been prepared and follow the plan view figure. Maximum concentrations of each detected parameter have been provided in Table 6-9 and shown in red text on the respective plan view and cross-sectional figures. COCs in groundwater are identified in Table 6-10c.

Metals and Inorganics

Concentrations of metals in groundwater greater than the Table 6 SCS were observed in 71 samples from 22 locations of the 248 samples analyzed from 72 locations. Exceedances were primarily for arsenic, lead, and zinc. Isolated exceedances of antimony, cobalt, and uranium occurred in single sampling events, but the results were not reproduced in subsequent sampling events. Therefore, these analytes were not considered groundwater COCs. The distribution of metals impacts in groundwater is smaller in area than the distribution of impacts in soil, but the impacts generally correspond geographically and are consistent with the wide-spread historical use of the Site as a foundry (APEC-1).

Arsenic exceedances in groundwater were localized to the north-central area of the Site within APECs for drum storage (APEC-25), unknown fill quality (APEC-29), and offsite PCAs (APEC-30). Two exceedances of the Table 6 SCS for arsenic occurred in the upper overburden and bedrock contact zone (MW17-112S, OW07-31) and one exceedance occurred in the Eramosa Formation (Reformatory Quarry) unit (MW18-112D). Arsenic impacts were vertically delineated by MW18-112G, which was installed deeper than MW18-112D within the Eramosa Formation (Vinemount).

Lead exceedances were localized to one location (OW09-II) in the northeast portion of the Site, including APECs for coal storage (APEC-19), unknown fill quality (APEC-29), and offsite PCAs to the south (APEC-31). OW09-II is screened within the Eramosa Formation (Reformatory Quarry) unit and the lead impacts were vertically delineated by MW18-129D, which was installed deeper within the same unit.

Zinc exceedances were localized to the eastern third of the Site and the central portion of the Site (OW07-32, OW07-37). APECs in these locations include a former machine shop (APEC-10), plating (APEC-11), sand mixing and storage (APEC-15), unknown fill quality (APEC-29), and offsite PCAs (APEC-31). Impacts of zinc were generally limited to the upper overburden and bedrock contact zone (fifty-three samples from 13 locations had exceedances of the Table 6 SCS for zinc). Only three samples from one location (OW18-II) had exceedances within the Eramosa Formation (Reformatory Quarry) unit. In the central portion of the Site, MW18-116D provides vertical delineation of the shallow groundwater impacts. In the eastern portion of the Site, several wells provide vertical delineation for the shallow groundwater impacts, including MW18-130D, MW18-132D, OW13-39D, OW22D, MW18-133D, MW18-129D, and OW31.

The results of the groundwater investigation for metals are shown in plan view on Figure 6-12 and in cross-section view on Figures 6-12a through 6-12d.

Inorganic parameters, including chloride, cyanide, sodium were not detected at concentrations greater than the Table 6 SCS in the 225 samples analyzed from 65 locations. The results of the groundwater investigation for inorganics are shown in plan view on Figure 6-13.

BTEX

Concentrations of BTEX (specifically, benzene and ethylbenzene) in groundwater greater than the Table 6 SCS occurred in 56 samples from 17 locations of the 271 samples analyzed from 87 locations. Exceedances were found to be localized to two areas of the Site: the eastern third and the south-central area along the southern boundary of the Phase Two Property. These areas had APECs related to a former foundry (APEC-1) and unknown fill quality (APEC-29) in the south-central area, and former machine shops (APEC-2, APEC-10), annealing room (APEC-3), former UST (APEC-8), oil house (APEC-9), plating (APEC-11), and offsite PCAs to the east (APEC-31) for the eastern third of the Site. The distribution of BTEX impacts in groundwater is larger in area than the distribution of impacts in soil and

generally do not overlap. This pattern may indicate migration away from historical remediated soil sources (for example, in the northeast corner of the Site) with groundwater flow, the presence of offsite sources, or both.

Maximum detected concentrations for benzene and ethylbenzene both occurred at MW17-105S, in the upper overburden and bedrock contact unit in the eastern portion of the Site. MW17-105D, nested with MW17-105S but screened within the Eramosa Formation (Reformatory Quarry/ Vinemount) unit also had exceedances of the Table 6 SCS for benzene, but had non-detected results for ethylbenzene. The benzene concentrations were an order-of-magnitude lower in the deeper unit compared the upper unit. Monitoring well (MW18-105G) was installed deeper than MW17-105D for vertical delineation, with non-detected concentrations of BTEX reported. The BTEX impacts in the eastern area were vertically delineated by several monitoring wells including MW18-105G, MW18-128D, MW18-133D, and OW31. The results of the groundwater investigation for BTEX are shown in plan view on Figure 6-14 and in cross-section view on Figures 6-14a through 6-14d.

PHCs

Concentrations of PHCs (PHC F1 to F4) in groundwater were greater than the Table 6 SCS in 26 samples from 8 locations of the 207 samples analyzed from 61 locations. PHC impacts in groundwater are localized to two areas of the Phase Two Property: the eastern third of the Site with APECs for a former annealing room (APEC-3), machine shop (APEC-10), unknown fill quality (APEC-29), and offsite PCAs to the east (APEC-31), and the south-central area of the Site with APECs for a former foundry (APEC-1), PCB capacitors (APEC-17), and unknown fill quality (APEC-29). The locations of PHC impacts in groundwater are geographically similar to two of the three areas where PHCs in soil were identified. This pattern suggests that the groundwater impacts are a result of onsite soil sources, with some dispersion away from soil sources via groundwater flow. Maximum concentrations of F2, F3, and F4 occurred at OW22S, located near the northeastern corner of the Phase Two Property within the footprint of the area historically remediated (for metals and PHC impacts). The maximum concentration of PHC F1 occurred at OW24D, located in the southeast corner of the Site. PHC impacts in groundwater in the eastern portion of the Site were vertically delineated by several monitoring wells including OW22D, OW13-39D, MW17-104D, MW18-128D, MW18-135D, and OW31. Light nonaqueous phase product (LNAPL) has been measured within OW23S, MW17-108S, and MW18-135S (all screened within the overburden and bedrock contact zone aquifer unit) on various occasions. The shallow PHC impacts in the south-central portion of the Site at OW25 were vertically delineated by MW18-126D. The results of the groundwater investigation for PHCs are shown in plan view on Figure 6-15 and in cross-section view on Figures 6-15a through 6-15e.

PAHs

Concentrations of PAHs in groundwater were greater than the Table 6 SCS in 24 samples from 8 locations of the 189 samples from 54 locations. Exceedances of PAHs in groundwater were generally localized to three areas of the Property: the eastern third with APECs for former annealing room (APEC-3), plating (APEC-11), machine shop (APEC-10), unknown fill quality (APEC-29), and offsite PCAs to the north (APEC-30); the centre with APECs for sand storage (APEC-4), and unknown fill quality (APEC-29); and the south-central area with APECs for former foundry (APEC-1), and unknown fill quality (APEC-29). The distribution of PAHs impacts in groundwater is comparable in area to the distribution of impacts in soil, but the impacts do not overlap in all cases. The historical remedial activities in the northeast corner of the Site (for metals and PHCs) may have removed a soil source of PAHs, as PAHs are absent in soil in this area, but the largest region of PAHs impacts in groundwater are located within and adjacent to the excavation footprint.

The majority of detected exceedances and maximum concentrations for PAHs occurred at OW22S and OW23S, both screened in the upper overburden and bedrock contact. Both of these locations have nested deeper wells installed in the Eramosa Formation (Reformatory Quarry) unit that have samples

meeting the SCS for the parameters that exceeded in the shallow aquifer unit (OW22D for OW22S and OW23D for OW23S). Additional vertical delineation in the eastern portion of the Site is provided by OW13-39D and MW18-135D. The PAHs impacts located in the centre and south-central areas of Site, have either been vertically delineated (OW03-I by OW03-II), or have had subsequent samples meeting the Table 6 SCS (OW25). The results of the groundwater investigation for PAHs are shown in plan view on Figure 6-16 and in cross-section view on Figures 6-16a through 6-16d.

Volatile Organic Compounds (VOCs)

VOCs were found at concentrations greater than the Table 6 SCS in 155 samples from 52 wells of the 259 samples analyzed from 87 locations across the Phase Two Property. VOC impacts were present across the entire Site. The distribution of VOC impacts in groundwater is larger in area than the distribution of VOC impacts in soil, indicating migration away from soil sources with groundwater flow. Soil VOC concentrations suggestive of on-site chlorinated VOC source areas were not identified. Chlorinated VOC impacted groundwater may originate or be amplified by the presence of offsite sources (for example, offsite manufacturing activities [APEC-31, APEC-32, APEC-33]). While onsite APECs associated with historical VOC use have been identified, for example, the operation of a foundry (APEC-1), machine/electrical shops (APEC-2, APEC-10, APEC-27), galvanizing activities (APEC-5, APEC-11), most of the VOC impacts in groundwater in the Eramosa Formation or deeper are believed to originate from offsite sources. The following subsections discuss the distribution of chloroethenes (specifically, 1,1-dichloroethene; cis-1,2-dichloroethene [cis-1,2-DCE]; tetrachloroethene; trans-1,2-dichloroethene; trichloroethylene [TCE]; and vinyl chloride) and chloroethanes (1,1,1-trichloroethane and 1,1-dichloroethane) in groundwater. The results of the groundwater investigation for VOCs are shown in plan view on Figure 6-17 (Part 1 and 2) and in cross-section view on Figures 6-17a through 6-3e.

Chloroethenes

Chloroethenes in groundwater were found at various depths throughout the Site. Of the 50 wells screened in the upper overburden and bedrock contact zone and sampled for chloroethenes, 21 had concentrations greater than the Table 6 SCS. These shallower impacts are generally located in the southwestern portion and eastern corner of the Site. Of the 36 wells screened in the Eramosa Formation (Reformatory Quarry/ Vinemount) unit and sampled for chloroethenes, 28 had concentrations greater than the Table 6 SCS. These deeper impacts are widespread across the Site, including the northwestern portion of the site where shallow groundwater impacts were not observed. The only well screened in the Goat Island Formation (OW31) had low-level detections of cis-1,2-dichloroethene (1.88 µg/L to 2.01 µg/L compared to a SCS of 1.6 µg/L), with all other chloroethenes reported as nondetect. The maximum concentrations of the majority of the chloroethenes were found in OW24D, which is located in the extreme southeastern corner of the property, adjacent to an area of known increasing groundwater concentrations off Site, therefore implying a source area off Site in an easterly direction. Vertical delineation of impacts has been achieved for 1,1-dichloroethene and trans-1,2-dichloroethene (MW18-128D and OW31), TCE (MW17-103D, OW07-34D, MW18-123D, and OW31), and vinyl chloride (MW18-128D, MW18-133D, MW18-136D, MW18-105G, and OW31). Concentrations of these COCs are generally highest adjacent to the eastern property boundary (near OW13-39S/D and OW24D) and decrease with both depth and distance from this area. Vertical delineation was not achieved for cis-1,2-dichloroethene, as uniform concentrations were encountered in almost every monitoring well installed with screens between 10.28 and 25.32 mbgs. cis-1,2-Dichloroethene concentrations in 15 monitoring wells in this zone ranged from 1.23 to 5.36 µg/L (average of 2.4 µg/L), which is similar to the concentrations measured in OW31, screened from 28.9 to 33.32 mbgs in the Goat Island Formation. Further efforts to vertically delineate cis-1,2-DCE, deeper into the Goat Island formation were not considered warranted as:

- The concentration of cis-1,2-DCE in the deepest hydrostratigraphic unit, the Goat Island Formation, does not appear to be the result of chlorinated VOC impacts derived from the upper

hydrostratigraphic unit. That is, where maximum chlorinated VOC parent compounds were identified, elevated concentrations of cis-1,2-DCE were not observed. This is evident in the area near OW31 where elevated concentrations of TCE were identified in the Stone Road and Reformatory Quarry Members of the Eramosa Formation. At this location TCE was not identified in the lower Goat Island Formation in OW31; however, approximately 2 µg/L of cis-1,2-DCE was identified;

- The concentration of cis-1,2-DCE at OW31 could be the result of downward migration in that area, however as previously noted, cis-1,2-DCE was identified from 1.23 to 5.36 µg/L in the lower hydrostratigraphic units (Vinemount Member and Goat Island Formation), across the area of the Site, including areas that are hydraulically up and cross-gradient of the shallow groundwater flow paths where elevated chlorinated VOCs in higher hydrostratigraphic units are observed. The concentration of cis-1,2-DCE at OW31 ranged from 1.88 to 2.01 µg/L (in the Goat Island Formation) was consistent with the concentration of cis-1,2-DCE, noted in other wells screened across the Goat Island and Vinemount Member across the site where concentrations ranged from 1.23 to 5.36 µg/L;
- The consistent concentration of cis-1,2-DCE identified in the Goat Island Formation and the Vinemount Member, a regional aquitard, implies that impact to the Goat Island Formation may be widespread, and is interpreted to be sourced from an area upgradient of the Site.
- It is also noted that the Site lies within the two-year Wellhead Protection Area (WHPA-B) for several of the City of Guelph's municipal water supply wells. Phase Two activities included characterization of the COCs to a depth of approximately 25 to 30 mbgs, but characterization did not extend into the underlying municipal production aquifer (Gasport Formation) that is estimated to lie approximately 40 to 50 mbgs. As previously discussed within the Hydrogeological Characteristics section, the Goat Island and Gasport Formation are understood to be hydraulically connected to one another, with the Gasport Formation serving as the principal municipal aquifer. Water quality data in the City's Membro, Park and Emma Wells were observed to have low concentrations of TCE and cis 1,2-DCE in 2017 (City of Guelph, 2018). The average detected concentrations of cis-1,2 DCE in the City's water supply in 2017 was 1.8 µg/L (0.00178 mg/L), similar to the observed concentrations on Site (City of Guelph, 2018).

These factors suggest there is a broad area of low concentration cis-1,2-DCE just greater than the Table 6 SCS beneath the Vinemount Member of the Eramosa Formation, a regional aquitard, including on Site. The data does not support the conclusion that chlorinated VOC impacts identified on Site are materially contributing to the observed elevated concentrations of cis-1,2-DCE.

Chloroethanes

Chlorethanes were found at concentrations greater than the Table 6 SCS in 9 samples from 8 locations. These impacts appear to be localized to the southwestern area of the Phase Two Property, with APECs for a former foundry (APEC-1), oil house (APEC-7), electrical shop (APEC-27), waste oil storage (APEC-28), unknown fill quality (APEC-29), and offsite PCAs to the south and west (APEC-32, APEC-33). The chloroethane impacts are primarily located in the upper overburden and bedrock contact zone in this area, with deeper impacts only observed in two monitoring wells within the Eramosa Formation (Reformatory Quarry) unit. Vertical delineation of chloroethane impacts are provided by the following monitoring wells which have concentrations of chloroethanes less than the Table 6 SCS: MW18-122G, MW18-120D, MW18-119D, MW18-116D, MW18-123D, MW18-126D, MW17-102D, and OW26D.

CPs

CPs were not detected at concentrations greater than the Table 6 SCS in the 11 samples analyzed from 9 locations. All RLs met the Table 6 SCS. As CPs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The results of the groundwater investigation for CPs are shown in plan view on Figure 6-18.

PCBs

PCBs were analyzed in 25 groundwater samples from 17 locations with concentrations reported greater than the Table 6 SCS at one location, OW26S, in 2010. Subsequent sampling events in 2011 and 2017 at this location reported nondetect concentrations and RLs below the SCS of 0.20 µg/L. All other samples for PCBs in groundwater on the Phase Two Property were nondetect with RLs which met the Table 6 SCS. APECs associated with PCBs include transformer use (APEC-16 and APEC-22), a garage (APEC-20), former capacitor room (APEC-17), former substation (APEC-29), PCB storage area (APEC-24), and fill of unknown quality (APEC-29). Remediation for PCBs occurred for the former capacitor room (APEC-17) where concentrations of PCBs in soil less than 5 µg/g were left in place. These residual soil impacts do not appear to be having an impact on groundwater, based on nondetect results of PCBs in the monitoring wells immediately downgradient of this APEC. The results of the groundwater investigation for PCBs are shown in plan view on Figure 6-19.

ABNs

ABNs were analyzed in 52 samples from 27 locations and were not detected in concentrations greater than the Table 6 SCS; however, one sample at OW23S had a raised RL for 1,1'-biphenyl that was greater than the Table 6 SCS. As all other samples on the Phase Two Property did not have detected concentrations of this parameter, and the laboratory noted dilution was required due to concentrations of other parameters, namely PAHs and PHCs in the sample, 1,1'-biphenyl is not considered a COC for the Phase Two Property. The results of the groundwater investigation for PCBs are shown in plan view on Figure 6-20.

Climatic or Meteorological Conditions Affecting Contaminant Distribution

Climatic or meteorological conditions that may have influenced the distribution and migration of COCs at the Phase Two Property include temporal fluctuations in groundwater levels. No atypical weather events that would be expected to influence COC transport are known to have occurred during the investigation of the Phase Two Property.

Soil Vapour Intrusion

Vapour intrusion was not evaluated as part of the Phase Two ESA because there are currently no existing buildings on the Phase Two Property. Details regarding the location or construction details of future buildings, or where subsurface utilities will be installed are not known at this time. Based on the results of the Phase Two ESA, volatile COCs are present in soil and groundwater at concentrations greater than the Table 6 SCS. Therefore, an assessment of the potential for vapour intrusion into future buildings should be further investigated as part of a Risk Assessment for the Phase Two Property or when detailed redevelopment plans become available.

Contaminant Pathways and Receptors

Figures E-1 and E-3 (Attachment E) present the human health and ecological contaminant pathway and receptor models, respectively, based on current and potential future Site conditions. The Site could be redeveloped for a mix of one or more of residential, commercial, parkland or community land use in the future. The models present preliminary assessments of the exposure pathways that should be further investigated, should a Risk Assessment be conducted for the Phase Two Property.

These figures identify the following:

1. **Release mechanisms** – The Phase Two Property became impacted as a result of historical operations at the Site (refer to the discussion on PCAs and APECs) where COCs were released to the ground (for example, via a spill or leak) or where impacted soil was imported to the Site and placed as fill.

2. **Contaminant transport pathways** – COCs released to soil may adsorb to soil or infiltrate deeper into the soil column. COCs in soil may also desorb and leach to groundwater or migrate vertically to the water table. COCs in soil can also be transported in the following ways: they can become airborne via wind or traffic erosion, eroded by overland water flow, be taken up by vegetation planted in the soil, or volatilize to outdoor air or indoor enclosed spaces. COCs in groundwater can be transported via vertical or horizontal groundwater flow, volatilization to outdoor air or indoor enclosed spaces, and uptake by vegetation.
3. **Human and ecological receptors located on, in, or under the Phase Two Property** – Receptors currently present or expected to be present in the future at the Phase Two Property include:
   - Human Receptors – residents, visitors, indoor workers, outdoor workers, construction workers, and utility workers.
   - Ecological Receptors - soil organisms, terrestrial plants, birds, and mammals
4. **Receptor exposure points** – COCs can be contacted directly in soil or groundwater and indirectly in outdoor and indoor air.
5. **Routes of exposure** – The primary routes of exposure by receptor type include:
   - Human Receptors
     - Direct contact with either soil or groundwater (incidental ingestion and dermal contact)
     - Inhalation of particulates (dust)
     - Inhalation of volatiles originating from a soil or groundwater source (indoor and outdoor air)
     - Ingestion of garden produce
   - Ecological Receptors
     - Direct contact with either soil or groundwater (ingestion and dermal)
     - Terrestrial plant root uptake from either soil or groundwater
     - Ingestion via terrestrial biota and prey

Proposed Future Land Use

The proposed land uses of the Phase Two Property includes residential and parkland uses. The proposed locations of any proposed buildings were unknown at the time this report was written.

Tables

Tables

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-1	Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS, 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main Foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech, 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the north west corner of the building and drained to the truck bay (P&R, 1991).	32	Iron and Steel Manufacturing and Processing	VOCs, PHCs, PAHs, ABNs, CPs, Metals	7	TP	ABNs, Metals**, PAHs, CN-, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, PAHs, PCBs, PHCs, and VOCs. Table 6 Standards exceedances in groundwater included BTEX, PAHs, PHCs, and VOCs Sampling has captured the COCs, and the APEC has been addressed.
					BH07-49	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Zn)	-	
					BH07-50	BH	Metals**, PCBs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Zn)	-	
					BH07-57	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Hg, Zn)	-	
					BH17-201	BH	Metals, Chemistry, PAH, PCB, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn) PAHs (FLT) PHCs (F3)	None	
					BH18-206	BH	Metals, Chemistry, PHC, EC, pH, SAR, CrVI, CN-, Hg	-	Metals (Cd, Zn)	None	
					C11	CH	Metals**, PCBs	-	Metals (Co,)	-	
					C2	CH	Metals**	-	Metals (Mo, Zn)	-	
					MW17-102D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, PHC, VOC	Metals (Cd, Pb, Zn) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P) VOCs (TCE)	BTEX (Bnz) VOCs (cis-1,2-DCE)	
					MW17-106D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, PHC, VOC	None	None	
					MW17-106S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					MW17-107S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Zn)	VOCs (1,1-DCA, 1,1-DCE, PCE, TCE)	
					MW18-107D	MW	-	BTEX, VOC	-	None	
					MW18-125S	MW	Metals, Chemistry, PAH, PCB, PHC, pH	BTEX, PAH, PCB, PHC, VOC	None	VOCs (VC)	
					MW18-126D	MW	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, pH	BTEX, PHC, VOC	None	VOCs (VC)	
					MW18-127S	MW	-	BTEX, PHC, VOC	-	None	
					MW18-136D	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE, VC)	
					MW18-136G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
					OW07-33	MW	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Zn)	VOCs (1,1-DCA, TCE)	
					OW07-34D	MW	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn), PAHs (ACY, ANT, B(a)A, B(a)P, B(b)F, BghiP, B(k)F, CHY, DahA, FLT, FLRN, I(123-cd)P, NPH, PHE, PYR)	VOCs (1,1-DCA, TCE)	
					OW07-34S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (TCE)	
					OW25	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE, TCE, VC), PHCs (F2, F3), PAH (B(a)P, B(bj)F, B(k)F)	
					TP13-11	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), VOCs (Bnz), PHCs (F3), PAHs (MNPH, ACYY, ANT, B(a)A, B(a)P, DahA, FLT, I(123-cd)P, NPH)	-	
					TP17-306	TP	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Sb, As, Cd, Pb, Zn) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P) PCBs	-	
					TP17-307	TP	Metals, BTEX, Chemistry, PHC, VOC, pH	-	None	-	
					TP17-308	TP	Metals, Chemistry, EC, pH, SAR, B-HWS, CrVI, Hg	-	None	-	
					TP18-315	TP	Metals, BTEX, Chemistry, PAH, PHC, pH	-	Metals (Cd) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P, NAP)	-	
APEC-2	Machine Shop - A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945 and 1960 showed this area changed operations to 'Shipping' and a 'Pattern Shop'.	34	Metal Fabrication	VOCs, PHCs, PAHs, metals	BH07-47	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, PAHs, PCBs, and PHCs. Table 6 Standards exceedances in groundwater included BTEX and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					BH07-48	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Cd, Zn)	-	
					BH07-52	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Cd, Cu, Pb, Zn)	-	
					BH18-206	BH	Metals, Chemistry, PHC, EC, pH, SAR, CrVI, CN-, Hg	-	Metals (Cd, Zn)	None	
					ES-14	CS	PAHs	-	PAHs (ACYY)	-	
					MW17-101D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Zn) PHCs (F3)	BTEX (Bnz), VOCs (VC)	
					MW17-101S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz) VOCs (TCE)	
					TP13-08	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), PHCs (F3), PAHs (MNPH, ACYY, ANT, B(a)A, B(a)P, BghiP, B(k)F, CHY, DahA, FLT, I(123-cd)P, NPH, PHE), PCBs	-	
					TP18-316	TP	Metals, Chemistry, PAH, PCB, PHC, pH	-	None	-	
APEC-3	Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the north wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't'. The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or USTs for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel oil fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the north side of the Annealing Room.	32	Iron and Steel Manufacturing and Processing	VOCs, PHCs, PAHs, metals	BH07-46	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals, BTEX, PAHs, PHCs and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					ES-12	CS	PAHs	-	None	-	
					ES-15	CS	PAHs	-	None	-	
					ES-16	CS	PAHs	-	None	-	
					MW17-104D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	PAHs (B(a)P)	
					MW17-104S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	PAHs (MNAP, PHE) PHCs (F2)	
					MW17-109S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	BTEX (EB) PAHs (MNAP)	
					OW22D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz)	
					OW22S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (EB), PAHs (MNPH, ACY, ANT, B(a)A, B(a)P, B(b)F, CHY, FLT, NPH, PHE, PYR) PHCs (F1, F2, F3, F4)	
					TP13-05	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
APEC-4	Sand Storage - The 1916 FIP shows a 'Sand Shed'. The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand'. The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks', and an additional area to the north labeled 'Sand'. No information was identified to if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.	32	Iron and Steel Manufacturing and Processing	PAHs, ABNs, CPs, metals	BH07-58	BH	Metals**, PAHs, PCBs, VOCs	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, and PAHs. Table 6 Standards exceedances in groundwater included PAHs. Sampling has captured the COCs, and the APEC has been addressed.
					I	TP	ABNs, Metals**, PAHs, EC, pH	-	Metals (Cu, Pb, Mo, Zn)	-	
					IE15	TP	Metals**, CN-	-	Metals (Mo,)	-	
					INE15	TP	Metals**	-	None	-	
					OW03-I	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	PAHs (B(a)P)	
					OW03-II	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					TP17-301	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cu, Zn) PAHs (MNAP, ACY, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P)	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-5	Galvanizing Building - A small free standing building for 'Galvanizing' was present on the south east portion of the Site as shown on the 1916, 1929 and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.	33	Metal Treatment, Coating, Plating and Finishing	VOCs, PHCs, PAHs, metals	BH18-207	BH	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, and PHCs. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					MW17-108S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Cu, Pb, Zn) PHCs (F2, F3)	None	
					TP18-309	TP	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn) PHCs (F3)	-	
					TP18-310	TP	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn)	-	
APEC-6	Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946 and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior west side of the building.	34	Metal Fabrication	Metals	BH18-208	BH	Metals, Chemistry, PAH, pH	-	Metals (Cd, Pb, Zn)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					MW17-100S	MW	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (V, Zn)	None	
APEC-7	Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil", and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the north building remaining, but is not labeled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R, 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech, 1999).	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PHCs	BH07-56	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Sb, Cd, Cu, Pb, Zn), PAHs (B(a)P, FLT)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceednaces in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					JS15	TP	ABNs, Metals**, PAHs, PCBs, CN-, CrVI, Hg	-	None	-	
					MW17-103D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, VOC	Metals (Cd, Zn) PAHs (B(a)A, B(a)P, B(b)F, DB(ah)A, I(123-cd)P)	None	
					MW17-103S	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					OW07-32	MW	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	PAHs (B(a)A, B(a)P, DahA, FLT, I(123-cd)P)	Metals (Zn) VOCs (TCE)	
					TP13-03	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Zn)	-	
					TP13-04	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	None	-	
APEC-8	Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labeled as a 'time office'), but does not show the UST. The gasoline use is not known, however it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R, 1991).	28	Gasoline and Associated Products Storage in Fixed Tanks	VOC, PHCs, PAHs, metals	B	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceednaces in groundwater included BTEX and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					BW11	TP	Metals**, CrVI	-	None	-	
					MW17-105D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, B(k)F, FLT, I(123-cd)P)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	
					MW18-105G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
					MW17-105S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz, EB) VOCs (cis-1,2-DCE, C6N, VC)	
APEC-9	Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil". The building/structure is not on 1916 FIP where the area is shown as exterior yard area, and is not present on the 1960 FIP where the area is occupied.	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PHCs	B	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included BTEX and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					BH07-54	BH	Metals**, PAHs, BTEX, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					MW17-105D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, B(k)F, FLT, I(123-cd)P)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	
					MW18-105G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
					MW17-105S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz, EB) VOCs (cis-1,2-DCE, C6N, VC)	
APEC-10	Machine Shop - A machine shop is shown on the 1929, 1946 and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop.	34	Metal Fabrication	VOCs, PHCs, PAHs, metals	BH07-40	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, PAHs, PCBs, PHCs, and VOCs. Table 6 Standards exceedances in groundwater included metals, BTEX, PAHs, PHCs, and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					BH07-52	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Cd, Cu, Pb, Zn)	-	
					BH13-40	BH	Metals, PAHs, PHCs, VOCs	-	Metals (Zn), VOCs (TCE)	-	
					BH17-203	BH	Metals, BTEX, Chemistry, PHC, VOC, pH	-	None	None	
					BH18-204	BH	Metals, BTEX, Chemistry, VOC, pH	-	Metals (Cd) VOCs (TCE)	None	
					C7	CH	Metals**	-	None	-	
					C8	CH	Metals**	-	Metals (Co,)	-	
					ES-14	CS	PAHs	-	PAHs (ACYY)	-	
					ES-17	CS	PAHs	-	None	-	
					L	TP	Metals**, CrVI, Hg	-	Metals (Pb, Zn)	-	
					MW18-128D	MW	-	BTEX, PHC, VOC	-	VOC (cis-1,2-DCE, TCE)	
					MW18-130D	MW	-	Metals, BTEX, PHC, VOC	-	BTEX (Bz), VOC (cis-1,2-DCE, VC)	
					MW18-132D	MW	-	Metals, BTEX, PHC, VOC	-	VOC (cis-1,2-DCE, VC)	
					MW18-135S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	BTEX (Bz), PHC (F2)	
					MW18-135D	MW	-	BTEX, PAH, PHC, VOC	-	None	
					OW18-I	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC), PAHs (B(a)P)	
					OW18-II	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (Bnz), PHC (F2), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
					OW19	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, PCE, TCE, VC)	
					OW23D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz), PHC (F3), VOCs (cis-1,2-DCE, TCE, VC)	
					OW23S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE, TCE, VC), PHCs (F2, F3, F4), PAHs (MNPH, ACY, ANT, B(a)A, B(a)P, CHY, FLT, PHE, PYR)	
					TP13-08	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), PHCs (F3), PAHs (MNPH, ACYY, ANT, B(a)A, B(a)P, BghiP, B(k)F, CHY, DahA, FLT, I(123-cd)P, NPH, PHE), PCBs	-	
					TP18-316	TP	Metals, Chemistry, PAH, PCB, PHC, pH	-	None	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-11	Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS, 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product, but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 ug/L of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25% of the sampling events between 2005 and 2016.	33	Metal Treatment, Coating, Plating and Finishing	VOCs, PHCs, PAHs, metals	BH07-42	BH	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included metals, BTEX, PAHs, and PHCs. Sampling has captured the COCs, and the APEC has been addressed.
					BH07-45	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-46	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-51	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Mo, Ni, Zn), PAHs (NPH)	-	
					ES-11	CS	PAHs	-	None	-	
					ES-12	CS	PAHs	-	None	-	
					KE13	TP	PCBs	-	None	-	
					L	TP	Metals**, CrVI, Hg	-	Metals (Pb, Zn)	-	
					LN2	TP	ABNs, Metals**, PAHs, EC, pH	-	Metals (Mo, Zn)	-	
					MW17-109S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	BTEX (EB) PAHs (MNAP)	
					MW18-131S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	Metals (Zn), VOC (cis-1,2-DCE, TCE)	
					MW18-133D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE)	
					OW22D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz)	
					OW22S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (EB), PAHs (MNPH, ACY, ANT, B(a)A, B(a)P, B(b)F, CHY, FLT, NPH, PHE, PYR) PHCs (F1, F2, F3, F4)	
					TP13-05	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
					TP13-06	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
					TP17-304	TP	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn)	-	
					TP17-305	TP	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Zn) PHCs (F3)	-	
APEC-12	Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.	8	Chemical Manufacturing, Processing and Bulk Storage	PAHs	OW07-37	MW	Metals**, PAHs, VOCs	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn)	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. No Table 6 Standards exceedances in soils were identified. Table 6 Standards exceedances in groundwater included metals. Sampling has captured the COCs, and the APEC has been addressed.
APEC-13	Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929 and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.	46	Rail Yards, Tracks and Spurs	PAHs, metals	11	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included metals. Sampling has captured the COCs, and the APEC has been addressed.
					BH07-42	BH	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					BH07-45	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-51	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Mo, Ni, Zn), PAHs (NPH)	-	
					ES-11	CS	PAHs	-	None	-	
					INE15	TP	Metals**	-	None	-	
					K	TP	Metals**, EC, pH	-	Metals (Mo, Zn)	-	
					KE13	TP	PCBs	-	None	-	
					LN2	TP	ABNs, Metals**, PAHs, EC, pH	-	Metals (Mo, Zn)	-	
					MW17-110S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, DB(ah)A, FLT, I(123-cd)P, NAP)	None	
					MW18-131S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	Metals (Zn), VOC (cis-1,2-DCE, TCE)	
					OW02	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl-Na, CrVI, CN-, Hg, EC, pH	-	None	
					OW07-37	MW	Metals**, PAHs, VOCs	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn)	
					OW07-38S	MW	Metals**, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC,	Metals (As, Cd, Mo, Zn)	None	
					TP17-301	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cu, Zn) PAHs (MNAP, ACY, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P)	-	
APEC-14	Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	VOCs, PHCs, PAHs, metals	BH17-202	BH	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					MW18-136D	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE, VC)	
					OW10	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
APEC-15	Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) do not have an indication of the buildings use.	8	Chemical Manufacturing, Processing and Bulk Storage	PHCs, PAHs, ABNs, CPs, metals	BH17-200	BH	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals. Sampling has captured the COCs, and the APEC has been addressed.
					OW07-37	MW	Metals**, PAHs, VOCs	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn)	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-16	Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.	55	Transformer Manufacturing, Processing and Use	PHCs, PCBs	OW07-32	MW	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	PAHs (B(a)A, B(a)P, DahA, FLT, I(123-cd)P)	Metals (Zn) VOCs (TCE)	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					TP13-03	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Zn)	-	
APEC-17	Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigationsite plan, and later remediated as part of the Earth Tech demolition (P&R, 1991; EarthTech, 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 ug/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 ug/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 ug/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated VOCs and PHCs (mainly F3) above the applicable potable water criteria (Table 6 Standards) (DCS, 2007b, 2014b; AECOM, 2017a and 2017b).	55	Transformer Manufacturing, Processing and Use	PCBs, PHCs	C11	CH	Metals**, PCBs	-	Metals (Co,)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, PAHs, and PCBs. Table 6 Standards exceedances in groundwater included PAHs, PHCs, and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					CS-37	CC	PCBs	-	PCBs	-	
					CS-38	CC	PCBs	-	None	-	
					CS-39	CC	PCBs	-	None	-	
					CS-40	RK	PCBs	-	None	-	
					CS-41	CC	PCBs	-	PCBs	-	
					CS-42	RK	PCBs	-	None	-	
					CS-44	CC	PCBs	-	None	-	
					CS-45	CC	PCBs	-	None	-	
					CS-46	CC	PCBs	-	None	-	
					CS-52	RK	PCBs	-	PCBs	-	
					CS-54	CC	PCBs	-	None	-	
					CS-56	CC	PCBs	-	None	-	
					CS-57	CC	PCBs	-	None	-	
					CS-58	SS	PCBs	-	None	-	
					CS-59	CC	PCBs	-	None	-	
					CS-60	SS	PCBs	-	None	-	
					CS-61	RK	PCBs	-	PCBs	-	
					CS-62	RK	PCBs	-	PCBs	-	
					CS-63	RK	PCBs	-	None	-	
					CS-64	RK	PCBs	-	PCBs	-	
					CS-65	RK	PCBs	-	PCBs	-	
					CS-66	RK	PCBs	-	PCBs	-	
					CS-67	RK	PCBs	-	PCBs	-	
					MW18-125S	MW	Metals, Chemistry, PAH, PCB, PHC, pH	BTEX, PAH, PCB, PHC, VOC	None	VOCs (VC)	
					MW18-126D	MW	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, pH	BTEX, PHC, VOC	None	VOCs (VC)	
					OW25	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE, TCE, VC), PHCs (F2, F3), PAH (B(a)P, B(bj)F, B(k)F)	
					SS-40	SS	PCBs	-	None	-	
					SS-41	SS	PCBs	-	PCBs	-	
					SS-42	SS	PCBs	-	None	-	
					SS-43	SS	PCBs	-	None	-	
					SS-44	SS	PCBs	-	None	-	
					SS-45	SS	PCBs	-	None	-	
					TP17-306	TP	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Sb, As, Cd, Pb, Zn) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P) PCBs	-	
					TP17-307	TP	Metals, BTEX, Chemistry, PHC, VOC, pH	-	None	-	
					TP17-308	TP	Metals, Chemistry, EC, pH, SAR, B-HWS, CrVI, Hg	-	None	-	
APEC-18	Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R, 1991, DCS, 2007a).	8	Chemical Manufacturing, Processing and Bulk Storage	PAHs	12SE10	TP	Metals**, CrVI, Hg	-	Metals (Cu, Mo, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					C14	CH	Metals**	-	None	-	
					MW17-110S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, DB(ah)A, FLT, I(123-cd)P, NAP)	None	
					OW07-38S	MW	Metals**, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (As, Cd, Mo, Zn)	None	
APEC-19	Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.	8	Chemical Manufacturing, Processing and Bulk Storage	PAHs	B	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included metals, BTEX, and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					MW17-105D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, B(k)F, FLT, I(123-cd)P)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	
					MW17-105S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz, EB) VOCs (cis-1,2-DCE, C6N, VC)	
					MW18-105G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
					OW09-I	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, TCE, VC)	
					OW09-II	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Pb), BTEX (Bnz), VOCs (cis-1,2-DCE, VC)	
APEC-20	Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the west side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	VOCs, PHCs, PAHs, metals, PCBs	BH07-67	BH	Metals**, PCBs, VOCs	-	Metals (As, Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					ESW8	TP	Metals**, PCBs, EC, pH	-	Metals (Zn)	-	
					EW8	TP	Metals**, PCBs	-	None	-	
					OW15	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					OW16	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					TP17-300	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn) PAHs (MNAP, ANT, B(a)A, B(a)P, B(b)F, BghiP, B(k)F, CHY, DB(ah)A, FLT, I(123-cd)P, NAP) PCBs PHCs (F3)	-	
					TP18-318	TP	Metals, BTEX, Chemistry, PAH, PCB, PHC, pH	-	None	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-21	Coal Storage - The 1960 FIP indicates coal storage south of the garage on the west side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labeled as coal.	8	Chemical Manufacturing, Processing and Bulk Storage	PAHs	ESW8	TP	Metals**, PCBs, EC, pH	-	Metals (Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					OW15	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					OW16	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					TP17-300	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn) PAHs (MNAP, ANT, B(a)A, B(a)P, B(b)F, BghiP, B(k)F, CHY, DB(ah)A, FLT, I(123-cd)P, NAP) PCBs PHCs (F3)	-	
APEC-22	Transformer - A 1200-volt transformer is shown on the 1991 Site Plan (P&R, 1991).	55	Transformer Manufacturing, Processing and Use	PHCs, PCBs	BH17-201	BH	Metals, Chemistry, PAH, PCB, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn) PAHs (FLT) PHCs (F3)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					OW07-33	MW	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Zn)	VOCs (1,1-DCA, TCE)	
APEC-23	Paint Shop - First shown on the P&R Site plan, a paint shop was located at the north end of the site, between the shipping building and the storage area (P&R, 1991). Drums were stored against the north wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.	39	Paints Manufacturing, Processing and Bulk Storage	VOCs, PHCs, PAHs, metals	12SE10	TP	Metals**, CrVI, Hg	-	Metals (Cu, Mo, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					C14	CH	Metals**	-	None	-	
					MW17-110S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, DB(ah)A, FLT, I(123-cd)P, NAP)	None	
					OW07-38S	MW	Metals**, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (As, Cd, Mo, Zn)	None	
APEC-24	PCB Storage Area - An area located at the northeast corner of the finishing and annealing room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as 'storage' (P&R, 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech, 1999). Confirmatory samples below the pad were 0.63 and <0.05 ug/g. The soil was later excavated to bedrock as part of the soil remediation in the northeast corner of the property (see APEC-11).	55	Transformer Manufacturing, Processing and Use	PHCs, PCBs	BH07-46	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included BTEX and PAHs. Sampling has captured the COCs, and the APEC has been addressed.
					ES-11	CS	PAHs	-	None	-	
					ES-12	CS	PAHs	-	None	-	
					MW17-109S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	BTEX (EB) PAHs (MNAP)	
					TP13-05	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
APEC-25	Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities which occurred along the north property boundary (P&R, 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.	8	Chemical Manufacturing, Processing and Bulk Storage	VOCs, PHCs, PAHs, metals	10	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals and PAHs. Table 6 Standards exceedances in groundwater included metals. Sampling has captured the COCs, and the APEC has been addressed.
					12	TP	Metals**, PCBs, CrVI, Hg	-	None	-	
					12SE10	TP	Metals**, CrVI, Hg	-	Metals (Cu, Mo, Zn)	-	
					BH07-51	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Mo, Ni, Zn), PAHs (NPH)	-	
					HNE19	TP	Metals**, CrVI	-	None	-	
					KE13	TP	PCBs	-	None	-	
					MW18-112D	MW	-	Metals, BTEX, VOC	-	Metals (As)	
					MW18-112S	MW	-	Metals	-	Metals (As)	
					MW18-112G	MW	-	Metals, BTEX, VOC	-	BTEX (Bz), VOC (CHL, cis-1,2-DCE)	
					MW18-114D	MW	-	Metals, BTEX, VOC	-	Metals (Sb), VOC (cis-1,2-DCE)	
					MW18-115S	MW	-	Metals	-	None	
					MW18-115D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE)	
					OW02	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl-Na, CrVI, CN-, Hg, EC, pH	-	None	
					OW07-31	MW	Metals**, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCBs, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	None	Metals (As)	
					OW17	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
					TP17-302	TP	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn)	-	
					TP18-319	TP	Metals, Chemistry, PAH, pH	-	Metals (Pb, Zn)	-	
APEC-26	Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated non-detect concentrations of PCBs. Similarly one location installed during the DCS Phase II ESA (2007) indicated non-detect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.	55	Transformer Manufacturing, Processing and Use	PHCs, PCBs	BH07-65	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. No Table 6 Standards exceedances in groundwater were identified. Sampling has captured the COCs, and the APEC has been addressed.
					MW17-111S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	None	None	
					TP18-311	TP	Metals	-	None	-	
					TP18-312	TP	Metals	-	Metals (Cd, Pb, Zn)	-	
					TP18-313	TP	Metals	-	Metals (Cd, Pb, Zn)	-	
					TP18-314	TP	Metals	-	Metals (Zn)	-	
APEC-27	Former Electrical Shop - A small electrical shop was noted to be on the southwest corner of the foundry (P&R, 1991). This addition was not shown on the FIPs from previous years, and was shown as the exterior yard area west of the foundry.	34	Metal Fabrication	VOCs, PHCs, PAHs, metals	6	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					DSW7	TP	Metals**, CN-	-	Metals (Tl,)	-	
					MW18-120D	MW	Metals	Metals, BTEX, VOC	Metals (Cd, Zn)	None	
					OW12	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (TCA)	
					TP17-303	TP	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Zn)	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
APEC-28	Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site Plan (P&R, 1991).	28	Gasoline and Associated Products Storage in Fixed Tanks	VOCs, PHCs, PAHs, metals	6	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					MW18-120D	MW	Metals	Metals, BTEX, VOC	Metals (Cd, Zn)	None	
					OW12	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (TCA)	
					TP17-303	TP	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Zn)	-	
APEC-29	Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag and cinders (up to 1.0 m) was found across the site (P&R, 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS, 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R, 1991).	30	Importation of Fill Material of Unknown Quality	BTEX, PHCs, PAHs, ABNs, CPs, metals, PCBs	1	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals, PAHs, PCBs, PHCs, and VOCs. Table 6 Standards exceedances in groundwater included metals, BTEX, PAHs, PHCs and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					2	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					3	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					4	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					5	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					6	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					7	TP	ABNs, Metals**, PAHs, CN-, CrVI, EC, Hg, pH	-	None	-	
					8	TP	Metals**, CN-, CrVI, EC, Hg, pH	-	None	-	
					9	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					10	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					11	TP	Metals**, CrVI, EC, Hg, pH	-	None	-	
					12	TP	Metals**, PCBs, CrVI, Hg	-	None	-	
					12SE10	TP	Metals**, CrVI, Hg	-	Metals (Cu, Mo, Zn)	-	
					A	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Mo, Tl, Zn)	-	
					AN21	TP	Metals**	-	Metals (Pb, Tl, Zn)	-	
					ASW14	TP	Metals**, CrVI	-	Metals (Pb, Zn)	-	
					B	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Zn)	-	
					BH07-40	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					BH07-41	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, Hg	-	Metals (Cd, Zn), PAHs (B(a)P, B(b)F, FLT, I(123-cd)P)	-	
					BH07-42	BH	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					BH07-45	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-46	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-47	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-48	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Cd, Zn)	-	
					BH07-49	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Zn)	-	
					BH07-50	BH	Metals**, PCBs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Zn)	-	
					BH07-51	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Mo, Ni, Zn), PAHs (NPH)	-	
					BH07-52	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Cd, Cu, Pb, Zn)	-	
					BH07-53	BH	Metals**, PAHs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Pb)	-	
					BH07-54	BH	Metals**, PAHs, BTEX, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					BH07-55	BH	Metals**, PAHs, VOCs	-	None	-	
					BH07-56	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Sb, Cd, Cu, Pb, Zn), PAHs (B(a)P, FLT)	-	
					BH07-57	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Hg, Zn)	-	
					BH07-58	BH	Metals**, PAHs, PCBs, VOCs	-	None	-	
					BH07-59	BH	Metals**, PAHs, PCBs, VOCs	-	None	-	
					BH07-60	BH	Metals**, PAHs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Pb, Zn)	-	
					BH07-61	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-62	BH	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Cd, Pb, Zn)	-	
					BH07-63	BH	Metals**, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Zn)	-	
					BH07-64	BH	Metals**, PAHs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Zn), PAHs (B(a)P)	-	
					BH07-65	BH	Metals**, PAHs, PCBs, VOCs	-	Metals (Cd, Pb, Zn)	-	
					BH07-66	BH	Metals**, PAHs, PCBs, BTEX	-	Metals (Zn), VOCs (Bnz, EB, XYL)	-	
					BH07-67	BH	Metals**, PCBs, VOCs	-	Metals (As, Cd, Pb, Zn)	-	
					BH07-68	BH	Metals**, PAHs, PCBs, BTEX	-	PAHs (DahA)	-	
					BH07-69	BH	Metals**, PAHs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	None	-	
					BH07-70	BH	Metals**, PAHs, PCBs, BTEX, CN-, CrVI, EC, Hg, pH, SAR	-	Metals (Zn)	-	
					BH07-71	BH	Metals**, PAHs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	-	None	-	
					BH13-40	BH	Metals, PAHs, PHCs, VOCs	-	Metals (Zn), VOCs (TCE)	-	
					BH17-200	BH	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn)	None	
					BH17-201	BH	Metals, Chemistry, PAH, PCB, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn) PAHs (FLT) PHCs (F3)	None	
					BH17-202	BH	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn)	None	
					BH17-203	BH	Metals, BTEX, Chemistry, PHC, VOC, pH	-	None	None	
					BH18-204	BH	Metals, BTEX, Chemistry, VOC, pH	-	Metals (Cd) VOCs (TCE)	None	
					BH18-205	BH	Metals, BTEX, Chemistry, PHC, VOC, pH	-	VOCs (TCE)	None	
					BH18-206	BH	Metals, Chemistry, PHC, EC, pH, SAR, CrVI, CN-, Hg	-	Metals (Cd, Zn)	None	
					BH18-207	BH	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn)	None	
					BH18-208	BH	Metals, Chemistry, PAH, pH	-	Metals (Cd, Pb, Zn)	None	
					BW11	TP	Metals**, CrVI	-	None	-	
					C	TP	Metals**, CrVI, EC, pH	-	Metals (Pb, Zn)	-	
					C1	CH	-	-	-	-	
					C11	CH	Metals**, PCBs	-	Metals (Co,)	-	
					C14	CH	Metals**	-	None	-	
					C2	CH	Metals**	-	Metals (Mo, Zn)	-	
					C3	CH	-	-	-	-	
					C4	CH	-	-	-	-	
					C7	CH	Metals**	-	None	-	
					C8	CH	Metals**	-	Metals (Co,)	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
			CE10	TP	Metals**	-	Metals (Mo, Tl,)	-	
			CS-37	CC	PCBs	-	PCBs	-	
			CS-38	CC	PCBs	-	None	-	
			CS-39	CC	PCBs	-	None	-	
			CS-40	RK	PCBs	-	None	-	
			CS-41	CC	PCBs	-	PCBs	-	
			CS-42	RK	PCBs	-	None	-	
			CS-44	CC	PCBs	-	None	-	
			CS-45	CC	PCBs	-	None	-	
			CS-46	CC	PCBs	-	None	-	
			CS-52	RK	PCBs	-	PCBs	-	
			CS-54	CC	PCBs	-	None	-	
			CS-56	CC	PCBs	-	None	-	
			CS-57	CC	PCBs	-	None	-	
			CS-58	SS	PCBs	-	None	-	
			CS-59	CC	PCBs	-	None	-	
			CS-60	SS	PCBs	-	None	-	
			CS-61	RK	PCBs	-	PCBs	-	
			CS-62	RK	PCBs	-	PCBs	-	
			CS-63	RK	PCBs	-	None	-	
			CS-64	RK	PCBs	-	PCBs	-	
			CS-65	RK	PCBs	-	PCBs	-	
			CS-66	RK	PCBs	-	PCBs	-	
			CS-67	RK	PCBs	-	PCBs	-	
			CW10	TP	ABNs, Metals**, PAHs	-	None	-	
			D	TP	ABNs, Metals**, PAHs, CrVI, EC, pH	-	Metals (Zn)	-	
			DSW7	TP	Metals**, CN-	-	Metals (Tl,)	-	
			ES-11	CS	PAHs	-	None	-	
			ES-12	CS	PAHs	-	None	-	
			ES-14	CS	PAHs	-	PAHs (ACYY)	-	
			ES-15	CS	PAHs	-	None	-	
			ES-16	CS	PAHs	-	None	-	
			ES-17	CS	PAHs	-	None	-	
			ESW8	TP	Metals**, PCBs, EC, pH	-	Metals (Zn)	-	
			EW8	TP	Metals**, PCBs	-	None	-	
			H	TP	Metals**, CrVI	-	Metals (Zn)	-	
			HNE19	TP	Metals**, CrVI	-	None	-	
			HW16	TP	Metals**	-	Metals (Pb,)	-	
			I	TP	ABNs, Metals**, PAHs, EC, pH	-	Metals (Cu, Pb, Mo, Zn)	-	
			IE15	TP	Metals**, CN-	-	Metals (Mo,)	-	
			INE15	TP	Metals**	-	None	-	
			JE15	TP	Metals**, CrVI, Hg	-	None	-	
			JS15	TP	ABNs, Metals**, PAHs, PCBs, CN-, CrVI, Hg	-	None	-	
			K	TP	Metals**, EC, pH	-	Metals (Mo, Zn)	-	
			KE13	TP	PCBs	-	None	-	
			KNW10	TP	Metals**	-	Metals (Pb, Zn)	-	
			KW32	TP	Metals**	-	None	-	
			L	TP	Metals**, CrVI, Hg	-	Metals (Pb, Zn)	-	
			LN2	TP	ABNs, Metals**, PAHs, EC, pH	-	Metals (Mo, Zn)	-	
			MW17-100S	MW	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (V, Zn)	None	
			MW17-101D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Zn) PHCs (F3)	BTEX (Bnz), VOCs (VC)	
			MW17-101S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz) VOCs (TCE)	
			MW17-102D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, PHC, VOC	Metals (Cd, Pb, Zn) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P) VOCs (TCE)	BTEX (Bnz) VOCs (cis-1,2-DCE)	
			MW17-103D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, VOC	Metals (Cd, Zn) PAHs (B(a)A, B(a)P, B(b)F, DB(ah)A, I(123-cd)P)	None	
			MW17-103S	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			MW17-104D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	PAHs (B(a)P)	
			MW17-104S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	PAHs (MNAP, PHE) PHCs (F2)	
			MW17-105D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, B(k)F, FLT, I(123-cd)P)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	
			MW17-105S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz, EB) VOCs (cis-1,2-DCE, C6N, VC)	
			MW18-105G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
			MW17-106D	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	BTEX, PHC, VOC	None	None	
			MW17-106S	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			MW17-107S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Zn)	VOCs (1,1-DCA, 1,1-DCE, PCE, TCE)	
			MW17-108S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Cu, Pb, Zn) PHCs (F2, F3)	None	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
			MW17-109S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn)	BTEX (EB) PAHs (MNAP)	
			MW17-110S	MW	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn) PAHs (MNAP, B(a)A, B(a)P, B(b)F, DB(ah)A, FLT, I(123-cd)P, NAP)	None	
			MW17-111S	MW	Metals, BTEX, Chemistry, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	Metals, BTEX, Chemistry, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	None	None	
			MW18-107D	MW	-	BTEX, VOC	-	None	
			MW18-112D	MW	-	Metals, BTEX, VOC	-	Metals (As)	
			MW18-112S	MW	-	Metals	-	Metals (As)	
			MW18-112G	MW	-	Metals, BTEX, VOC	-	BTEX (Bz), VOC (CHL, cis-1,2-DCE)	
			MW18-113S	MW	-	Metals	-	None	
			MW18-113D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE, TCE)	
			MW18-114S	MW	-	Metals	-	None	
			MW18-114D	MW	-	Metals, BTEX, VOC	-	Metals (Sb), VOC (cis-1,2-DCE)	
			MW18-115S	MW	-	Metals	-	None	
			MW18-115D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE)	
			MW18-116D	MW	-	Metals, BTEX, VOC	-	VOCs (TCE)	
			MW18-116S	MW	-	Metals, BTEX, VOC	-	None	
			MW18-117S	MW	Metals, BTEX, Chemistry, PHC, pH	Metals	Metals (Pb, Zn) PHCs (F3)	None	
			MW18-118S	MW	-	Metals, BTEX, PAH, VOC	-	None	
			MW18-119S	MW	-	Metals, BTEX, VOC	-	VOCs (1,1-DCA, 1,1-DCE)	
			MW18-119D	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
			MW18-120D	MW	Metals	Metals, BTEX, VOC	Metals (Cd, Zn)	None	
			MW18-121D	MW	-	BTEX, VOC	-	VOCs (cis-1,2-DCE, VC)	
			MW18-121S	MW	Metals	Metals, BTEX, VOC	Metals (Zn)	None	
			MW18-122D	MW	Metals, Chemistry, PAH, EC, pH, SAR, CrVI, CN-, Hg	BTEX, VOC	None	VOCs (1,1-DCA, cis-1,2-DCE)	
			MW18-122G	MW	-	BTEX, VOC	-	None	
			MW18-123D	MW	Metals, BTEX, Chemistry, PAH, VOC, EC, pH, SAR, CrVI, CN-, Hg	BTEX, VOC	Metals (Cd, Pb, Zn)	VOCs (cis-1,2-DCE)	
			MW18-123S	MW	-	BTEX, VOC	-	VOCs (cis-1,2-DCE, TCE)	
			MW18-124S	MW	Metals, Chemistry, PAH, pH	PAH	None	None	
			MW18-125S	MW	Metals, Chemistry, PAH, PCB, PHC, pH	BTEX, PAH, PCB, PHC, VOC	None	VOCs (VC)	
			MW18-126D	MW	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, pH	BTEX, PHC, VOC	None	VOCs (VC)	
			MW18-127S	MW	-	BTEX, PHC, VOC	-	None	
			MW18-128D	MW	-	BTEX, PHC, VOC	-	VOC (cis-1,2-DCE, TCE)	
			MW18-129D	MW	Metals, Chemistry, PAH, PHC, EC, pH, SAR, CrVI, CN-, Hg	Metals, BTEX, Metals, VOC	Metals (Zn)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	
			MW18-130D	MW	-	Metals, BTEX, PHC, VOC	-	BTEX (Bz), VOC (cis-1,2-DCE, VC)	
			MW18-131S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	Metals (Zn), VOC (cis-1,2-DCE, TCE)	
			MW18-132D	MW	-	Metals, BTEX, PHC, VOC	-	VOC (cis-1,2-DCE, VC)	
			MW18-133D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE)	
			MW18-134S	MW	-	BTEX, VOC	-	None	
			MW18-134D	MW	-	BTEX, VOC	-	BTEX (Bz), VOC (VC)	
			MW18-135S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	BTEX (Bz), PHC (F2)	
			MW18-135D	MW	-	BTEX, PAH, PHC, VOC	-	None	
			MW18-136D	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE, VC)	
			MW18-136G	MW	-	BTEX, VOC	-	VOC (cis-1,2-DCE)	
			OW02	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl-Na, CrVI, CN-, Hg, EC, pH	-	None	
			OW03-I	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	PAHs (B(a)P)	
			OW03-II	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW07-31	MW	Metals**, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCBs, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	None	Metals (As)	
			OW07-32	MW	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	PAHs (B(a)A, B(a)P, DahA, FLT, I(123-cd)P)	Metals (Zn) VOCs (TCE)	
			OW07-33	MW	Metals**, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Zn)	VOCs (1,1-DCA, TCE)	
			OW07-34D	MW	Metals**, PAHs, PCBs, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn), PAHs (ACY, ANT, B(a)A, B(a)P, B(b)F, BghiP, B(k)F, CHY, DahA, FLT, FLRN, I(123-cd)P, NPH, PHE, PYR)	VOCs (1,1-DCA, TCE)	
			OW07-34S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (TCE)	
			OW07-37	MW	Metals**, PAHs, VOCs	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn)	
			OW07-38S	MW	Metals**, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (As, Cd, Mo, Zn)	None	
			OW09-I	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, TCE, VC)	
			OW09-II	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Pb), BTEX (Bnz), VOCs (cis-1,2-DCE, VC)	
			OW10	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW11-I	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW11-II	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (TCA, 1,1-DCA, 1,1-DCE, VC)	
			OW12	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (TCA)	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
			OW13	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, TCE, VC)	
			OW13-39D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz) VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
			OW13-39S	MW	Metals, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn), VOCs (TCE)	VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
			OW14	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (cis-1,2-DCE, TCE)	
			OW15	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW16	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW17	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
			OW18-I	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC), PAHs (B(a)P)	
			OW18-II	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (Bnz), PHC (F2), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
			OW19	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, PCE, TCE, VC)	
			OW22D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz)	
			OW22S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (EB), PAHs (MNPH, ACY, ANT, B(a)A, B(a)P, B(b)F, CHY, FLT, NPH, PHE, PYR) PHCs (F1, F2, F3, F4)	
			OW23D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz), PHC (F3), VOCs (cis-1,2-DCE, TCE, VC)	
			OW23S	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE, TCE, VC), PHCs (F2, F3, F4), PAHs (MNPH, ACY, ANT, B(a)A, B(a)P, CHY, FLT, PHE, PYR)	
			OW24D	MW	-	Metals, ABN, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), PHC (F1), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
			OW24S	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE)	
			OW25	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE, TCE, VC), PHCs (F2, F3), PAH (B(a)P, B(bj)F, B(k)F)	
			OW26D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE)	
			OW26S	MW	-	Metals, ABN, BTEX, Chemistry, PCB, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCA)	
			OW31	MW	-	Metals, BTEX, PAHs, PCB, PHC, VOC, CrVI, Cl-, Hg	-	VOCs (1,1-DCE, Bnz, cis-1,2-DCE, t-1,2-DCE, TCE, VC), PHCs (F2, F3, F4)	
			SS-40	SS	PCBs	-	None	-	
			SS-41	SS	PCBs	-	PCBs	-	
			SS-42	SS	PCBs	-	None	-	
			SS-43	SS	PCBs	-	None	-	
			SS-44	SS	PCBs	-	None	-	
			SS-45	SS	PCBs	-	None	-	
			TP13-01	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Zn)	-	
			TP13-02	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Zn)	-	
			TP13-03	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Zn)	-	
			TP13-04	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	None	-	
			TP13-05	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
			TP13-06	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
			TP13-08	TP	Metals, PAHs, PCBs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), PHCs (F3), PAHs (MNPH, ACYY, ANT, B(a)A, B(a)P, BghiP, B(k)F, CHY, DahA, FLT, I(123-cd)P, NPH, PHE), PCBs	-	
			TP13-09	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), PAHs (B(a)A, B(a)P, DahA, FLT, I(123-cd)P)	-	
			TP13-10	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn)	-	
			TP13-11	TP	Metals, PAHs, PHCs, VOCs, Hg	-	Metals (Cd, Pb, Zn), VOCs (Bnz), PHCs (F3), PAHs (MNPH, ACYY, ANT, B(a)A, B(a)P, DahA, FLT, I(123-cd)P, NPH)	-	
			TP17-300	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn) PAHs (MNAP, ANT, B(a)A, B(a)P, B(b)F, BghiP, B(k)F, CHY, DB(ah)A, FLT, I(123-cd)P, NAP) PCBs PHCs (F3)	-	
			TP17-301	TP	Metals, ABN, BTEX, CP, Chemistry, PAH, PHC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cu, Zn) PAHs (MNAP, ACY, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P)	-	
			TP17-302	TP	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Zn)	-	
			TP17-303	TP	Metals, BTEX, Chemistry, PAH, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Zn)	-	
			TP17-304	TP	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Cd, Pb, Zn)	-	
			TP17-305	TP	Metals, BTEX, Chemistry, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Zn) PHCs (F3)	-	
			TP17-306	TP	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, EC, pH, SAR, B-HWS, CrVI, Hg	-	Metals (Sb, As, Cd, Pb, Zn) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P) PCBs	-	
			TP17-307	TP	Metals, BTEX, Chemistry, PHC, VOC, pH	-	None	-	
			TP17-308	TP	Metals, Chemistry, EC, pH, SAR, B-HWS, CrVI, Hg	-	None	-	
			TP18-309	TP	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn) PHCs (F3)	-	
			TP18-310	TP	Metals, Chemistry, PHC, pH	-	Metals (Cd, Pb, Zn)	-	
			TP18-311	TP	Metals	-	None	-	
			TP18-312	TP	Metals	-	Metals (Cd, Pb, Zn)	-	
			TP18-313	TP	Metals	-	Metals (Cd, Pb, Zn)	-	
			TP18-314	TP	Metals	-	Metals (Zn)	-	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
					TP18-315	TP	Metals, BTEX, Chemistry, PAH, PHC, pH	-	Metals (Cd) PAHs (ANT, B(a)A, B(a)P, B(b)F, B(k)F, DB(ah)A, FLT, I(123-cd)P, NAP)	-	
					TP18-316	TP	Metals, Chemistry, PAH, PCB, PHC, pH	-	None	-	
					TP18-317	TP	Metals, BTEX, Chemistry, PHC, pH	-	None	-	
					TP18-318	TP	Metals, BTEX, Chemistry, PAH, PCB, PHC, pH	-	None	-	
					TP18-319	TP	Metals, Chemistry, PAH, pH	-	Metals (Pb, Zn)	-	
APECs from Offsite PCAs to the North											
APEC-30 (Offsite North)	Rail Lines - Bordering the north side of the Site, rail lines are present (owned by Guelph Rail Line) and have existed since at least the early 1900s. Has historically been indicated as the Canadian Pacific Railway (1916, 1929, 1946, 1960 FIPs and P&R [1991]), Guelph Junction Railway (EarthTech, 1999; DCS, 2007a).	46	Rail Yards, Tracks and Spurs	VOCs, PHCs, PAHs, ABNs, CPs, metals	MW18-112D	MW	-	Metals, BTEX, VOC	-	Metals (As)	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. No Table 6 Standards exceedances in soils were identified. Table 6 Standards exceedances in groundwater included metals. Sampling has captured the COCs, and the APEC has been addressed.
	Paper Manufacturing - Companies at 309 Elizabeth Street have been listed in the Scott's Manufacturing Directory for paper related manufacturing: Trinity Graphics was established in 1977 and 1978 with a plant sizes of 3,000 and 50,000 m3 for paper bag and coated and treated paper manufacturing, all other converted paper product manufacturing, platemaking and related services; Independent Paper Converters was established in 1978 with a plant size of 56,000 m3 for manufacturing including paper bag, coated and treated paper, plastic film and sheet. The 1960 FIP indicated gummed paper manufacturing (Top Paper Products).	45	Pulp, Paper and Paperboard Manufacturing and Processing		MW18-112S	MW	-	Metals	-	Metals (As)	
					MW18-112G	MW	-	Metals, BTEX, VOC	-	BTEX (Bz), VOC (CHL, cis-1,2-DCE)	
	Auto Body Repair Shop - An automobile wrecking and recycling record was listed in the ERIS report for Sutton Auto Collision at 349 Elizabeth Street, which is an autobody repair facility. Additionally Top Gun Auto Painting & Collision is listed at this address from the City Directory.	10	Commercial Autobody Shops		MW18-113S	MW	-	Metals	-	None	
					MW18-113D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE, TCE)	
	Automobile Repair - Two automotive repair shops are listed in the City Directory at 349 Elizabeth Street from approximately 2005.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles		MW18-130D	MW	-	Metals, BTEX, PHC, VOC	-	BTEX (Bz), VOC (cis-1,2-DCE, VC)	
	Gasoline Station - A private fuel outlet with a 2,250 L liquid fuel double walled AST for gasoline is listed in the ERIS report for Oaks Precast Ind. Div. Standard Ind. at 351 Elizabeth Street with a license issue date of 1990. An additional record indicates a tank capacity of 36,500 L.	28	Gasoline and Associated Products Storage in Fixed Tanks								
	Trucking Company - A general freight trucking company (Polymer Distribution Inc.) is listed at 351 Elizabeth Street.	11	Commercial Trucking and Container Terminals		MW18-131S	MW	-	Metals, BTEX, PAH, PHC, VOC	-	Metals (Zn), VOC (cis-1,2-DCE, TCE)	
	Concrete Products Manufacturing - Lafarge Canada Inc. is listed at 351 Elizabeth Street, with a Scott's Manufacturing directory listing indicating an established date of 1933 and plant size of 50,000 ft3.	12	Concrete, Cement and Lime Manufacturing		MW18-133D	MW	-	Metals, BTEX, VOC	-	VOC (cis-1,2-DCE)	
	Plastic Products Manufacturing - ERIS and the City Directory searches indicate plastic products manufacturing at 53 Victoria Rd S. Scott's Manufacturing directory listings indicate Sterling Creations was established in 1983 with a 5,000 ft2 plant size, as well as Clear Choice Window Manufacturing established in 1990 with a 1,600 ft2 plant size.	43	Plastics (including Fibreglass) Manufacturing and Processing								
	Wire/Spring Manufacturing - ERIS searches list records for Guelph Wire Products which was established in 1974, plant size of 4,000 ft2 and manufactures steel springs, wire springs and miscellaneous fabricated wire products.	34	Metal Fabrication		OW02	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl-Na, CrVI, CN-, Hg, EC, pH	-	None	
	Metal Valve Manufacturing - ERIS searches list records for DeNardis Industrial Sales Ltd. at 61 Victoria Rd S Unit C for metal valve manufacturing, established in 1985, plant size 4000 ft2. Former Spill - Spill records from ERIS indicated a release of diesel fuel in 2005 at 65 Victoria South.	34	Metal Fabrication		OW07-31	MW	Metals**, VOCs, CN-, CrVI, EC, Hg, pH, SAR	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCBs, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	None	Metals (As)	
	Electro-plating company - Holody Electro-Plating Limited is listed at 66 Victoria associated with metal product coating, iron and steel mills and ferro-alloy manufacturing since at 1955, with a plant size of 40,000 ft2 according to available records from ERIS. The 1960 FIP showed labeled buildings for plating, polishing, and an office.	33	Metal Treatment, Coating, Plating and Finishing		OW17	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
	Window and Door Manufacturing - Clear Choice Window Manufacturing Inc. and Richview Doors Ltd are listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size. A spill at 75 Victoria Road South of a polymer emulsion (100lbs) in 2016 was reported.	43	Plastics (including Fibreglass) Manufacturing and Processing								
	Scrap Yard - B&F Scrap Dealers are listed at 100 Victoria Road South, with an automobile wrecking and recycling record in ERIS and listings in the city directory search from 1970 to 2011. A spill was reported at the property of a gasoline and water mixture (quantity not specified) in 2006 from cargo leaking to the ground.	49	Salvage Yard, including automobile wrecking		OW19	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, PCE, TCE, VC)	
APECs from Offsite PCAs to the East											
APEC-31 (Offsite East)	Steel Valve Manufacturing - Guelph Engineering Co. was shown located at 10 Kingsmill Avenue, buildings on the 1960 FIP indicate steel valve manufacturing with a machine shop, pattern shop and oil house. Previous FIPs (1916, 1929 and 1946) show residences in this area.	32	Iron and Steel Manufacturing and Processing	VOCs, PHCs, PAHs, ABNs, CPs, metals, PCBs	MW18-129D	MW	Metals, Chemistry, PAH, PHC, EC, pH, SAR, CrVI, CN-, Hg	Metals, BTEX, Metals, VOC	Metals (Zn)	BTEX (Bnz) VOCs (cis-1,2-DCE, VC)	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals, BTEX, PAHs, PHCs, and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
					MW18-130D	MW	-	Metals, BTEX, PHC, VOC	-	BTEX (Bz), VOC (cis-1,2-DCE, VC)	
	Former Stove Manufacturer/Foundry - Guelph Stove Company was shown at 490 York Road on the 1916, 1929, 1946 and 1960 FIPs. Buildings included a foundry, storage (coke, coal, sand), milling room, pattern shops, plating and buffing, offices, warehouses, steel mounting room & blacksmith, crating, stove mounting, and oil. Transformers are shown on the enamel building. Operations existed until approximately the mid-1960s where the city directory listings indicate Franklin Manufacturing Co (Canada) LTD and then Resco Refrigeration Supplies Co LTD from approximately 1970. The facility became a multi-tenant commercial companies from the 1990s to present.	32	Iron and Steel Manufacturing and Processing		MW18-132D	MW	-	Metals, BTEX, PHC, VOC	-	VOC (cis-1,2-DCE, VC)	
					OW09-I	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, TCE, VC)	
					OW09-II	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Pb), BTEX (Bnz), VOCs (cis-1,2-DCE, VC)	
					OW13	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, TCE, VC)	

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]		COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments
Box Manufacturing - Packing manufacturers are listed at 136 Victoria Road South: Ellis Packing West Inc. listed as a corrugated and solid fibre box manufacturer; and ABCO Box and Carton Ltd. listed as a folding paperboard box manufacturer, established in 1946 with a plant size of 40,000 ft2. The 1960 FIP shows ABCO Box and Carton Co. Ltd with buildings labeled for office, pattern making, cutting, raw stock, stripping, gluing and finished stock. ABCO was present until approx. 2000 when Ellis Packing West replaced them as listed in the city directory.	45	Pulp, Paper and Paperboard Manufacturing and Processing		OW13-39D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	BTEX (Bnz) VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
				OW13-39S	MW	Metals, VOCs	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	Metals (Cd, Pb, Zn), VOCs (TCE)	VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
Potential USTs - On the 1960 FIP, McGregor Sportswear of Canada was shown to have 2 fuel oil USTs (2,500 gal each) on the property at 136 Victoria Rd S.	28	Gasoline and Associated Products Storage in Fixed Tanks		OW14	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (cis-1,2-DCE, TCE)	
Scrap Yard - Joe Brown & Son Ltd, a junk yard, is shown on the 1960 FIP at 150 Victoria; ERIS records include Hendersons Disposal Systems Ltd as the owner, and list the facility as a transfer service from 2000 to 2004, and 2005 as an Ontario numbered company.	49	Salvage Yard, including automobile wrecking		OW18-I	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC), PAHs (B(a)P)	
Former Fuel Storage Facility - Multiple companies have been listed at 154 Victoria Rd S (Shell Canada Products, Doug Pollock Fuels Ltd, Granger Fuels) as an expired TSSA fuel storage facility with gasoline and diesel. A spill was reported in 1988 due to container overflow of 150 L of gasoline to the gravel surface. The 1946 FIP shows 6 gasoline USTs, and the 1960 FIP shows 13 gasoline USTs and an oil warehouse; both listed as Canadian Oil Companies Ltd.	28	Gasoline and Associated Products Storage in Fixed Tanks		OW18-II	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), BTEX (Bnz), PHC (F2), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
				OW19	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn) VOCs (cis-1,2-DCE, PCE, TCE, VC)	
Former Paint Application - A cabinet manufacturer was shown on the 1960 FIP, Gilson Manufacturing Co. Ltd. Cabinet Division at 57 Victoria Rd S with buildings labeled for steel storage, tubing room, steel room, washer, dryer, office, paint spray, transformer.	39	Paints Manufacturing, Processing and Bulk Storage		OW24D	MW	-	Metals, ABN, BTEX, Chemistry, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), PHC (F1), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE, VC)	
Chemical Manufacturer or Distributor - Robert On Guard Products was listed in the chemical facilities records.	8	Chemical Manufacturing, Processing and Bulk Storage		OW24S	MW	-	Metals, ABN, BTEX, CPs, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCE, cis-1,2-DCE, t-1,2-DCE, TCE)	
Transformers - The National PCB records list up to 7 transformers on 490 York Road associated with Sherwood Forest Investments (formerly Hamril Investments). The volumes listed total approximately 1,600 L. Transformers (7 total) are shown on the 1960 FIP on the enameling building of Guelph Stove Co. Ltd.	55	Transformer Manufacturing, Processing and Use		OW31	MW	-	Metals, BTEX, PAHs, PCB, PHC, VOC, CrVI, Cl-, Hg	-	VOCs (1,1-DCE, Bnz, cis-1,2-DCE, t-1,2-DCE, TCE, VC), PHCs (F2, F3, F4)	
APECs from Offsite PCAs to the South										
APEC-32 (Offsite South) Screw Manufacturing - Linread Canada Ltd. is shown on the 1960 FIP as a screw manufacturer, and is listed in ERIS reports as a industrial fastener at 24 Hayes with records until 1998. "Jet" is listed as a manufacturer of metal dies at this location with records between 1993 and 1998. Multiple Scott's Directory listings are reported for this address for machinery/equipment/ industrial fan and fabricated metal tools/product manufacturing (Daltec Industries, Allen Simpson Marketing and Design) with established dates of 1984 and 1975, and records up to 2006. A spill was reported of slurry to the road in 2014.	34	Metal Fabrication	VOCs, PHCs, PAHs, metals	MW18-122D	MW	Metals, Chemistry, PAH, EC, pH, SAR, CrVI, CN-, Hg	BTEX, VOC	None	VOCs (1,1-DCA, cis-1,2-DCE)	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
				MW18-122G	MW	-	BTEX, VOC	-	None	
				MW18-123D	MW	Metals, BTEX, Chemistry, PAH, VOC, EC, pH, SAR, CrVI, CN-, Hg	BTEX, VOC	Metals (Cd, Pb, Zn)	VOCs (cis-1,2-DCE)	
				MW18-123S	MW	-	BTEX, VOC	-	VOCs (cis-1,2-DCE, TCE)	
				OW10	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
Former USTs - One gasoline UST is shown on the 1960 FIP on the south side of the building at Traders' Plumbing and Heating Supplies Limited at 150 Stevenson Street South.	28	Gasoline and Associated Products Storage in Fixed Tanks		OW11-I	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
				OW11-II	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (TCA, 1,1-DCA, 1,1-DCE, VC)	
Former Transportation Company - The 1960 FIP indicates a transportation company (Direct Winter's Transport) at 101 Beverley and city directories the company was present from the early 1950s to 1960s.	11	Commercial Trucking and Container Terminals		OW26D	MW	-	Metals, ABN, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	VOCs (cis-1,2-DCE)	
				OW26S	MW	-	Metals, ABN, BTEX, Chemistry, PCB, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (1,1-DCA)	
APECs from Offsite PCAs to the West										
APEC-33 (Offsite West) Window Manufacturing - Clear Choice Window Manufacturing Inc. is listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size.	43	Plastics (including Fibreglass) Manufacturing and Processing	VOCs, PHCs, PAHs, metals	MW18-120D	MW	Metals	Metals, BTEX, VOC	Metals (Cd, Zn)	None	Current or historical sampling activities, or both, have captured the COCs in soil and groundwater. Table 6 Standards exceedances in soils included metals. Table 6 Standards exceedances in groundwater included metals and VOCs. Sampling has captured the COCs, and the APEC has been addressed.
Metal Treatment - Choice Enterprises is listed in the Scott's Manufacturing Directory; as coating, engraving, heat treating, and allied activities; established in 1998.	33	Metal Treatment, Coating, Plating and Finishing								
Spring Manufacturing - ERIS records indicate heavy gauge spring manufacturing at 60 Johnston Street as Steele Bros. Ltd., the Scott's manufacturing directory record indicates the company was established in 1986 with a plant size of 6,500 ft2. The 1960 FIP shows the H.I. Thompson Co. of Canada Limited (Aircraft Insulation) with a factory, spring room, spray room, transformer, and cement storage.	34	Metal Fabrication								
Former Refractory Facility - Former Foundry Services of Canada (FOSECO) facility operated at 201 Alice Street until approximately the late 1990s, had a known contaminated plume in the shallow groundwater occurring at the bedrock/overburden interface, migrating northward and a groundwater treatment system for toluene (P&R, 1991). A certificate of approval record was issued in 1989 to Foseco for the toluene stripper for groundwater. The 1960 FIP indicates the following buildings: tablet making, lab, shipping, mixing, warehouse, ball mill, elevator, transformer, oil storage, blending, mouldable exothermic feeding compound, incinerator.	34	Metal Fabrication		OW12	MW	-	Metals, BTEX, Chemistry, PAH, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	Metals (Zn), VOCs (TCA)	
Motor Vehicle Parts Manufacturing - BP Canada Energy Company is listed in ERIS operating at 201 Alice Street.	57	Vehicles and Associated Parts Manufacturing		OW15	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	
Former Spill - A spill was reported at the corner of Alice and Stevensons Street of 15 L of windshield washer fluid and antifreeze to a catch basin a motor vehicle accident in 2016.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles		OW16	MW	-	Metals, BTEX, Chemistry, PAH, PCB, PHC, VOC, Cl, CrVI, CN-, Hg, EC, pH	-	None	

Notes:
Information provided in this table is limited to detected parameters exceeding the MOE Standards. MDLs which exceed the MOE Standards can be found in the results tables provided in Section 6.

[a.] PCA – Potentially contaminating activity (as defined by O. Reg 153/04, as amended), (*) best fit available where starred.

[b.] AP Method groups as defined in the "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" dated July 1, 2011.

Table 6-4. APEC Disposition Table
200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]	List of Parameters above Table 6 (soil) [d.]	List of Parameters above Table 6 (GW) [d.]	Comments

[c.] Metals include the following AP Method groups: metals, hydride-forming metals, sodium, hexavalent chromium, cyanide, mercury, and electrical conductivity (EC). Additional parameters in soil include hot water soluble (HWS) boron, sodium adsorption ratio (SAR), calcium and magnesium; additional parameters in groundwater include chloride.

[d.] Ontario Regulation 153/04 Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition for Residential/Parkland/Institutional Property USe and Coarse Textured Soils (MOECC, 2011)

**Incomplete as per O. Reg. 153/04 AP method groups; parameters based on historical laboratory parameter groups.

"-" = no data for the specified media

1,1-DCA = 1,1-dichloroethane
1,1-DCE = 1,1-dichloroethene
ABNs = acid base neutral compounds
ACY = acenaphthylene
ANT = anthracene
APEC = area of potential environmental concern
As = arsenic
AST = aboveground storage tank
B(a)A = benzo(a)anthracene
B(a)P = benzo(a)pyrene
B(b)F = (benzo(b)fluoranthene
B(ghi)P = benzo(g,h,i)perylene
B(k)F = benzo(k)fluoranthene
BH = borehole
B-HWS = boron - hot water soluble
Bnz = benzene
BTEX = benzene, toluene, ethylbenzene, xylene
C6N = n-hexane
Cd = cadmium
CC =
CH = core hole
CS = confirmatory sample
CHY = chrysene
cis-1,2-DCE = cis-1,2-dichloroethene
Cl = chloride
CN- = cyanide
COC = contaminant of concern
CPs = chlorophenols
CrVI = hexavalent chromium
Cu = copper
DB(ah)A = dibenzo(a,h)anthracene
EB = ehtylbenzene
EC = electrical conductivity
ERIS = environmental risk information services
F1 = PHC fraction 1 (C6-C10)
F2 = PHC fraction 2 (C10-C16)
F3 = PHC fraction 3 (C16-C34)
F4 = PHC fraction 4 (C34-C50)
FIP = fire insurance plan
FLRN = fluorene
FLT = fluoranthene
GW = groundwater
Hg = mercury
I(123-cd)P = ideno(1,2,3-cd)pyrene
MDL = method detection limit
MECP = Ontario Ministry of Environment, Conservation and Parks
MNAP = 1,2-methylnaphthalene
Mo = molybdenum
MW = monitoring well
NAP = naphthalene
Ni = nickel
PAHs = polyaromatic hydrocarbons
Pb = lead
PCA = potentially contaminating activity
PCBs = polychlorinated biphenyls
PCE = tertrachloroethene
pH = pH
PHCs = petroleum hydrocarbons
PHE = phenanthrene
PYR = pyrene
RK =
SAR = sodium adorption ratio
Sb = antimony
SS = soil sample
trans-1,2-DCE = trans-1,2-dichloroethene
TCA = trichloroethane
TCE = trichloroethylene
Tl = thalium
TP = test pit
TSSA = technical standards and safety authority
UST = underground storage tank
VC = vinyl chloride
VOCs = volitile organic compounds
XYL = xylenes
Zn = zinc

Table 6-5. Summary of Soil Analytical Results

200 Beverley Street, Guelph, Ontario

Location	Units	Table 6 SCS [a]	1	10	11	12			12SE10		2	3	4	5	6
Sample ID			1-1_SO_N_19910122	10-2 (11-2)_SO_N_19910122	11-1 (12-1)_SO_N_19910122	12-1 (OW7 SW7-1)_SO_N_19910122	12-2 (OW7-SW7-2)_SO_N_19910122	12-P1 (OWSW7-P1)_SO_N_19910122	12SE10-1 (OW7-SE10-1)_SO_N_18991230	12SE10-2 (OW7SE10-2)_SO_N_18991230	2-1_SO_N_19910122	3-1_SO_N_19910122	4-1_SO_N_19910122	5-1_SO_N_19910122	6-1_SO_N_19910122
Start Depth (m)			0.3	0.2	0.5	0.2	0.4	0.2	0.2	0.4	0.2	0.3	0	0.4	0.2
End Depth (m)			1	1	0.5	0.4	1	0.4	0.4	1.4	0.5	0.3	0.8	1.1	0.9
Sample Date			1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991	1/22/1991
Analyte															
ABNs															
1,1'-Biphenyl	µg/g	0.31	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	µg/g	0.36	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	µg/g	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	µg/g	38	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	µg/g	2	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	µg/g	1	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	µg/g	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	µg/g	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
bis (2-Chloroisopropyl) ether	µg/g	0.67	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	µg/g	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	µg/g	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	µg/g	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	µg/g	9.4	0.01 U	--	0.01 U	--	--	--	--	--	--	--	--	--	--
BTEX															
Benzene	µg/g	0.21	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	µg/g	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	µg/g	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, o	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, m & p	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	µg/g	3.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophenols															
2,4,5-Trichlorophenol	µg/g	4.4	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	µg/g	2.1	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	µg/g	0.19	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	µg/g	1.6	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	µg/g	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--
General Chemistry															
Electrical Conductivity	mS/cm	0.7	**0.015**	**0.043**	**0.034**	--	--	--	--	--	**0.042**	**0.047**	**0.026**	**0.092**	**0.055**
Moisture	%	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	pH UNITS	5-9; 5-11 [b]	**6.6**	**8.7**	**7.7**	--	--	--	--	--	**7.7**	**8.2**	**7**	**8.3**	**8.2**
pH (Laboratory)	pH UNITS	5-9; 5-11 [b]	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	µg/g	NV	--	--	--	--	--	--	--	**470**	--	--	--	--	--
Sodium Absorption Ratio	SAR	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Inorganics															
Aluminum	µg/g	NV	--	--	--	--	--	--	--	**9520**	--	--	--	--	--
Antimony	µg/g	7.5	**1.76**	**0.7**	**0.32**	--	**0.92**	--	**3.56**	--	**1.14**	**2.21**	**0.45**	**0.22**	**0.22**
Arsenic	µg/g	18	--	--	--	--	--	--	--	**4.7**	--	--	--	--	--
Barium	µg/g	390	**28**	**28**	**24**	--	**50**	--	**62**	**59.7**	**43**	**116**	**34**	**21**	**31**
Beryllium	µg/g	4	**1**	**2**	**2**	--	**4**	--	**1**	1.3 U	**3**	**3**	**1**	**2**	**3**
Bismuth	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	µg/g	120	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron (HWS)	µg/g	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	µg/g	1.2	0.5 U	0.5 U	0.5 U	--	0.5 U	--	0.5 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Calcium	µg/g	NV	--	--	--	--	--	--	--	**20600**	--	--	--	--	--
Chloride (Cl)	µg/g	NV	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	µg/g	160	**7**	**4.6**	**5.8**	--	**4.2**	--	**18**	**17.9**	**3.4**	**3.9**	**4.1**	**5.5**	**5.9**
Chromium, Hexavalent (Cr6+)	µg/g	8	10 U	10 U	10 U	--	10 U	--	10 U	--	10 U	10 U	10 U	10 U	10 U
Cobalt	µg/g	22	**1.4**	**1.9**	**1.6**	--	**3.8**	--	**3.8**	**13**	**2.5**	**1**	**1.6**	**1**	**2.1**
Copper	µg/g	140	**13**	**22**	**14**	--	**25**	--	**37**	**322**	**17**	**19**	**10**	**12**	**9.2**
Cyanide	µg/g	0.051	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	µg/g	0.051	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	µg/g	0.051	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	µg/g	NV	--	--	--	--	--	--	--	**57600**	--	--	--	--	--

Table 6-6. Maximum Detected Contaminant Concentrations in Soil

200 Beverley Street, Guelph, Ontario

Analytical Group	Analyte Name	Maximum Detection	Result Units	Location Name	Sample Name	Sample Type Code	Sample Date	Sample Beginning Depth (mbgs)	Sample Ending Depth (mbgs)	Laboratory Code	SDG
ABNs	1,1'-Biphenyl	0.237	µg/g	MW17-110S	MW17-110S-0-2-10162017-N	N	10/16/2017	0	0.61	ALS	L2010780
BTEX	Benzene	0.26	µg/g	BH07-66	BH07-66 SS-1A-02082007-N	N	2/9/2007	0.05	1.22	AGAT	07T209831
BTEX	Ethylbenzene	4.1	µg/g	BH07-66	BH07-66 SS-1A-02082007-N	N	2/9/2007	0.05	1.22	AGAT	07T209831
BTEX	Toluene	1.2	µg/g	TP13-11	DUP2-12032013-FD	FD	12/3/2013	0.1	0.3	Maxxam	B3K9090
BTEX	Xylenes, Total	3.9	µg/g	BH07-66	BH07-66 SS-1A-02082007-N	N	2/9/2007	0.05	1.22	AGAT	07T209831
Metals/Inorganics	Electrical Conductivity	0.514	mS/cm	OW07-32	OW07-32SS1-02222007-N	N	2/22/2007	0	1.07	AGAT	07T211735
Metals/Inorganics	pH	10.64	pH	MW17-106D	BH17-204-0.5-2-10182017-N	N	10/18/2017	0.15	0.61	ALS	L2010780
Metals/Inorganics	Phosphorus	2100	µg/g	TP13-11	TP11-6-12032013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Sodium Absorption Ratio	2	SAR	BH07-40	BH07-40SS-1A-02082007-N	N	2/8/2007	0.3	1.22	AGAT	07T209831
Metals/Inorganics	Aluminum	16000	µg/g	A	A-1_SO_N_19910122	N	1/22/1991	0.3	1	Unknown	91-4543/91-4281
Metals/Inorganics	Antimony	18.6	µg/g	BH07-56	BH07-56 SS-1A-02082007-N	N	2/9/2007	0.05	0.91	AGAT	07T209831
Metals/Inorganics	Arsenic	23	µg/g	BH07-67	BH07-67 SS1A-02082007-N	N	2/9/2007	0.015	0.91	AGAT	07T209831
Metals/Inorganics	Barium	277	µg/g	BH07-57	DUP#5-02082007-FD	FD	2/8/2007	0.05	1.22	AGAT	07T209831
Metals/Inorganics	Beryllium	4	µg/g	12	12-2 (OW7-SW7-2)_SO_N_19910122	N	1/22/1991	0.4	1	Unknown	P&R_E.O.90K26
Metals/Inorganics	Bismuth	150	µg/g	TP13-11	DUP2-12032013-FD	FD	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Boron	23	µg/g	TP13-08	TP8-4-12022013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Boron (HWS)	0.87	µg/g	BH17-200	BH17-200-3-3.5-10102017-N	N	10/10/2017	0.91	1.07	ALS	L2007635
Metals/Inorganics	Cadmium	83.4	µg/g	MW17-108S	MW17-108S-8-9-10112017-N	N	10/11/2017	2.44	2.74	ALS	L2007635
Metals/Inorganics	Calcium	220000	µg/g	TP13-06	TP6-4-12022013-N	N	12/2/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Chloride (Cl)	122	µg/g	BH07-53	DUP#1-02082007-FD	FD	2/8/2007	1.22	1.47	AGAT	07T209831
Metals/Inorganics	Chromium	84.7	µg/g	K	K-1_SO_N_19910122	N	1/22/1991	0	0.7	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Chromium, Hexavalent (Cr6+)	0.32	µg/g	MW17-100S MW18-129D	MW17-100S-4.5-6-10122017-N DUP2 JUL23-07232018-FD	N FD	10/12/2017 7/23/2018	1.37 0.76	1.83 1.37	ALS	L2007635 L2136825
Metals/Inorganics	Cobalt	393	µg/g	C11	C11-1_SO_N_18991230	N	2/8/1991	0.34	0.4	Unknown	91-4346/P&R_E.O.90K2
Metals/Inorganics	Copper	2460	µg/g	I	I-1_SO_N_19910122	N	1/22/1991	0.5	0.5	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Iron	128000	µg/g	I	I-1_SO_N_19910122	N	1/22/1991	0.5	0.5	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Lead	10100	µg/g	BH07-65	BH07-65 SS-1A-02082007-N	N	2/9/2007	0.05	0.61	AGAT	07T209831
Metals/Inorganics	Magnesium	120000	µg/g	TP13-06	TP6-4-12022013-N	N	12/2/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Manganese	1810	µg/g	I	I-1_SO_N_19910122	N	1/22/1991	0.5	0.5	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Mercury	0.319	µg/g	BH07-57	BH07-57 SS-1A-02082007-N	N	2/8/2007	0.05	1.22	AGAT	07T209831
Metals/Inorganics	Molybdenum	35	µg/g	K	K-1_SO_N_19910122	N	1/22/1991	0	0.7	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Nickel	117	µg/g	BH07-51	BH07-51 SS-1-02082007-N	N	2/8/2007	0	1.22	AGAT	07T209831
Metals/Inorganics	Potassium	2000	µg/g	TP13-08	TP8-4-12022013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Selenium	1	µg/g	BH07-67	BH07-67 SS1A-02082007-N	N	2/9/2007	0.015	0.91	AGAT	07T209831
Metals/Inorganics	Silver	7.8	µg/g	C11	C11-1_SO_N_18991230	N	2/8/1991	0.34	0.4	Unknown	91-4346/P&R_E.O.90K2
Metals/Inorganics	Sodium	510	µg/g	TP13-08	TP8-4-12022013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Strontium	190	µg/g	TP13-11	TP11-6-12032013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Thallium	6	µg/g	AN21	AN21-2_SO_N_19910122	N	1/22/1991	0.9	1.7	Unknown	91-4281/P&R_E.O.90K2
Metals/Inorganics	Tin	9.6	µg/g	TP13-08	DUP1-12032013-FD	FD	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Titanium	532	µg/g	12SE10	12SE10-2 (OW7SE10-2)_SO_N_18991230	N	1/22/1991	0.4	1.4	Unknown	91-4543
Metals/Inorganics	Uranium	2.6	µg/g	TP13-11	TP11-6-12032013-N	N	12/3/2013	0.1	0.3	Maxxam	B3K9090
Metals/Inorganics	Vanadium	100	µg/g	MW17-100S	MW17-100S-4.5-6-10122017-N	N	10/12/2017	1.37	1.83	ALS	L2007635
Metals/Inorganics	Zinc	67200	µg/g	MW17-108S	MW17-108S-8-9-10112017-N	N	10/11/2017	2.44	2.74	ALS	L2007635
Metals/Inorganics	Zirconium	19	µg/g	I	I-1_SO_N_19910122	N	1/22/1991	0.5	0.5	Unknown	91-4281/P&R_E.O.90K2

Table 6-6. Maximum Detected Contaminant Concentrations in Soil

200 Beverley Street, Guelph, Ontario

Analytical Group	Analyte Name	Maximum Detection	Result Units	Location Name	Sample Name	Sample Type Code	Sample Date	Sample Beginning Depth (mbgs)	Sample Ending Depth (mbgs)	Laboratory Code	SDG
PAHs	1-Methylnaphthalene	1.8	µg/g	MW17-110S	MW17-110S-0-2-10162017-N	N	10/16/2017	0	0.61	ALS	L2010780
PAHs	2-(1-)Methylnaphthalene	4.93	µg/g	TP17-300	DUP 4-10042017-N	FD	10/4/2017	0.3	0.61	ALS	L2003037
PAHs	2-Methylnaphthalene	3.67	µg/g	TP17-300	DUP 4-10042017-N	FD	10/4/2017	0.3	0.61	ALS	L2003037
PAHs	Acenaphthene	94	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Acenaphthylene	1	µg/g	TP13-08	DUP1-12032013-FD	FD	12/3/2013	0.1	0.3	Maxxam	B3K9090
PAHs	Anthracene	160	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Benzo(a)anthracene	200	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Benzo(a)pyrene	130	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Benzo(b)fluoranthene	190	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Benzo(g,h,i)perylene	70	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Benzo(k)fluoranthene	66	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Chrysene	180	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Dibenzo(a,h)anthracene	26	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Fluoranthene	660	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Fluorene	150	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Indeno(1,2,3-Cd)Pyrene	80	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Naphthalene	220	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Phenanthrene	900	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PAHs	Pyrene	470	µg/g	OW07-34D	OW07-34SS1-02222007-N	N	2/22/2007	0	1.22	AGAT	07T211735
PCBs	PCB, Total	1.65	µg/g	TP17-300	DUP 3-10042017-N	FD	10/4/2017	0	0.3	ALS	L2003037
PHCs	PHC F1 (C6-C10)	13.8	µg/g	MW17-106D	BH17-204-0.5-2-10182017-N	N	10/18/2017	0.15	0.61	ALS	L2010780
PHCs	PHC F2 (C10-C16)	3600	µg/g	BH07-46	BH07-46 SS-2-02082007-N	N	2/8/2007	1.22	1.68	AGAT	07T209831
PHCs	PHC F3 (C16-C34)	23000	µg/g	BH07-40	BH07-40SS-1A-02082007-N	N	2/8/2007	0.3	1.22	AGAT	07T209831
PHCs	PHC F4 (C34-C50)	7300	µg/g	BH07-67	BH07-67 SS1A-02082007-N	N	2/9/2007	0.015	0.91	AGAT	07T209831
VOCs	1,1,1-Trichloroethane	0.01	µg/g	OW07-37	OW07-37SS-1A-02222007-N	N	2/22/2007	0.61	1.22	AGAT	07T211735
VOCs	Acetone	0.68	µg/g	TP13-01	TP1-5-12022013-N	N	12/2/2013	0.1	0.3	Maxxam	B3K9090
VOCs	n-Hexane	0.861	µg/g	MW17-107S	MW17-107S-0.5-2-10122017-N	N	10/12/2017	0.15	0.61	ALS	L2007635
VOCs	Trichloroethylene	1	µg/g	OW13-39S	OW13-39S-12122013-N	N	12/12/2013	2.29	2.25	Maxxam	B3L5721

Notes:

µg/g = microgram per gram

ABN = acid base neutrals

BTEX = benzene, toluene, ethylbenzene, xylenes

FD = Field duplicate

mbgs = metre below ground surface

mS/cm = millisiemen per centimetre

N = Normal sample

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

PHC = petroleum hydrocarbon

SAR = sodium absorption ratio

SDG = sample delivery group

VOC = Volatile organic compound

Table 6-7c. Contaminants of Concern Identified in Soil
200 Beverley Street, Guelph, Ontario

Soil Contaminants of Concern	
2-(1-)Methylnaphthalene	Fluorene
Acenaphthene	Indeno(1,2,3-Cd)Pyrene
Acenaphthylene	Lead
Anthracene	Mercury
Antimony	Molybdenum
Arsenic	Naphthalene
Benzene	Nickel
Benzo(a)anthracene	PCB, Total
Benzo(a)pyrene	Petroleum Hydrocarbons F2 (C10-C16)
Benzo(b)fluoranthene	Petroleum Hydrocarbons F3 (C16-C34)
Benzo(g,h,i)perylene	Petroleum Hydrocarbons F4 (C34-C50)
Benzo(k)fluoranthene	Phenanthrene
Cadmium	Pyrene
Chrysene	Thallium
Cobalt	Trichloroethylene
Copper	Vanadium
Dibenzo(a,h)anthracene	Xylenes, Total
Ethylbenzene	Zinc
Fluoranthene	

F = fraction

PCB = polychlorinated biphenyls

Table 6-8. Summary of Groundwater Analytical Results

200 Beverley Street, Guelph, Ontario

Location	Units	Table 6 SCS [a]	MW17-100S		MW17-101S		MW17-101D			MW17-102D		MW17-103S	MW17-103D	MW17-104S	MW17-104D			MW17-105S	MW17-105D	
Sample ID			MW17-100S-07312018-N	MW17-100S-10312017-N	DUP3-11012017-N	MW17-101S-11012017-N	MW17-101D-03212018-N	MW17-101D-04132018-N	MW17-101D-11012017-N	MW17-102D-11022017-N	MW17-102D-12212018-N	MW17-103S-11022017-N	MW17-103D-11022017-N	MW17-104S-11012017-N	DUP1-07312018-FD	MW17-104D-07312018-N	MW17-104D-11012017-N	MW17-105S-10312017-N	DUP2-10312017-N	MW17-105D-10312017-N
Screen Start Depth (m)			3.38	3.38	1.22	1.22	6.3	6.3	6.3	13.76	13.76	2.44	7.32	1.22	6.1	6.1	6.1	3.2	6.93	6.93
Screen End Depth (m)			4.9	4.9	4.27	4.27	7.82	7.82	7.82	15.29	15.29	3.96	8.84	3.66	7.62	7.62	7.62	4.72	8.46	8.46
Sample Date			7/31/2018	10/31/2017	11/1/2017	11/1/2017	3/21/2018	4/13/2018	11/1/2017	11/2/2017	12/21/2018	11/2/2017	11/2/2017	11/1/2017	7/31/2018	7/31/2018	11/1/2017	10/31/2017	10/31/2017	10/31/2017
Hydrostatic Unit Interpretation of Screened Interval [b]			HSU 1		HSU 1		HSU 2			HSU 2		HSU 1	HSU 2	HSU 1	HSU 1			HSU 1	HSU 2	
Analyte																				
ABNs																				
1,1'-Biphenyl	µg/L	0.5	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	µg/L	3	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	µg/L	5	--	--	--	--	--	--	--	--	--	0.57 U	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	µg/L	59	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	µg/L	10	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	µg/L	NV	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	µg/L	NV	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	µg/L	0.5	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
4-Chloroaniline	µg/L	10	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	µg/L	5	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	µg/L	10	--	--	--	--	--	--	--	--	--	2 U	--	--	--	--	--	--	--	--
Diethylphthalate	µg/L	30	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--
Dimethylphthalate	µg/L	30	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--
Phenol	µg/L	890	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--
BTEX																				
Benzene	µg/L	0.5	--	0.5 U	--	**0.89**	--	--	**1.17**	**1.18**	**1.44**	0.5 U	0.5 U	0.5 U	--	--	0.5 U	**66.8**	**3.07**	**3.05**
Ethylbenzene	µg/L	2.4	--	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.65**	--	--	0.5 U	**8.42**	0.5 U	0.5 U
Toluene	µg/L	24	--	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	0.5 U	**1.57**	0.5 U	0.5 U
Xylene, o	µg/L	NV	--	0.3 U	--	0.3 U	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	**2.47**	--	--	0.3 U	**1.17**	0.3 U	0.3 U
Xylenes, m & p	µg/L	NV	--	0.4 U	--	0.4 U	--	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**0.63**	--	--	0.4 U	**37.4**	**0.7**	**0.72**
Xylenes, Total	µg/L	72	--	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**3.1**	--	--	0.5 U	**38.6**	**0.7**	**0.72**
Chlorophenols																				
2,4,5-Trichlorophenol	µg/L	8.9	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	µg/L	2	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	µg/L	20	--	--	--	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--
2-Chlorophenol	µg/L	8.9	--	--	--	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--
Pentachlorophenol	µg/L	30	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--
General Chemistry																				
Alkalinity, Bicarbonate (as CaCO3)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	CU	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	mS/cm	NV	--	**0.817**	--	**1.04**	--	--	**1.5**	--	--	**0.864**	--	**0.758**	--	--	**0.725**	**1.01**	**1.09**	**1.08**
Hardness (as CaCO3)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	pH UNITS	NV	--	**7.25**	--	**7.44**	--	--	**7.59**	--	--	**7.63**	--	**7.69**	--	--	**7.65**	**7.61**	**7.61**	**7.5**
pH (Laboratory)	pH UNITS	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	µg/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NTU	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IonBalance	%	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Langelier Index (@ 20C)	None	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Langelier Index (@ 4C)	None	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Measures the sum of cations in a sample	meq/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Measures the sum of the anions in a sample	meq/L	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH (@ 20C)	pH UNITS	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH (@ 4C)	pH UNITS	NV	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-9. Maximum Detected Contaminant Concentrations in Groundwater

200 Beverley Street, Guelph, Ontario

Analytical Group	Analyte Name	Maximum Detection	Result Units	Location Name	Sample Name	Sample Type Code	Sample Date	Sample Beginning Depth (mbgs)	Sample Ending Depth (mbgs)	Laboratory Code	SDG
BTEX	Benzene	66.8	µg/L	MW17-105S	MW17-105S-10312017-N	N	10/31/2017	3.2	4.72	ALS	L2017929
BTEX	Ethylbenzene	8.42	µg/L	MW17-105S	MW17-105S-10312017-N	N	10/31/2017	3.2	4.72	ALS	L2017929
BTEX	Toluene	1.74	µg/L	MW18-112G	MW-112G-11222018-N	N	11/22/2018	19.35	20.88	ALS	L2200634
BTEX	Xylenes, Total	38.6	µg/L	MW17-105S	MW17-105S-10312017-N	N	10/31/2017	3.2	4.72	ALS	L2017929
Metals/Inorganics	Antimony	6.2	µg/L	MW18-114D	MW18-114D-12102018-N	N	12/10/2018	19.2	20.73	ALS	L2209758
Metals/Inorganics	Arsenic	45.7	µg/L	OW07-31	OW07-31-09052017-N	N	9/5/2017	1.5	6.22	ALS	L1986110
Metals/Inorganics	Barium	283	µg/L	OW13-39D	OW13-39D-09072017-N	N	9/7/2017	10.68	12.2	ALS	L1988005
Metals/Inorganics	Boron	251	µg/L	OW13-39D	OW13-39D-09072017-N	N	9/7/2017	10.68	12.2	ALS	L1988005
Metals/Inorganics	Bromide	1000	µg/L	OW16	OW16-10072010-N	N	10/7/2010	1.82	4.87	Maxxam	B0E3110
Metals/Inorganics	Cadmium	1.33	µg/L	OW12	OW12-09052017-N	N	9/5/2017	1.76	4.81	ALS	L1986110
Metals/Inorganics	Calcium	440000	µg/L	OW22S	OW 22(S)-09202011-N	N	9/20/2011	1.36	4.1	Maxxam	B1E6126
Metals/Inorganics	Cesium (Cs)	1.58	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Chloride (Cl)	327000	µg/L	OW07-31	OW07-31-09052017-N	N	9/5/2017	1.5	6.22	ALS	L1986110
Metals/Inorganics	Chromium	13.3	µg/L	MW18-114D	MW18-114D-12102018-N	N	12/10/2018	19.2	20.73	ALS	L2209758
Metals/Inorganics	Cobalt	5.79	µg/L	OW11-II	DUP3-09012017-FD	FD	9/1/2017	6.28	7.8	ALS	L1985429
Metals/Inorganics	Copper	14.4	µg/L	OW07-37	OW07-37-09062017-N	N	9/6/2017	3.1	6.15	ALS	L1988005
Metals/Inorganics	Fluoride	3900	µg/L	OW14	OW14-10072010-N	N	10/7/2010	6.29	7.81	Maxxam	B0E3110
Metals/Inorganics	Iron	8900	µg/L	OW23S	OW23(S)-12122012-N	N	12/12/2012	2.52	5.26	Maxxam	B2J7139
Metals/Inorganics	Lead	17	µg/L	OW09-II	OW9-II-12122012-N	N	12/12/2012	6.33	7.85	Maxxam	B2J7139
Metals/Inorganics	Lithium	68.9	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Magnesium	46000	µg/L	OW14	OW 14-09202011-N	N	9/20/2011	6.29	7.81	Maxxam	B1E6126
Metals/Inorganics	Manganese	1200	µg/L	OW23S	OW23(S)-12122012-N	N	12/12/2012	2.52	5.26	Maxxam	B2J7139
Metals/Inorganics	Molybdenum	52.4	µg/L	MW18-114D	MW18-114D-12102018-N	N	12/10/2018	19.2	20.73	ALS	L2209758
Metals/Inorganics	Nickel	16.2	µg/L	OW22S	OW22S-09062017-N	N	9/6/2017	1.36	4.1	ALS	L1988005
Metals/Inorganics	Potassium	30600	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Rubidium (Rb)	99.1	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Selenium	6.26	µg/L	MW17-101S	MW17-101S-11012017-N	N	11/1/2017	1.22	4.27	ALS	L2017929
Metals/Inorganics	Silicon	968	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Sodium	183000	µg/L	MW18-120D	MW18-120D-07302018-N	N	7/30/2018	18.59	20.11	ALS	L2139225
Metals/Inorganics	Strontium	1050	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Thallium	0.984	µg/L	OW07-32	OW07-32-09062017-N	N	9/6/2017	3.17	6.22	ALS	L1988005
Metals/Inorganics	Tin	0.88	µg/L	OW31	OW31-09192016-N	N	9/19/2016	28.9	33.32	ALS	L1830739
Metals/Inorganics	Uranium	25.9	µg/L	OW22S	OW22S-09062017-N	N	9/6/2017	1.36	4.1	ALS	L1988005
Metals/Inorganics	Vanadium	1.66	µg/L	OW07-31	OW07-31-09052017-N	N	9/5/2017	1.5	6.22	ALS	L1986110

Table 6-9. Maximum Detected Contaminant Concentrations in Groundwater

200 Beverley Street, Guelph, Ontario

Analytical Group	Analyte Name	Maximum Detection	Result Units	Location Name	Sample Name	Sample Type Code	Sample Date	Sample Beginning Depth (mbgs)	Sample Ending Depth (mbgs)	Laboratory Code	SDG
Metals/Inorganics	Zinc	4500	µg/L	OW19	OW19-03232010-N	N	3/23/2010	1.77	4.82	Maxxam	B035447
PAHs	1-Methylnaphthalene	180	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	2-(1-)Methylnaphthalene	280	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	2-Methylnaphthalene	100	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	Acenaphthene	40	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	Acenaphthylene	0.553	µg/L	MW17-109S	MW17-109S-11022017-N	N	11/2/2017	2.79	4.32	ALS	L2017929
PAHs	Anthracene	31	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	Benzo(a)anthracene	21	µg/L	OW23S	OW23S-11202015-N	N	11/20/2015	2.52	5.26	Maxxam	B5N9633
PAHs	Benzo(a)pyrene	2.4	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
PAHs	Benzo(b&j)fluoranthene	6.1	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
PAHs	Benzo(b)fluoranthene	0.248	µg/L	OW22S	OW22S-09062017-N	N	9/6/2017	1.36	4.1	ALS	L1988005
PAHs	Benzo(e)pyrene	0.065	µg/L	OW22S	OW22(S)-10252013-N	N	10/25/2013	1.36	4.1	Maxxam	B3I4530
PAHs	Benzo(g,h,i)perylene	0.1	µg/L	OW07-31	OW07- 31-03292007-N	N	3/29/2007	1.5	6.22	AGAT	07T217626
PAHs	Benzo(k)fluoranthene	0.26	µg/L	OW25	OW 25-09192011-N	N	9/19/2011	1.98	4.72	Maxxam	B1E6126
PAHs	Chrysene	38	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
PAHs	Dibenzo(a,h)anthracene	0.1	µg/L	OW07-31	OW07- 31-03292007-N	N	3/29/2007	1.5	6.22	AGAT	07T217626
PAHs	Fluoranthene	24	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
PAHs	Fluorene	83	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	Indeno(1,2,3-Cd)Pyrene	0.1	µg/L	OW07-31	OW07- 31-03292007-N	N	3/29/2007	1.5	6.22	AGAT	07T217626
PAHs	Naphthalene	27	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PAHs	Phenanthrene	110	µg/L	OW23S	OW23S-11202015-N	N	11/20/2015	2.52	5.26	Maxxam	B5N9633
PAHs	Pyrene	59	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
PCBs	PCB, Total	1.27	µg/L	OW26S	OW26S-03242010-N	N	3/24/2010	3.08	4.6	Maxxam	B036036
PHCs	PHC F1 (C6-C10)	1100	µg/L	OW24D	OW 24(D)-09202011-N	N	9/20/2011	6.55	7.77	Maxxam	B1E6126
PHCs	PHC F2 (C10-C16)	210000	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PHCs	PHC F3 (C16-C34)	850000	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
PHCs	PHC F4 (C34-C50)	37000	µg/L	OW22S	OW22S-10252016-N	N	10/25/2016	1.36	4.1	Maxxam	B6N2170
VOCs	1,1,1-Trichloroethane	37.1	µg/L	OW11-II	OW11-II-09012017-N	N	9/1/2017	6.28	7.8	ALS	L1985429
VOCs	1,1-Dichloroethane	29.5	µg/L	OW11-II	OW11-II-09012017-N	N	9/1/2017	6.28	7.8	ALS	L1985429
VOCs	1,1-Dichloroethene	64	µg/L	OW24D	OW24D-11202015-N	N	11/20/2015	6.55	7.77	Maxxam	B5N9633
VOCs	Acetone	14	µg/L	OW23S	OW23S-10252016-N	N	10/25/2016	2.52	5.26	Maxxam	B6N2170
VOCs	Bromodichloromethane	7.3	µg/L	MW18-112G	MW-112G-11222018-N	N	11/22/2018	19.35	20.88	ALS	L2200634
VOCs	Chloroform	5.8	µg/L	MW18-112G	MW-112G-11222018-N	N	11/22/2018	19.35	20.88	ALS	L2200634
VOCs	Chlorodibromomethane	7.4	µg/L	MW18-112G	MW-112G-11222018-N	N	11/22/2018	19.35	20.88	ALS	L2200634

Table 6-9. Maximum Detected Contaminant Concentrations in Groundwater

200 Beverley Street, Guelph, Ontario

Analytical Group	Analyte Name	Maximum Detection	Result Units	Location Name	Sample Name	Sample Type Code	Sample Date	Sample Beginning Depth (mbgs)	Sample Ending Depth (mbgs)	Laboratory Code	SDG
VOCs	cis-1,2-Dichloroethene	960	µg/L	OW24D	OW24D-11202015-N	N	11/20/2015	6.55	7.77	Maxxam	B5N9633
VOCs	n-Hexane	7.46	µg/L	MW17-105S	MW17-105S-10312017-N	N	10/31/2017	3.2	4.72	ALS	L2017929
VOCs	Tetrachloroethene	1.14	µg/L	OW19	OW19-03212018-N	N	3/21/2018	1.77	4.82	ALS	L2070926
VOCs	trans-1,2-Dichloroethene	81	µg/L	OW24D	OW24D-11202015-N	N	11/20/2015	6.55	7.77	Maxxam	B5N9633
VOCs	Trichloroethylene	7900	µg/L	OW24D	OW24D-11202015-N	N	11/20/2015	6.55	7.77	Maxxam	B5N9633
VOCs	Vinyl Chloride	86	µg/L	OW24D	OW 24(D)-09202011-N	N	9/20/2011	6.55	7.77	Maxxam	B1E6126

Notes:

µg/L = microgram per litre

ABN = acid base neutrals

BTEX = benzene, toluene, ethylbenzene, xylenes

FD = Field duplicate

mbgs = metre below ground surface

N = Normal sample

PAH = polycyclic aromatic hydrocarbons

PCB = polychlorinated biphenyls

PHC = petroleum hydrocarbon

SAR = sodium absorption ratio

SDG = sample delivery group

VOC = Volatile organic compound

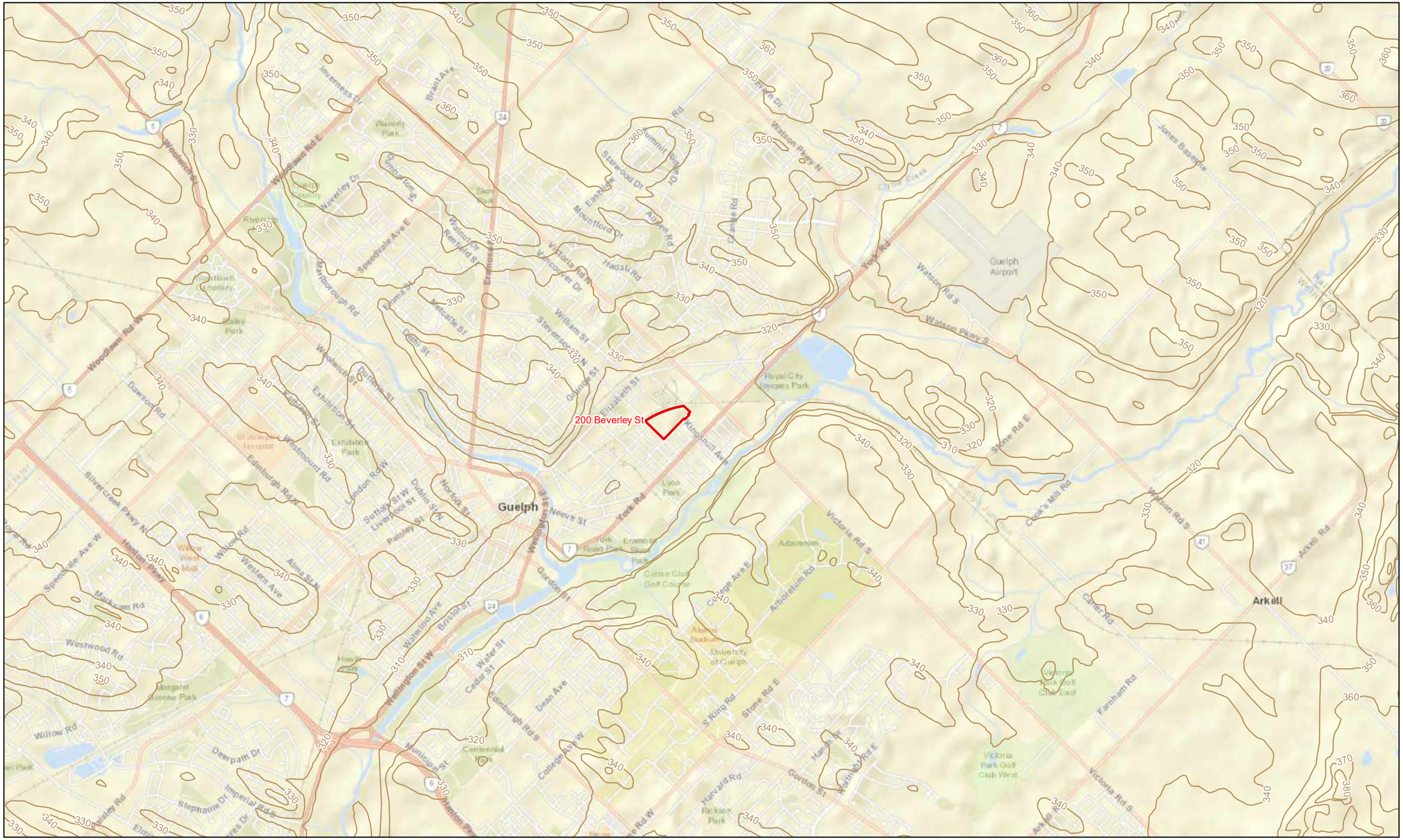
Table 6-10c. Contaminants of Concern Identified in Groundwater
200 Beverley Street, Guelph, Ontario

Groundwater Contaminants of Concern	
1,1,1-Trichloroethane	Fluoranthene
1,1-Dichloroethane	Lead
1,1-Dichloroethene	Naphthalene
2-(1-)Methylnaphthalene	n-Hexane
Acenaphthene	Petroleum Hydrocarbons F1 (C6-C10)
Anthracene	Petroleum Hydrocarbons F2 (C10-C16)
Arsenic	Petroleum Hydrocarbons F3 (C16-C34)
Benzene	Petroleum Hydrocarbons F4 (C34-C50)
Benzo(a)anthracene	Phenanthrene
Benzo(a)pyrene	Pyrene
Benzo(b&j)fluoranthene	Tetrachloroethene
Benzo(k)fluoranthene	trans-1,2-Dichloroethene
Chrysene	Trichloroethylene
cis-1,2-Dichloroethene	Vinyl Chloride
Ethylbenzene	Zinc

F = fraction

Figures

Figures



N

0 250 500 750 1,000
Metres

Former IMICO Property Boundary
Elevation Contour (10-m Interval)

Notes:
1. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community
2. Topography Contours obtained from Canvec.

DRAFT

Figure 3-1
Regional Topography
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFT\REGIONALTOPOGRAPHY.MXD VM048279 12/18/2018 5:27:52 PM

N

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- Railway
- Former IMICO Property Boundary

Area of Potential Concern
- Annealing Room
- Auto
- Chipping/Grinding
- Coal Storage
- Drum Storage
- Former Electrical Shop
- Former PCB Storage
- Former Rail Line
- Former SubStation
- Former UST
- Former Waste Oil Storage
- Foundry
- Galvanizing
- Garage
- Machine Shop
- Off-Site APEC
- Oil House
- PCB Capacitors
- Paint Shop
- Plating
- Sand Mixing/Storage
- Sand Storage
- Transformers
- Unknown Fill Quality

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/. http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 4-1
APECs Sampling Locations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\APECS_SAMPLINGLOCATIONS.MXD SCYR 2/14/2019 10:41:16 AM

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- Location Included in Cross-section
- Cross-section Location
- Railway
- Former IMICO Property Boundary

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

DRAFT

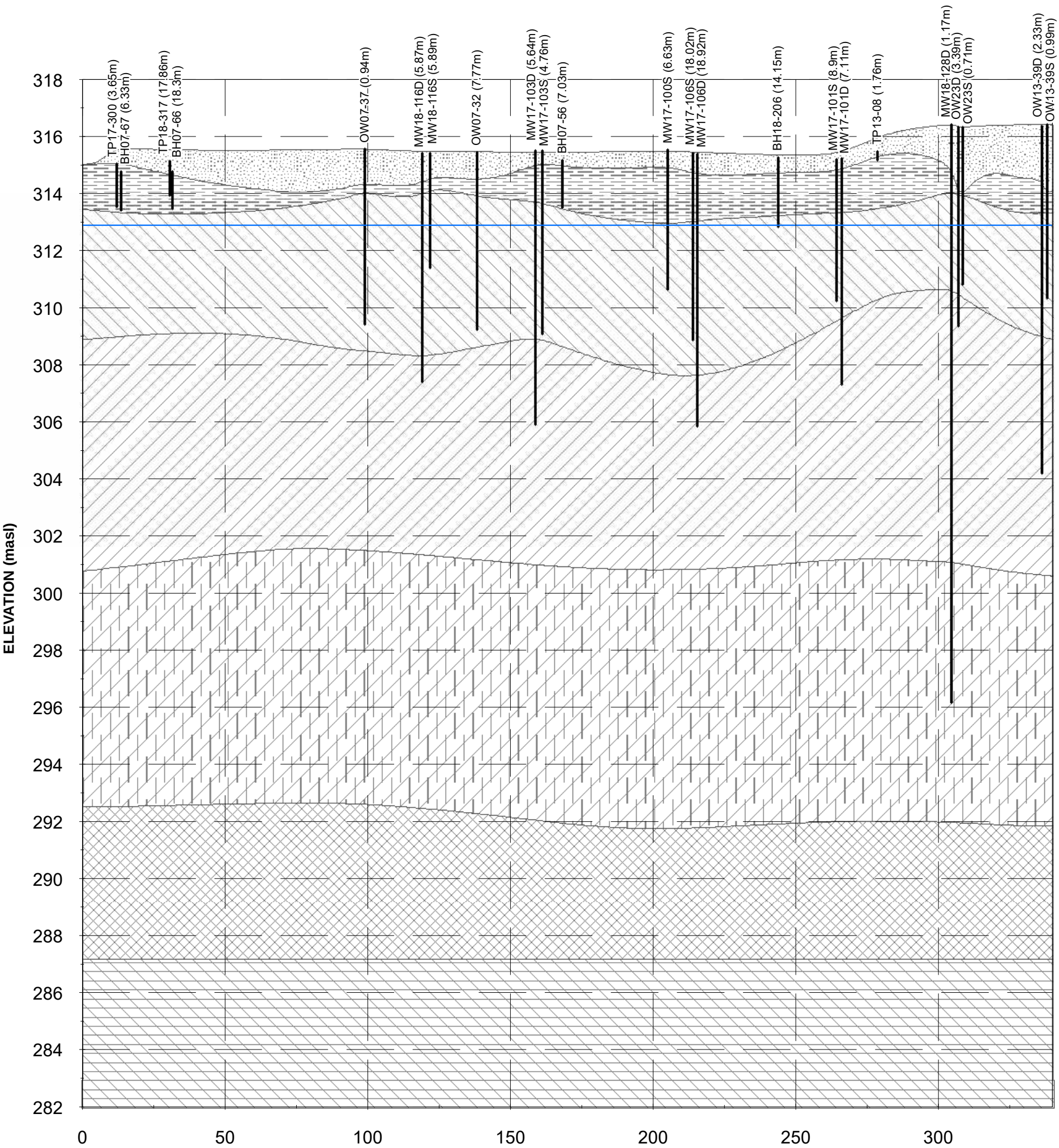
Figure 6-1
Geological Cross-Section Locations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\CROSSSECTION_LOCATIONS.MXD SCYR 2/11/2019 1:18:38 PM

WEST
A

EAST
A'



Approximate Groundwater Elevation

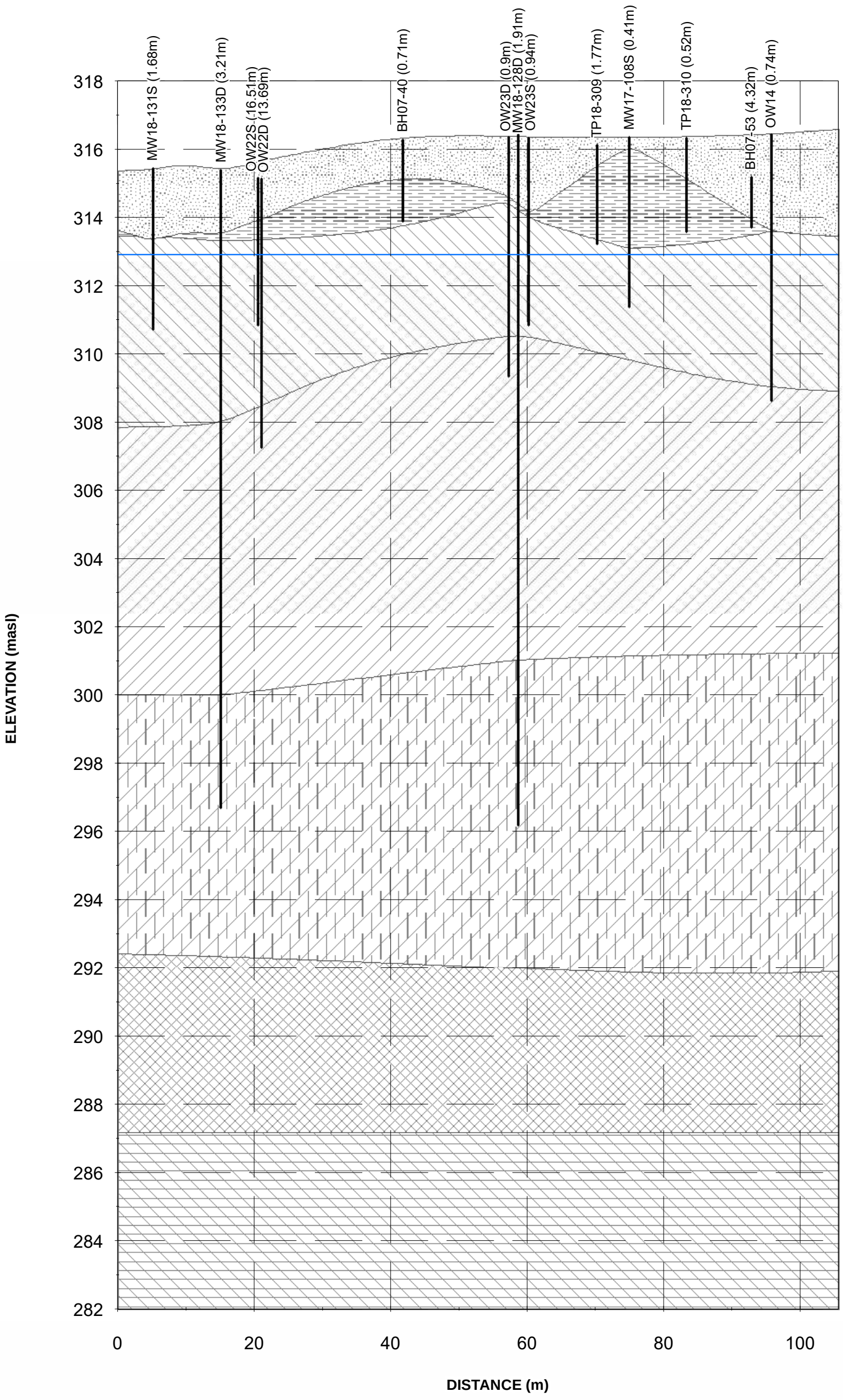
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1a
Section A-A'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'



- Approximate Groundwater Elevation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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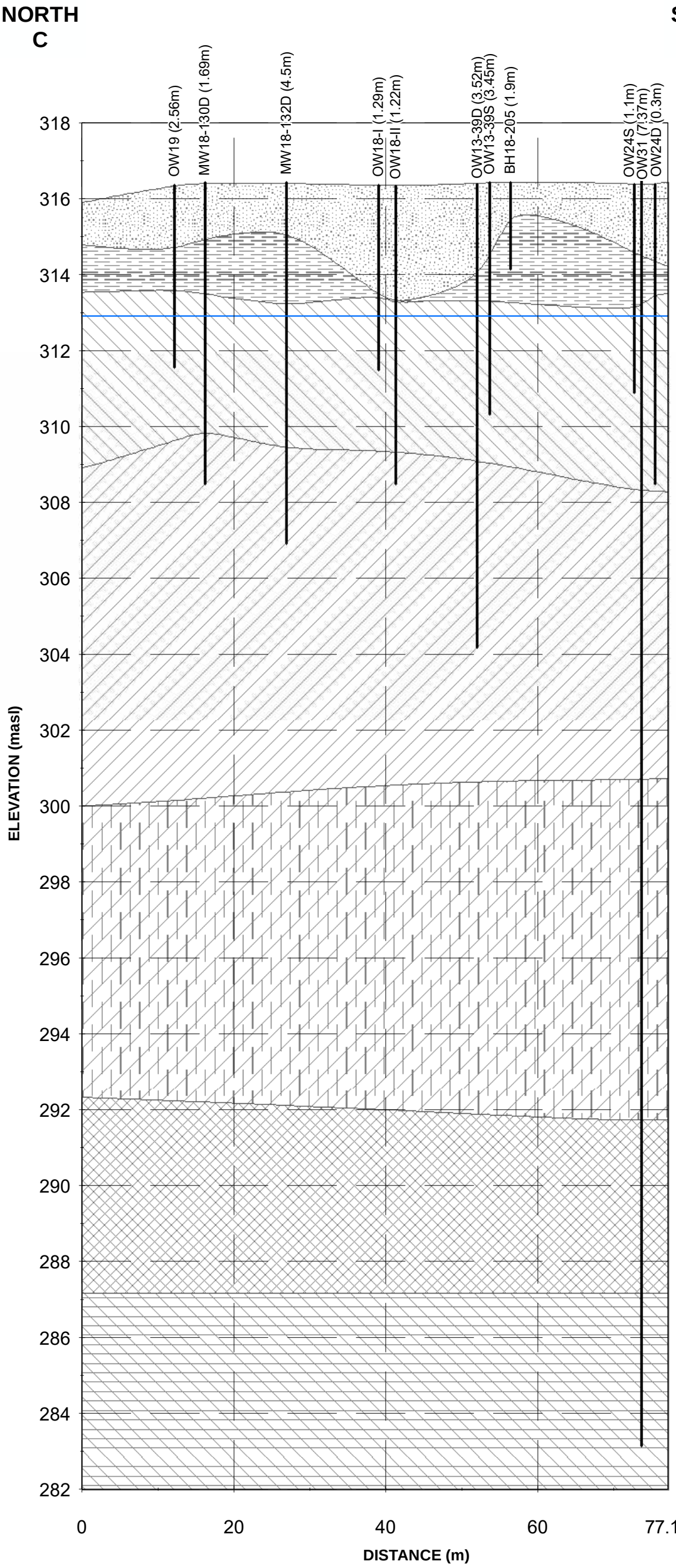
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1b
Section B-B'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Approximate Groundwater Elevation

- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1c
Section C-C'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
D

EAST
D'

MW18-122D (3.41m)
MW18-122G (3.66m)
OW11-I (4.15m)
OW11-II (4.17m)
MW18-121S (12.43m)
MW18-121D (11m)
BH07-61 (10.14m)
OW26D (8.57m)
OW26S (8.58m)
BH07-57 (13.79m)
MW18-123D (6.08m)
MW18-123S (0.29m)
MW18-136G (15.86m)
MW18-136D (14.82m)
OW10 (7.75m)
MW18-134S (9.99m)
MW18-134D (10.68m)
MW18-105G (1.16m)
MW17-105D (0.59m)
MW17-105S (2.72m)
OW09-II (8.49m)
OW09-I (9.92m)
MW18-129D (9.23m)
OW14 (10.84m)
OW31 (3.96m)
OW24D (6.16m)
OW24S (4.04m)

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

DISTANCE (m)

- Approximate Groundwater Elevation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

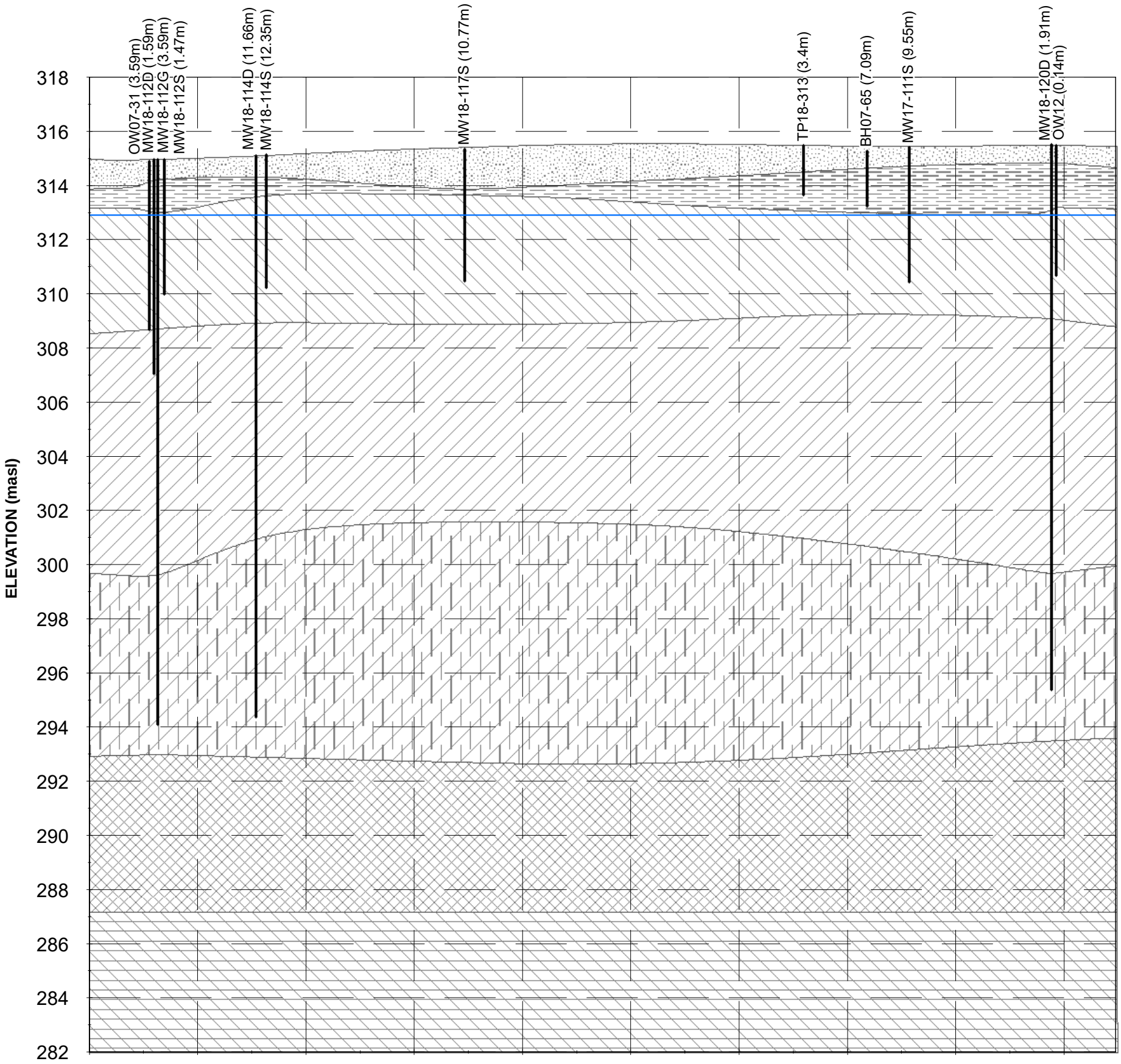
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1d
Section D-D'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
E

SOUTH
E'



- Approximate Groundwater Elevation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

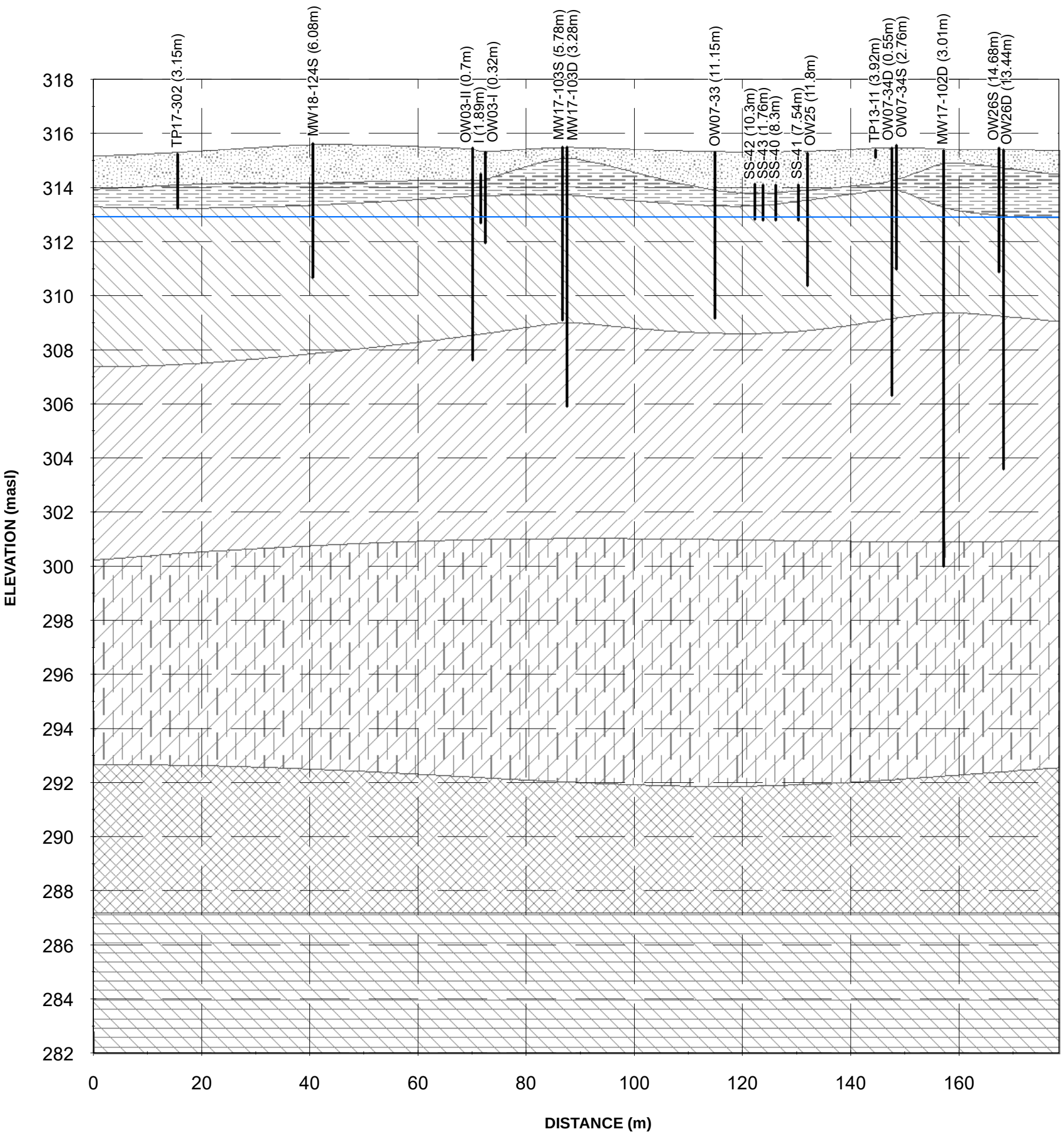
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1e
Section E-E'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
F

SOUTH
F'



- Approximate Groundwater Elevation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

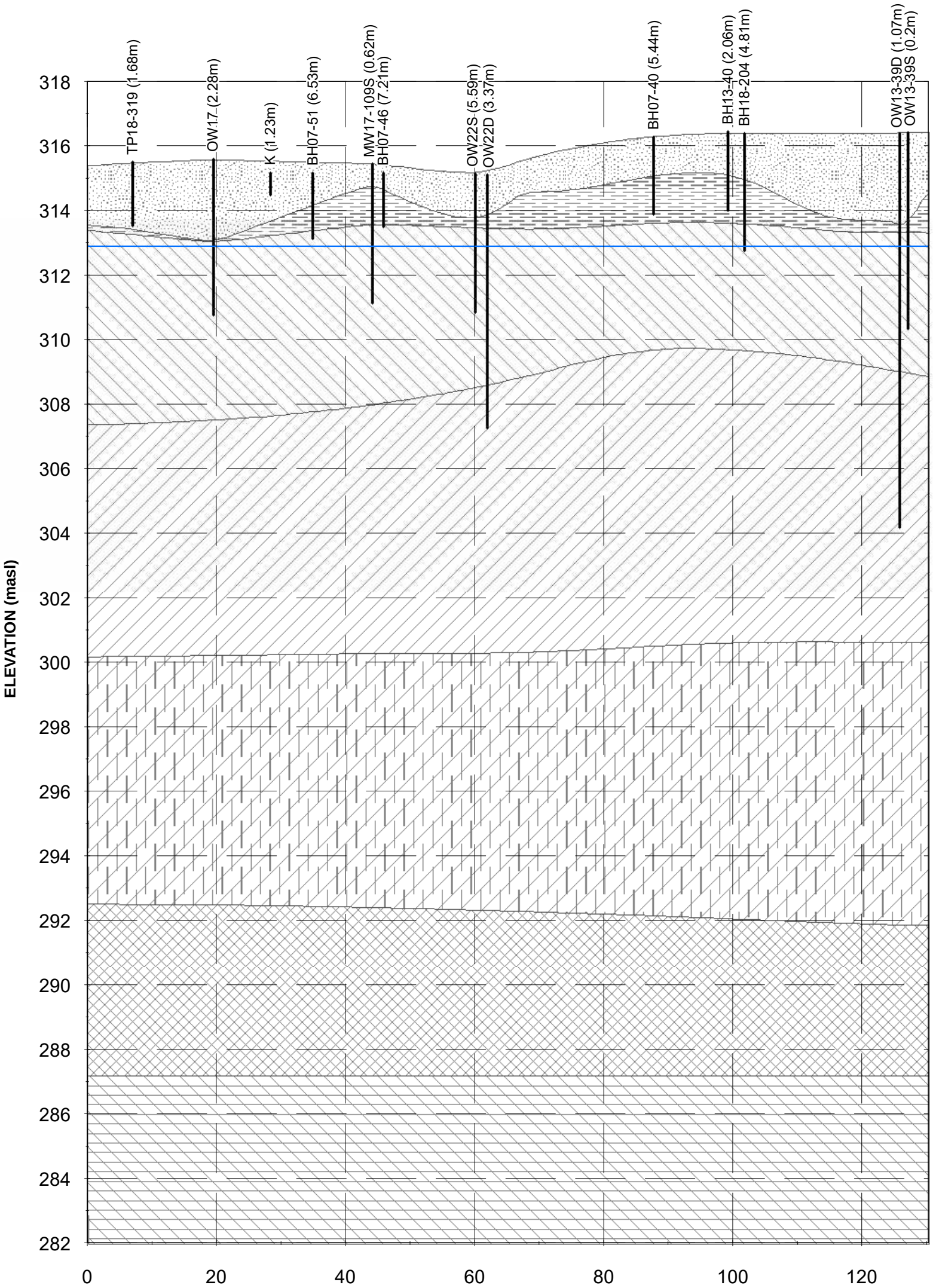
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1f
Section F-F'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
G

EAST
G'



- Approximate Groundwater Elevation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-1g
Section G-G'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

N

0 10 20 30
Metres

Monitoring Well With Groundwater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Railway
Former IMICO Property Boundary

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

DRAFT

Figure 6-2a
Water Table (Contact Zone); August 2018
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_ELEVATIONS_AUG2018.MXD SCYR 2/6/2019 12:27:50 PM

N

0 10 20 30
Metres

Monitoring Well With Groundwater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Railway
Former IMICO Property Boundary

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

DRAFT

Figure 6-2b
Water Table (Contact Zone); December 2018
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_ELEVATIONS_DEC2018.MXD SCYR 2/6/2019 12:25:56 PM

N

0 10 20 30
Metres

Monitoring Well With Groundwater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Railway
Former IMICO Property Boundary

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

DRAFT

Figure 6-2c
Potentiometric Surface (Reformatory Quarry and Vinemount); August 2018
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_ELEVATIONS_PS_AUG2018.MXD SCYR 2/6/2019 12:24:23 PM

N

0 10 20 30

Metres

Monitoring Well With Groundwater Elevation (masl)

Groundwater Elevation Contour (masl)

Interpreted Groundwater Flow Direction

Railway

Former IMICO Property Boundary

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

DRAFT

Figure 6-2d
Potentiometric Surface (Reformatory Quarry and Vinemount); December 2018"
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_ELEVATIONS_PS_DEC2018.MXD SCYR 2/6/2019 12:21:07 PM

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Antimony	7.5µg/g	18.6µg/g	BH07-56
Arsenic	18µg/g	23µg/g	BH07-67
Cadmium	1.2µg/g	83.4µg/g	MW17-108S
Cobalt	22µg/g	393µg/g	C11
Copper	140µg/g	2460µg/g	I
Lead	120µg/g	10100µg/g	BH07-65
Mercury	0.27µg/g	0.319µg/g	BH07-57
Molybdenum	6.9µg/g	35µg/g	K
Nickel	100µg/g	117µg/g	BH07-51
Thallium	1µg/g	6µg/g	AN21
Vanadium	86µg/g	100µg/g	MW17-100S
Zinc	340µg/g	67200µg/g	MW17-108S

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

DRAFT

Figure 6-3 (Part 1)
Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\SO_METALS_PART1.MXD SCYR 1/31/2019 10:47:35 AM

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Antimony	7.5µg/g	18.6µg/g	BH07-56
Arsenic	18µg/g	23µg/g	BH07-67
Cadmium	1.2µg/g	83.4µg/g	MW17-108S
Cobalt	22µg/g	393µg/g	C11
Copper	140µg/g	2460µg/g	I
Lead	120µg/g	10100µg/g	BH07-65
Mercury	0.27µg/g	0.319µg/g	BH07-57
Molybdenum	6.9µg/g	35µg/g	K
Nickel	100µg/g	117µg/g	BH07-51
Thallium	1µg/g	6µg/g	AN21
Vanadium	86µg/g	100µg/g	MW17-100S
Zinc	340µg/g	67200µg/g	MW17-108S

N

0 10 20 30

Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

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Figure 6-3 (Part 2)
Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\SO_METALS_PART2.MXD SCYR 1/31/2019 10:46:19 AM

WEST
A

EAST
A'

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS

0.91-1.22m
Zinc_____803

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS

1.37-1.83m
Vanadium_____100
Zinc_____724

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

TP17-300 (3.65m)
BH07-67 (6.33m)
TP18-317 (17.86m)
BH07-66 (18.3m)
OW07-37 (0.94m)
MW18-116D (5.87m)
MW18-116S (5.89m)
OW07-32 (7.77m)
MW17-103D (5.64m)
MW17-103S (4.76m)
BH07-56 (7.03m)
MW17-100S (6.63m)
MW17-106S (18.02m)
MW17-106D (18.92m)
BH18-206 (14.15m)
MW17-101S (8.9m)
MW17-101D (7.11m)
TP13-08 (1.76m)
MW18-128D (1.17m)
OW23D (3.39m)
OW23S (0.71m)
OW13-39D (2.33m)
OW13-39S (0.99m)

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

*See Plan View

BH07-66
09 Feb 2007
0.05-1.22m: Meets SCS

1.22-1.32m
Zinc_____349

07 Mar 2007
0-1.32m: Meets SCS

BH07-67
09 Feb 2007 0.015-0.91m
Arsenic_____23
Cadmium_____2.1
Lead_____336
Zinc_____379

09 Feb 2007 1.22-1.37m
Zinc_____538

OW07-32
22 Feb 2007
0-1.07m: Meets SCS

07 Mar 2007
0-1.65m:Meets SCS

BH18-206
23 Jul 2018 0.76-1.37m
Cadmium_____1.43
Zinc_____614

MW17-101D
20 Oct 2017 0.61-0.91m
Cadmium_____6.6
Zinc_____1240

20 Oct 2017 1.22-1.68m
Zinc_____410

OW13-39S
12 Dec 2013 2.29-2.25m
Cadmium_____1.9
Lead_____220
Zinc_____2400

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS

1.22-1.83m
Zinc_____456

BH07-56
09 Feb 2007 0.05-0.91m
Antimony_____18.6
Cadmium_____1.8
Copper_____283
Lead_____545
Zinc_____472

09 Feb 2007 1.22-1.67m
Zinc_____664

TP13-08
03 Dec 2013
0.1-0.3m
Cadmium_____2.2 (1.6)
Lead_____310 (460)
Zinc_____760 (810)

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

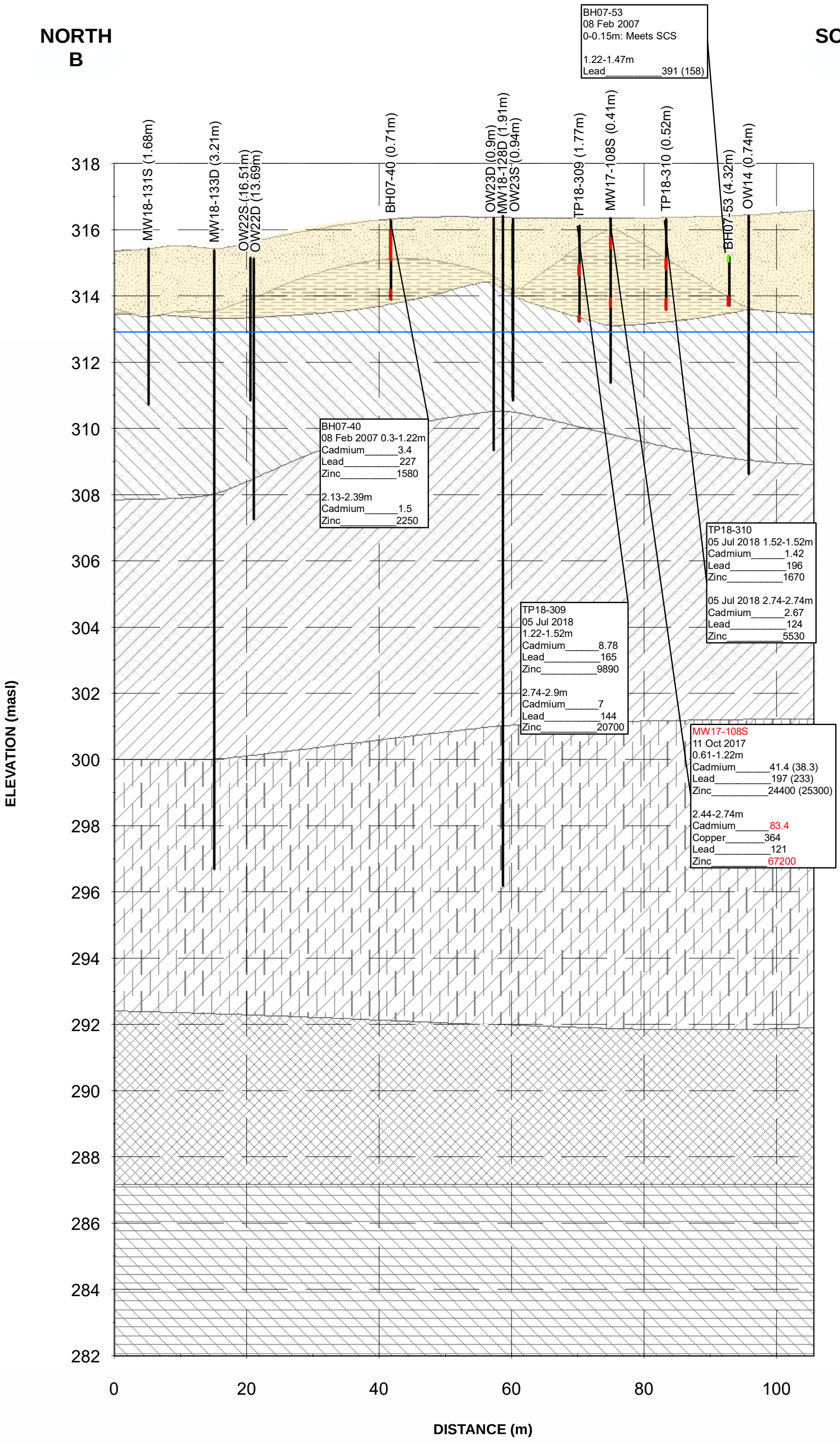
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-3a
Section A-A' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'



- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3b
Section B-B' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
D

EAST
D'

MW18-122D
26 Jul 2018
0.76-1.37m: Meets SCS

MW18-121S
27 Jul 2018 0.76-1.37m
Zinc_____403

MW18-129D
23 Jul 2018 0.76-1.37m
Zinc_____410 (372)

MW18-122D (3.41m)
MW18-122G (3.66m)
OW11-I (4.15m)
OW11-II (4.17m)
MW18-121S (12.43m)
MW18-121D (11m)
BH07-61 (10.14m)
OW26D (8.57m)
OW26S (8.58m)
BH07-57 (13.79m)
MW18-123D (6.08m)
MW18-123S (0.29m)
MW18-136G (15.86m)
MW18-136D (14.82m)
OW10 (7.75m)
MW18-134S (9.99m)
MW18-134D (10.68m)
MW18-105G (1.16m)
MW17-105D (0.59m)
MW17-105S (2.72m)
OW09-II (8.49m)
OW09-I (9.92m)
MW18-129D (9.23m)
OW14 (10.84m)
OW31 (3.96m)
OW24D (6.16m)
OW24S (4.04m)

BH07-57
08 Feb 2007 0.05-1.22m
Cadmium_____2 (2.3)
Lead_____232 (243)
Mercury_____0.319
Zinc_____679 (805)

1.22-1.88m
Lead_____176
Zinc_____628

MW17-105D
24 Oct 2017 0-0.09m
Cadmium_____1.34
Lead_____175
Zinc_____901

1.22-1.83m
Zinc_____590

BH07-61
08 Feb 2007 0.05-1.22m
Lead_____155
Zinc_____771

08 Feb 2007 1.22-1.37m
Cadmium_____2.9
Lead_____123
Zinc_____782

MW18-123D
27 Jun 2018 0-0.6m
Cadmium_____1.82
Lead_____186
Zinc_____543

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3c
Section D-D' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
E

SOUTH
E'

OW07-31
22 Feb 2007
0-1.22m: Meets SCS

MW18-117S
25 Jul 2018 0-0.6m
Lead_____156
Zinc_____536

25 Jul 2018 0.76-1.37m
Lead_____121
Zinc_____389

MW17-111S
12 Oct 2017
0-0.61m: Meets SCS

OW07-31 (3.59m)
MW18-112D (1.59m)
MW18-112G (3.59m)
MW18-112S (1.47m)
MW18-114D (11.66m)
MW18-114S (12.35m)
MW18-117S (10.77m)
TP18-313 (3.4m)
BH07-65 (7.09m)
MW17-111S (9.55m)
MW18-120D (1.91m)
OW12 (0.14m)

TP18-313
06 Jul 2018
0.6-0.6m
Cadmium_____1.84
Lead_____155
Zinc_____517

1.82-1.82m
Cadmium_____1.63
Zinc_____666

BH07-65
09 Feb 2007 0.05-0.61m
Cadmium_____1.4
Lead_____10100
Zinc_____426

0.61-2.03m
Zinc_____514

MW18-120D
21 Jun 2018 0.76-1.37m
Zinc_____585

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120
140
160
180

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

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Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
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Figure 6-3d
Section E-E' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
F

SOUTH
F'

MW18-124S
24 Jul 2018
0.76-1.37m: Meets SCS

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS

1.22-1.83m
Zinc_____456

OW07-33
22 Feb 2007 0-1.22m
Zinc_____720

TP17-302 (3.15m)
MW18-124S (6.08m)
OW03-II (0.7m)
I (1.89m)
OW03-I (0.32m)
MW17-103S (5.78m)
MW17-103D (3.28m)
OW07-33 (11.15m)
SS-42 (10.3m)
SS-43 (1.76m)
SS-40 (8.3m)
SS-41 (7.54m)
OW25 (11.8m)
TP13-11 (3.92m)
OW07-34D (0.55m)
OW07-34S (2.76m)
MW17-102D (3.01m)
OW26S (14.68m)
OW26D (13.44m)

TP13-11
03 Dec 2013 0.1-0.3m
Cadmium_____1.9 (308)
Lead_____230 (470)
Zinc_____890 (2200)

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS

1.52-2.13m
Zinc_____1070

I
22 Jan 1991 0.5-0.5m
Copper_____2460
Lead_____2450
Molybdenum___25
Zinc_____1810

22 Jan 1991 1-1.5m
Zinc_____586

OW07-34D
22 Feb 2007 0-1.22m
Cadmium_____1.3
Lead_____274
Zinc_____635

MW17-102D
26 Oct 2017
1.22-1.68m
Cadmium_____1.54
Lead_____424
Zinc_____784

1.83-2.13m
Zinc_____393

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120
140
160

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

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Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3e
Section F-F' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
G

EAST
G'

TP18-319
05 Jul 2018 0.3-0.61m
Lead_____139
Zinc_____1680

TP18-319 (1.68m)
OW17-(2.28m)
K (1.23m)
BH07-51 (6.53m)
MW17-109S (0.62m)
BH07-46 (7.21m)
OW22S-(5.59m)
OW22D (3.37m)
BH07-40 (5.44m)
BH13-40 (2.06m)
BH18-204 (4.81m)
OW13-39D (1.07m)
OW13-39S (0.2m)

BH07-40
08 Feb 2007 0.3-1.22m
Cadmium_____3.4
Lead_____227
Zinc_____1580

2.13-2.39m
Cadmium_____1.5
Zinc_____2250

OW13-39S
12 Dec 2013 2.29-2.25m
Cadmium_____1.9
Lead_____220
Zinc_____2400

BH13-40
12 Dec 2013 1.83-2.44m
Zinc_____620

K
22 Jan 1991 0-0.7m
Molybdenum___35
Zinc_____431

BH07-51
08 Feb 2007 0-1.22m
Cadmium_____1.4
Lead_____131
Molybdenum___9.9
Nickel_____117
Zinc_____1220

1.22-2.06m
Zinc_____536

BH07-46
08 Feb 2007
0.05-1.22m: Meets SCS

1.22-1.68m
Cadmium_____2.9
Lead_____148
Zinc_____1470

MW17-109S
16 Oct 2017
0-0.61m: Meets SCS

1.22-1.52m
Cadmium_____11.7
Lead_____158
Zinc_____3900

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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3. masl = metres above sea level
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5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3f
Section G-G' - Soil Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

JE15
22 Jan 1991
0.1-0.6m: Meets SCS

11
22 Jan 1991
0.5-0.5m: Meets SCS

INE15
22 Jan 1991
0.3-1m: Meets SCS

KNW10
22 Jan 1991
0.1-0.7m: Meets SCS

KW32
22 Jan 1991
0.2-1m: Meets SCS

TP18-319
05 Jul 2018
0.6-0.6m: Meets SCS

TP13-05
02 Dec 2013
1.22-1.42m: Meets SCS

MW17-109S
16 Oct 2017
0-0.61m: Meets SCS
1.22-1.52m: Meets SCS

TP13-06
02 Dec 2013
0.1-0.3m: Meets SCS

L
22 Jan 1991
0.8-1m: Meets SCS

12SE10
22 Jan 1991
0.2-0.4m: Meets SCS
0.4-1.4m: Meets SCS

C7
08 Feb 1991
0.61-1.22m: Meets SCS

BH13-40
12 Dec 2013
1.83-2.44m: Meets SCS

OW13-39S
12 Dec 2013
2.29-2.25m: Meets SCS

MW17-110S
16 Oct 2017
0-0.61m: Meets SCS
1.22-1.83m: Meets SCS

10
22 Jan 1991
0.2-1m: Meets SCS

HNE19
22 Jan 1991
0.4-0.4m: Meets SCS

I
22 Jan 1991
0.5-0.5m: Meets SCS
1-1.5m: Meets SCS

OW07-38S
22 Feb 2007
0-1.22m: Meets SCS

H
22 Jan 1991
0.5-0.8m: Meets SCS

TP17-301
04 Oct 2017
0.3-0.91m: Meets SCS
1.22-1.52m: Meets SCS

BH18-208
23 Jul 2018
0.76-1.37m: Meets SCS

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS
1.37-1.83m: Meets SCS

TP13-09
03 Dec 2013
0.3-0.5m: Meets SCS

TP13-03
02 Dec 2013
0.1-0.3m: Meets SCS

IE15
22 Jan 1991
0.3-0.8m: Meets SCS

MW18-129D
23 Jul 2018
0.76-1.37m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

MW17-104D
17 Oct 2017
0.61-1.22m: Meets SCS

BH07-63
09 Feb 2007
0.05-1.22m: Meets SCS
1.22-1.88m: Meets SCS

8
22 Jan 1991
0.2-1m: Meets SCS

BH17-201
10 Oct 2017
0-0.61m: Meets SCS
0.61-0.91m: Meets SCS

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS
1.22-1.42m: Meets SCS

TP13-01
02 Dec 2013
0.1-0.3m: Meets SCS

C2
08 Feb 1991
0.61-1.07m: Meets SCS

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

BH18-206
23 Jul 2018
0.76-1.37m: Meets SCS

EW8
22 Jan 1991
0.2-0.3m: Meets SCS
0.5-0.7m: Meets SCS

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS
1.22-1.83m: Meets SCS

MW18-126D
31 Jul 2018
0-0.6m: Meets SCS

BH07-55
08 Feb 2007
0.91-1.22m: Meets SCS

TP18-313
06 Jul 2018
0.6-0.6m: Meets SCS
1.82-1.82m: Meets SCS

MW18-125S
31 Jul 2018
0.76-1.37m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

7
22 Jan 1991
0.4-0.9m: Meets SCS
1-1.2m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

OW07-32
22 Feb 2007
0-1.07m: Meets SCS

07 Mar 2007
0-1.65m: Meets SCS

TP13-11
03 Dec 2013
0.1-0.3m: Meets SCS

MW17-111S
12 Oct 2017
0-0.61m: Meets SCS

OW07-34D
22 Feb 2007
0-1.22m: Meets SCS

5
22 Jan 1991
0.4-1.1m: Meets SCS

MW18-122D
26 Jul 2018
0.76-1.37m: Meets SCS

BH17-200
10 Oct 2017
0.91-1.07m: Meets SCS
1.22-1.83m: Meets SCS

TP17-306
04 Oct 2017
0.91-1.22m: Meets SCS
1.52-1.83m: Meets SCS

BH07-64
08 Feb 2007
0.05-1.22m: Meets SCS
1.22-2.29m: Meets SCS

4
22 Jan 1991
0-0.8m: Meets SCS

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

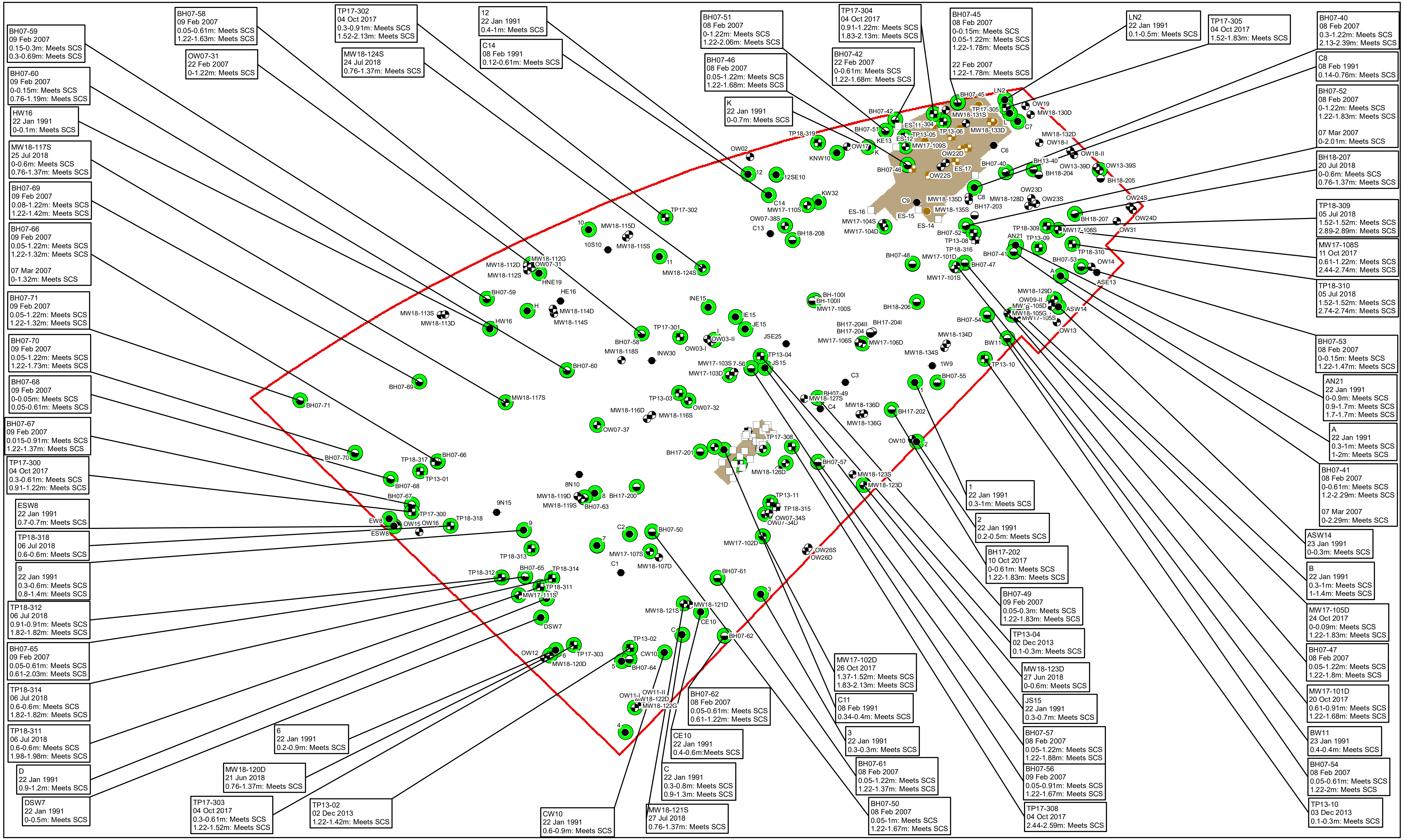
- Former IMICO Property Boundary
- Historical Building Location (Approximate)
- Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-4
Soil Exceedances - Inorganics
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

JACOBS

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\SO_INORGANICS_PART1.MXD SCYR 2/4/2019 2:27:22 PM



N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- Former IMICO Property Boundary
- Historical Building Location (Approximate)
- Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-4
Soil Exceedances - Inorganics
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

JACOBS

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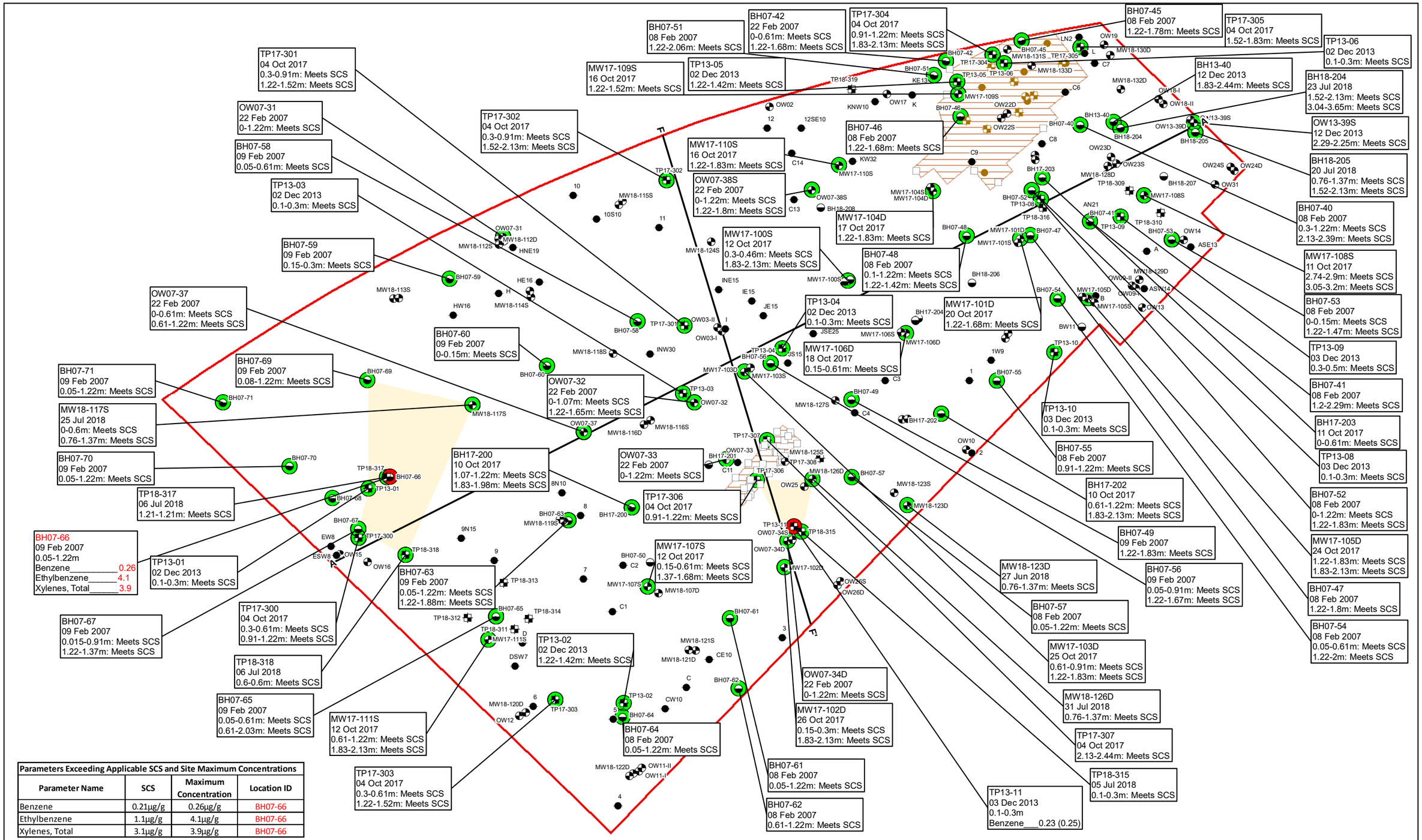


Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Benzene	0.21µg/g	0.26µg/g	BH07-66
Ethylbenzene	1.1µg/g	4.1µg/g	BH07-66
Xylenes, Total	3.1µg/g	3.9µg/g	BH07-66

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

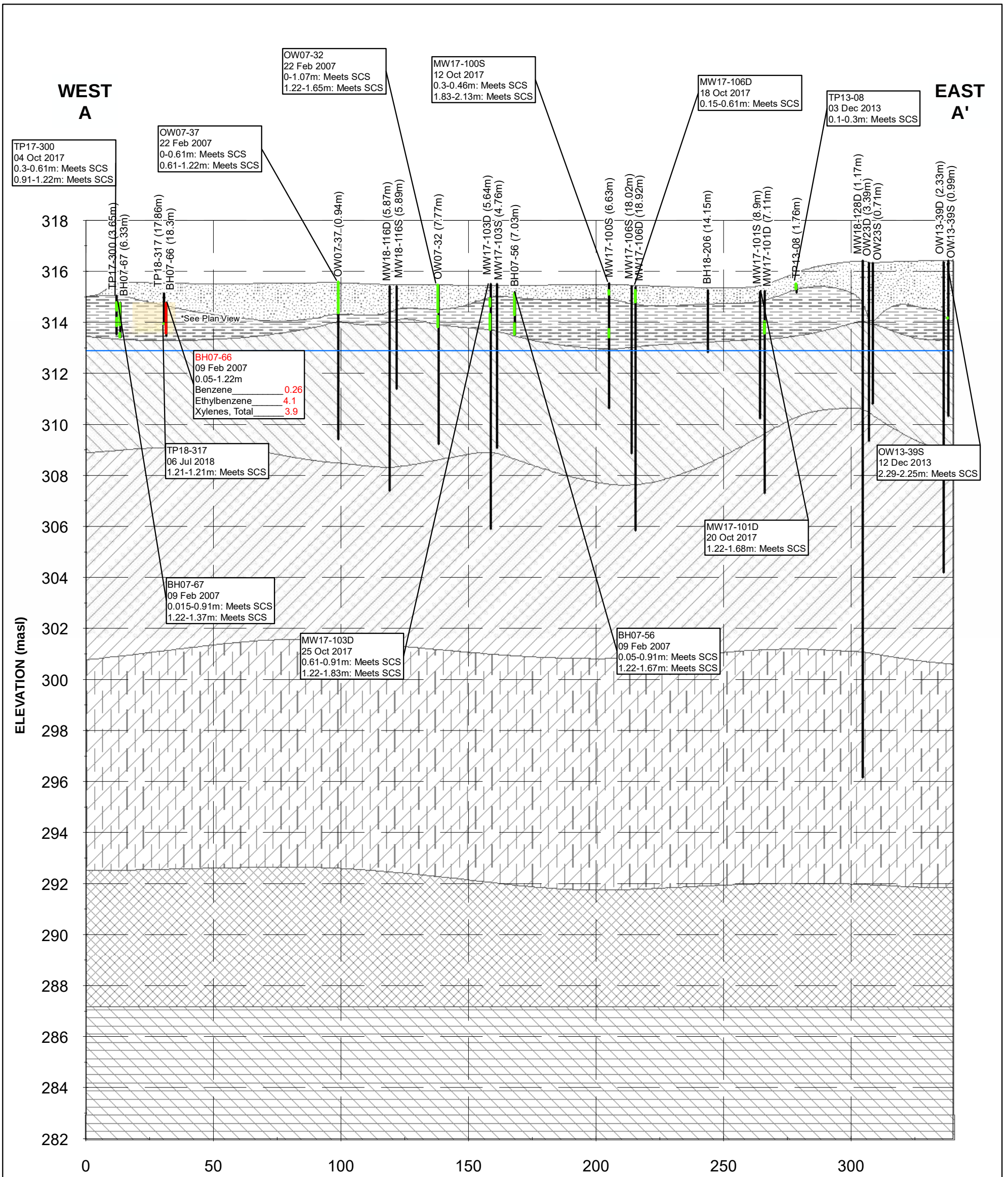
- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-5
Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-5a
Section A-A' - Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
F

SOUTH
F'

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS
1.52-2.13m: Meets SCS

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

TP13-11
03 Dec 2013
0.1-0.3m
Benzene___0.23 (0.25)

OW07-34D
22 Feb 2007
0-1.22m: Meets SCS

MW17-103D
25 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.83m: Meets SCS

MW17-102D
26 Oct 2017
0.15-0.3m: Meets SCS
1.83-2.13m: Meets SCS

TP17-302 (3.15m)
MW18-124S (6.08m)
OW03-II (0.7m)
I (1.89m)
OW03-I (0.32m)
MW17-103S (5.78m)
MW17-103D (3.28m)
OW07-33 (11.15m)
SS-42 (10.3m)
SS-43 (1.76m)
SS-40 (8.3m)
SS-41 (7.54m)
OW25 (11.8m)
TP13-11 (3.92m)
OW07-34D (0.55m)
OW07-34S (2.76m)
MW17-102D (3.01m)
OW26S (14.68m)
OW26D (13.44m)
*See Plan View

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120
140
160

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-5b
Section F-F' - Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

BH07-46
08 Feb 2007 1.22-1.68m
PHCs F2 (C10-C16)_3600
PHCs F3 (C16-C34)_6200

TP13-06
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-42
22 Feb 2007
0-0.61m: Meets SCS

TP17-304
04 Oct 2017
0.91-1.22m: Meets SCS
1.83-2.13m: Meets SCS

BH07-45
08 Feb 2007
0-0.15m: Meets SCS
1.22-1.78m: Meets SCS

TP17-305
04 Oct 2017 1.52-1.83m
PHCs F3 (C16-C34)_451

BH07-40
08 Feb 2007 0.3-1.22m
PHCs F2 (C10-C16)_400
PHCs F3 (C16-C34)_23000

2.13-2.39m
PHCs F2 (C10-C16)_290
PHCs F3 (C16-C34)_14000

BH13-40
12 Dec 2013
1.83-2.44m: Meets SCS

BH07-51
08 Feb 2007
0-1.22m: Meets SCS
1.22-2.06m: Meets SCS

TP13-05
02 Dec 2013
1.22-1.42m: Meets SCS

MW17-109S
16 Oct 2017
1.22-1.52m: Meets SCS

BH18-205
20 Jul 2018
1.52-2.13m: Meets SCS

BH18-207
20 Jul 2018
0.76-1.37m: Meets SCS

TP18-309
05 Jul 2018 1.52-1.52m
PHCs F3 (C16-C34)_530

OW07-31
22 Feb 2007
0-1.22m: Meets SCS

MW17-110S
16 Oct 2017
1.22-1.83m: Meets SCS

BH07-52
08 Feb 2007
0-1.22m: Meets SCS
1.22-1.83m: Meets SCS

MW17-104D
17 Oct 2017
1.22-1.83m: Meets SCS

MW17-108S
11 Oct 2017
0.61-1.22m: Meets SCS

2.74-2.9m
PHCs F2 (C10-C16)_345
PHCs F3 (C16-C34)_14700

3.05-3.2m
PHCs F3 (C16-C34)_2280

TP17-301
04 Oct 2017
0.3-0.91m: Meets SCS
1.22-1.52m: Meets SCS

OW07-38S
22 Feb 2007
0-1.22m: Meets SCS

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS

1.22-1.42m
PHCs F3 (C16-C34)_450

BH07-59
09 Feb 2007
0.15-0.3m: Meets SCS

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS
1.52-2.13m: Meets SCS

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS
1.83-2.13m: Meets SCS

TP18-310
05 Jul 2018
1.21-1.21m: Meets SCS

BH07-69
09 Feb 2007
0.08-1.22m: Meets SCS

BH07-58
09 Feb 2007
0.05-0.61m: Meets SCS

TP13-04
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-53
08 Feb 2007
0-0.15m: Meets SCS
1.22-1.47m: Meets SCS

BH07-71
09 Feb 2007
0.05-1.22m: Meets SCS

BH07-60
09 Feb 2007 0-0.15m
PHCs F3 (C16-C34)_400

MW17-103D
25 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.83m:Meets SCS

TP13-09
03 Dec 2013
0.3-0.5m: Meets SCS

BH07-70
09 Feb 2007
1.22-1.73m: Meets SCS

MW18-117S
25 Jul 2018 0-0.6m
PHCs F3 (C16-C34)_670

0.76-1.37m
PHCs F3 (C16-C34)_800

TP13-03
02 Dec 2013
0.1-0.3m: Meets SCS

OW07-32
22 Feb 2007
0-1.07m: Meets SCS
1.22-1.65m: Meets SCS

BH07-41
08 Feb 2007 0-0.61m
PHCs F3 (C16-C34)_550

1.2-2.29m: Meets SCS

TP13-10
03 Dec 2013
0.1-0.3m: Meets SCS

MW17-101D
20 Oct 2017 1.22-1.68m
Petroleum Hydrocarbons F3 (C16-C34)_727

BH07-66
09 Feb 2007 0.05-1.22m
PHCs F3 (C16-C34)_310

1.22-1.32m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

BH17-201
10 Oct 2017 0-0.61m
PHCs F3 (C16-C34)_521

0.61-0.91m: Meets SCS

MW18-129D
23 Jul 2018
2.28-2.89m: Meets SCS

TP18-317
06 Jul 2018
1.21-1.21m: Meets SCS

BH07-63
09 Feb 2007
1.22-1.88m: Meets SCS

BH07-55
08 Feb 2007
0.91-1.22m: Meets SCS

BH17-203
11 Oct 2017
0-0.61m: Meets SCS

BH07-68
09 Feb 2007
0-0.05m: Meets SCS

0.05-0.61m
PHCs F3 (C16-C34)_350

TP13-01
02 Dec 2013
0.1-0.3m: Meets SCS

BH17-200
10 Oct 2017
1.07-1.22m: Meets SCS
1.83-1.98m: Meets SCS

BH07-50
08 Feb 2007
0.05-1m: Meets SCS

BH18-206
23 Jul 2018
1.52-2.13m: Meets SCS

TP13-08
03 Dec 2013 0.1-0.3m
PHCs F3 (C16-C34)_520 (770)

BH07-67
09 Feb 2007 0.015-0.91m
PHCs F3 (C16-C34)_13000
PHCs F4 (C34-C50)_7300

TP18-318
06 Jul 2018
0.6-0.6m: Meets SCS

BH17-202
10 Oct 2017
0.61-1.22m: Meets SCS
1.83-2.13m: Meets SCS

TP18-316
05 Jul 2018
0.3-0.6m: Meets SCS

TP17-300
04 Oct 2017 0.3-0.61m
PHCs F3 (C16-C34)___516 (477)

0.91-1.22m: Meets SCS

BH07-65
09 Feb 2007
0.05-0.61m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m:Meets SCS
1.37-1.68m:Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

MW17-105D
24 Oct 2017
1.22-1.83m: Meets SCS
1.83-2.13m: Meets SCS

TP18-315
05 Jul 2018
0.1-0.3m: Meets SCS

BH07-49
09 Feb 2007
1.22-1.83m: Meets SCS

BH07-52
08 Feb 2007 0-1.22m
PHCs F3 (C16-C34)_2400

1.22-1.83m
PHCs F3 (C16-C34)_1400

MW17-111S
12 Oct 2017
0.61-1.22m: Meets SCS

TP17-303
04 Oct 2017
0.3-0.61m: Meets SCS
1.22-1.52m: Meets SCS

TP13-11
03 Dec 2013 0.1-0.3m
PHCs F3 (C16-C34)_370

BH07-57
08 Feb 2007
0.05-1.22m: Meets SCS

BH07-56
09 Feb 2007 0.05-0.91m
PHCs F3 (C16-C34)_330

BH07-47
08 Feb 2007 1.22-1.8m
PHCs F3 (C16-C34)_360

TP13-02
02 Dec 2013
1.22-1.42m:Meets SCS

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

MW18-126D
31 Jul 2018
0.76-1.37m: Meets SCS

BH07-64
08 Feb 2007
0.05-1.22m: Meets SCS

TP17-306
04 Oct 2017
0.91-1.22m: Meets SCS

OW07-34D
22 Feb 2007 0-1.22m
PHCs F3 (C16-C34)_700

BH07-54
08 Feb 2007
0.05-0.61m: Meets SCS
1.22-2m: Meets SCS

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

MW17-102D
26 Oct 2017
0.15-0.3m: Meets SCS
1.83-2.13m: Meets SCS

MW18-125S
31 Jul 2018
0.76-1.37m:Meets SCS

TP17-307
04 Oct 2017
2.13-2.44m: Meets SCS

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Petroleum Hydrocarbons F2 (C10-C16)	98µg/g	3600µg/g	BH07-46
Petroleum Hydrocarbons F3 (C16-C34)	300µg/g	23000µg/g	BH07-40
Petroleum Hydrocarbons F4 (C34-C50)	2800µg/g	7300µg/g	BH07-67

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-6
Soil Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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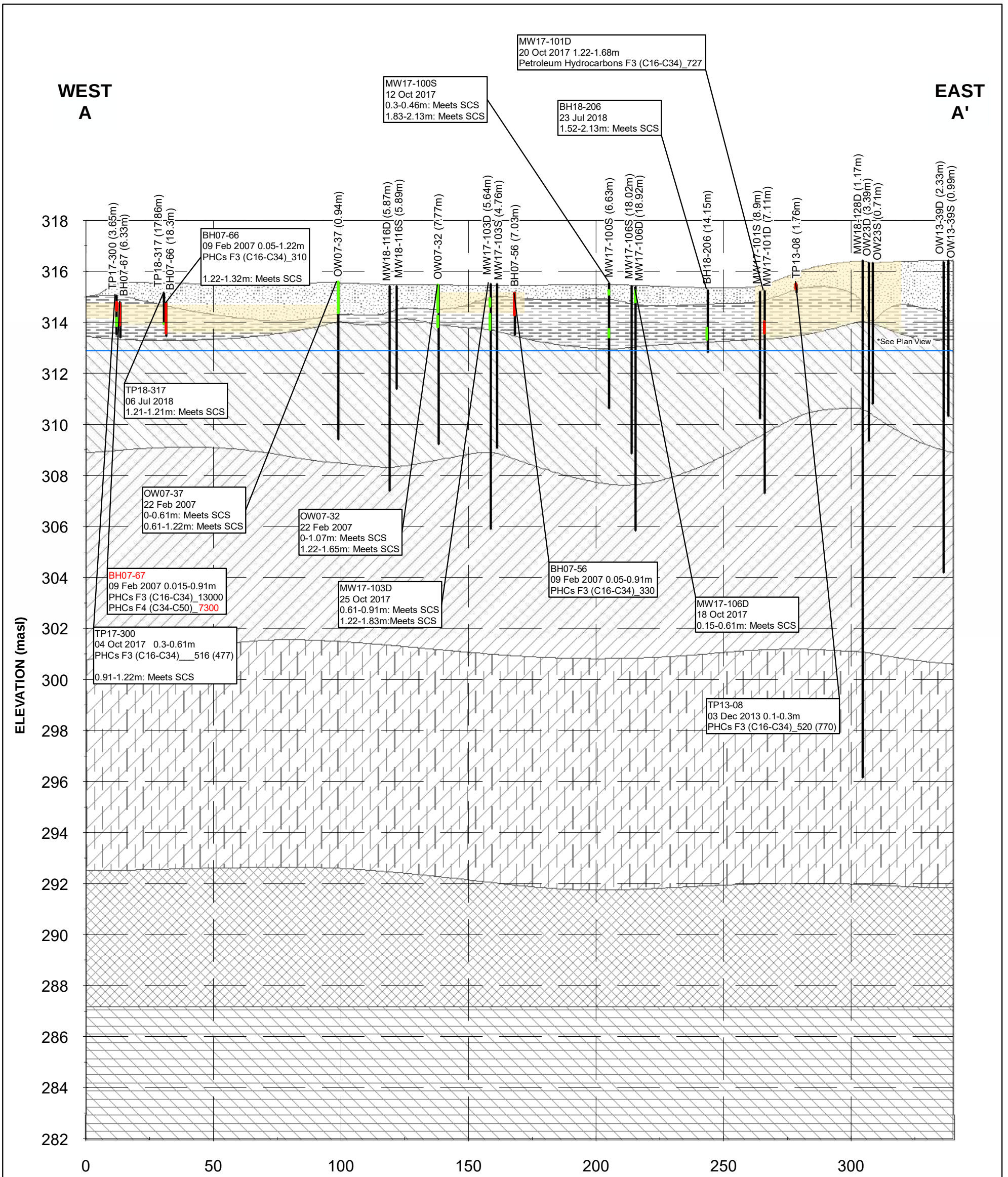
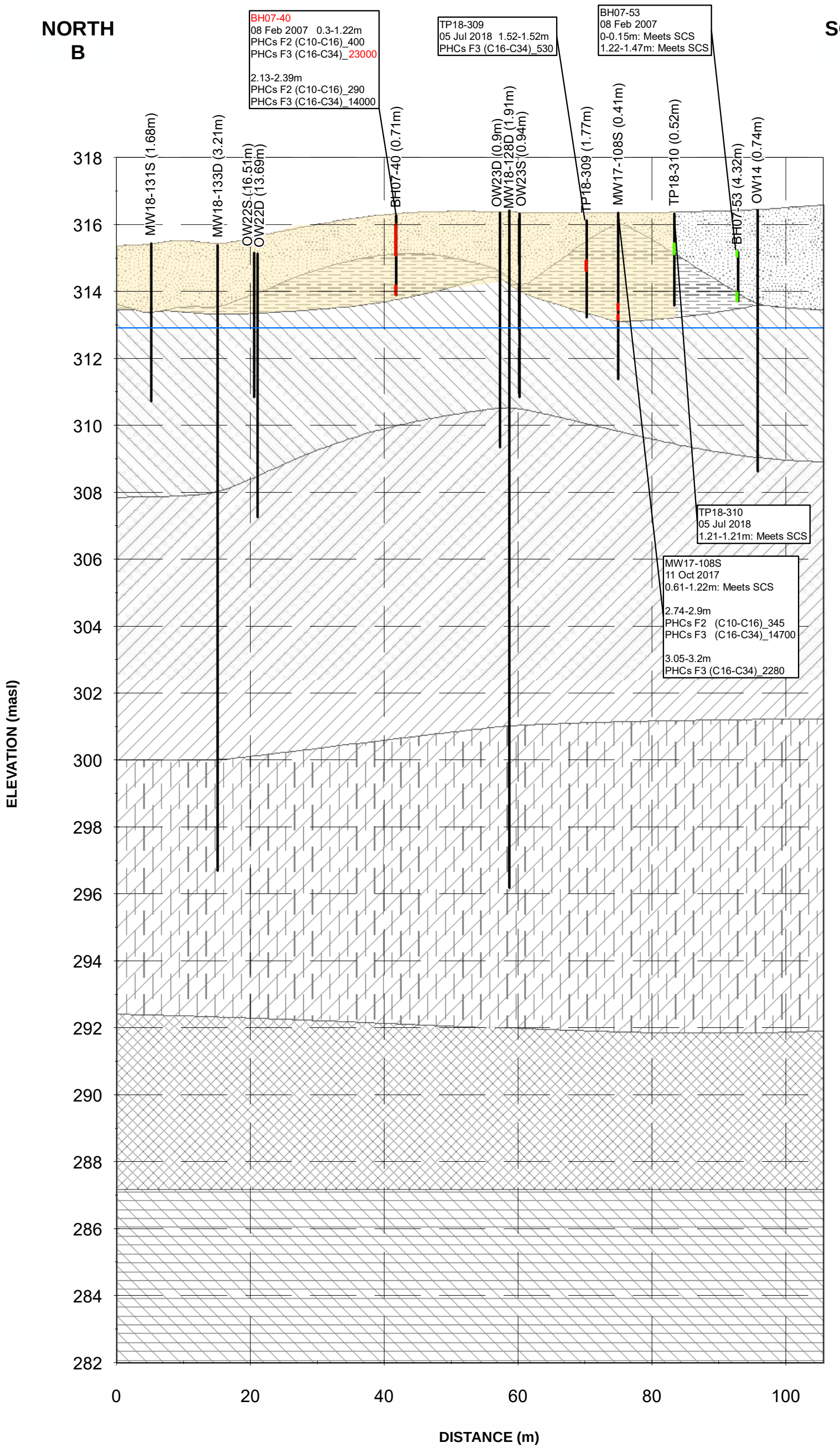


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-6a
Section A-A' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



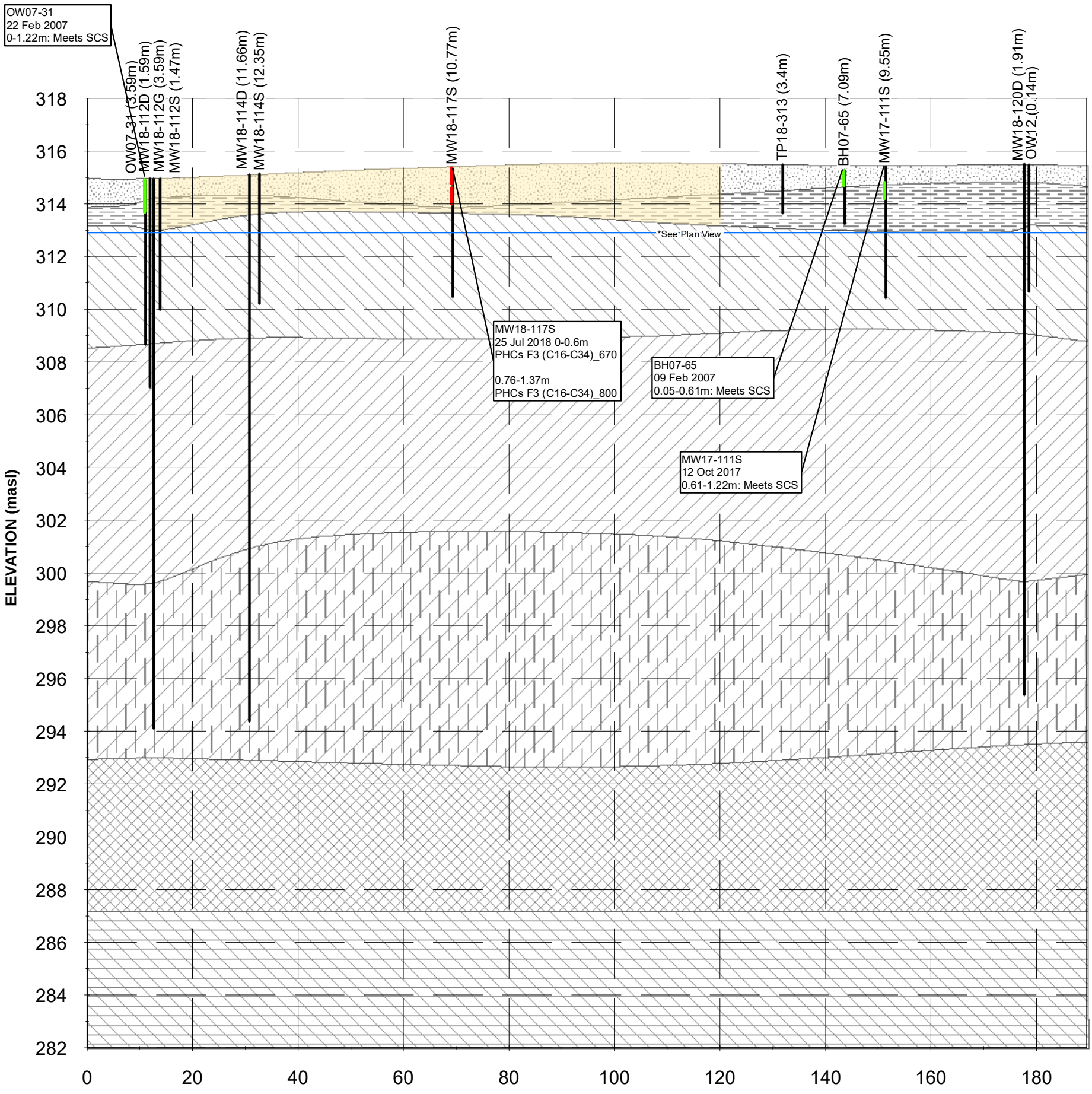
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6b
Section B-B' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
E

SOUTH
E'

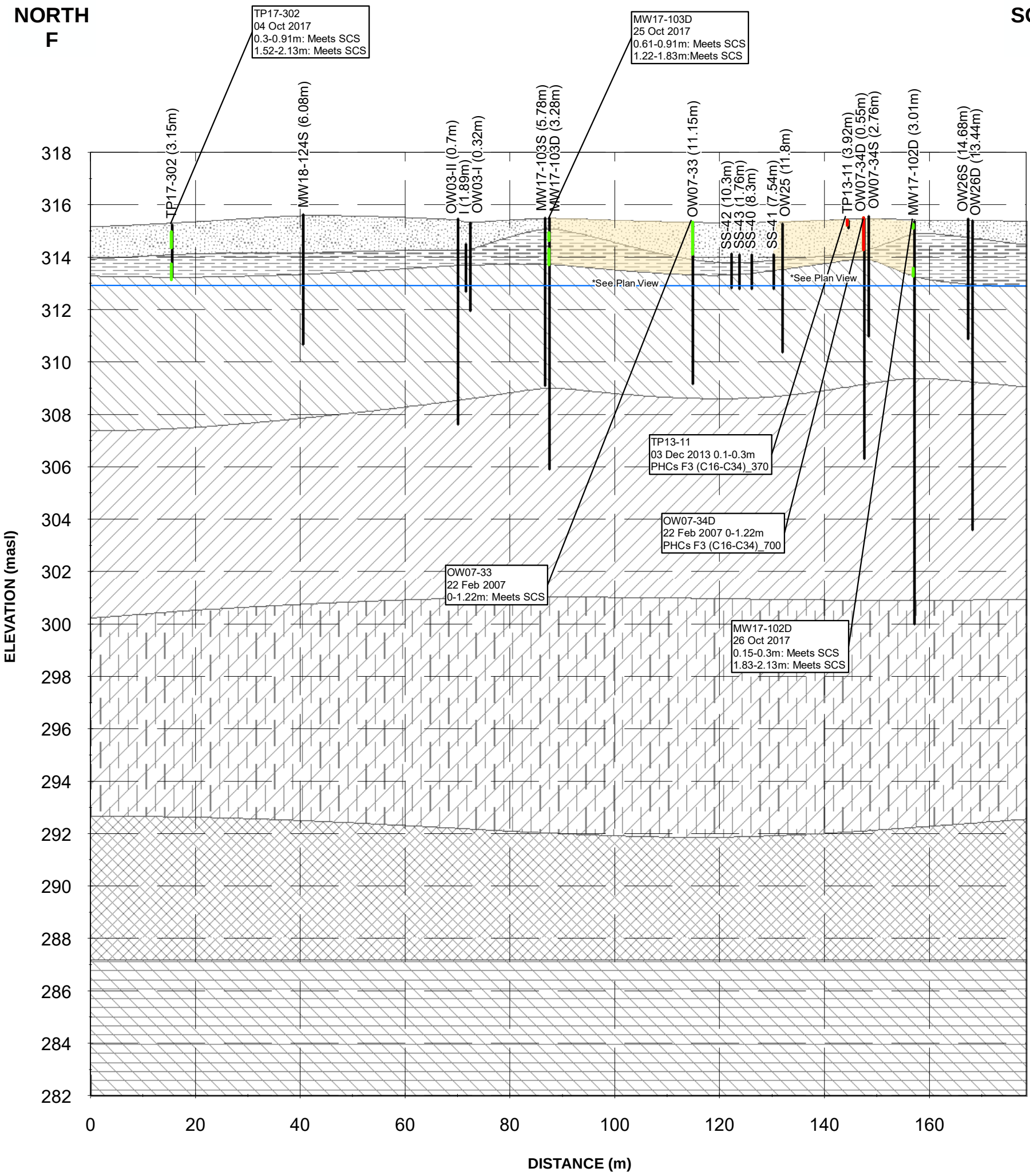


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-6c
Section E-E' - Soil Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-6d
Section F-F' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\CROSSSECTIONF_SO_PHC.MXD SCYR 1/31/2019 5:29:09 PM

ch2m:

WEST
G

EAST
G'

BH07-40
08 Feb 2007 0.3-1.22m
PHCs F2 (C10-C16)_400
PHCs F3 (C16-C34)_23000

2.13-2.39m
PHCs F2 (C10-C16)_290
PHCs F3 (C16-C34)_14000

TP18-319 (1.68m)
OW17-(2.28m)
K (1.23m)
BH07-51 (6.53m)
MW17-109S (0.62m)
BH07-46 (7.21m)
OW22S-(5.59m)
OW22D (3.37m)
BH07-40 (5.44m)
BH13-40 (2.06m)
BH18-204 (4.81m)
OW13-39D (1.07m)
OW13-39S (0.2m)

*See Plan View

BH07-51
08 Feb 2007
0-1.22m: Meets SCS
1.22-2.06m: Meets SCS

BH13-40
12 Dec 2013
1.83-2.44m: Meets SCS

MW17-109S
16 Oct 2017
1.22-1.52m: Meets SCS

BH07-46
08 Feb 2007 1.22-1.68m
PHCs F2 (C10-C16)_3600
PHCs F3 (C16-C34)_6200

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-6e
Section G-G' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

TP17-301
04 Oct 2017 0.3-0.91m
2-(1-)Methylnaphthalene_2 (1.99)
Acenaphthylene_____0.38 (0.59)
Benzo(a)anthracene__0.92 (1.27)
Benzo(a)pyrene_____1.76 (2.52)
Benzo(b)fluoranthene__2.44 (3.03)
Benzo(k)fluoranthene__1.64 (1.96)
Dibenzo(a,h)anthracene_0.44 (0.66)
Fluoranthene_____0.89 (1.13)
Indeno(1,2,3-Cd)Pyrene_1.61 (2.47)

1.22-1.52m: Meets SCS

MW17-110S
16 Oct 2017 0-0.61m
2-(1-)Methylnaphthalene_3.59
Benzo(a)anthracene__0.97
Benzo(a)pyrene_____0.837
Benzo(b)fluoranthene1.03
Dibenzo(a,h)anthracene_0.185
Fluoranthene_____1.92
Indeno(1,2,3-Cd)Pyrene_0.648
Naphthalene_____1.04

1.22-1.83m: Meets SCS

TP18-319
05 Jul 2018
0.91-0.91m: Meets SCS
1.82-1.82m: Meets SCS

BH07-46
08 Feb 2007
0.05-1.22m: Meets SCS
1.22-1.68m: Meets SCS

ES-12
16 Jun 1999
0-2m: Meets SCS

TP13-05
02 Dec 2013
1.22-1.42m: Meets SCS

BH07-51
08 Feb 2007 1.22-2.06m
Naphthalene_____0.73

ES-11
16 Jun 1999
0-2m: Meets SCS

TP13-06
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-45
08 Feb 2007
1.22-1.78m: Meets SCS

LN2
22 Jan 1991
0.1-0.5m: Meets SCS

ES-17
23 Jun 1999
0-2m: Meets SCS

BH07-40
08 Feb 2007
0.3-1.22m: Meets SCS

TP13-08
03 Dec 2013 0.1-0.3m
2-(1-)Methylnaphthalene_(1.6)
Acenaphthylene_____0.48 (1)
Anthracene_____4.3 (10)
Benzo(a)anthracene__11 (22)
Benzo(a)pyrene_____8.9 (17)
Benzo(b&j)fluoranthene_12 (19)
Benzo(g,h,i)perylene__(7.8)
Benzo(k)fluoranthene__4.5 (7.3)
Chrysene_____9.1 (18)
Dibenzo(a,h)anthracene_1.5 (2.4)
Fluoranthene_____28 (58)
Indeno(1,2,3-Cd)Pyrene_5.9 (8.8)
Naphthalene_____0.72 (1.5)
Phenanthrene_____17 (48)

BH13-40
12 Dec 2013
1.83-2.44m: Meets SCS

BH07-52
08 Feb 2007
0-1.22m: Meets SCS

BH07-58
09 Feb 2007
0.05-0.61m: Meets SCS

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS
1.52-2.13m: Meets SCS

BH18-208
23 Jul 2018
0.76-1.37m: Meets SCS

ES-16
17 Jun 1999
0-2m: Meets SCS

ES-14
17 Jun 1999 0-2m
Acenaphthylene_____0.2

ES-15
17 Jun 1999
0-2m: Meets SCS

MW17-104D
17 Oct 2017
0.61-1.22m: Meets SCS

MW17-103D
25 Oct 2017 0.3-0.46m
Benzo(a)anthracene__0.661
Benzo(a)pyrene_____0.748
Benzo(b)fluoranthene0.902
Dibenzo(a,h)anthracene_0.15
Indeno(1,2,3-Cd)Pyrene_0.673

25 Oct 2017 1.22-1.83m
Benzo(a)pyrene_____0.307

BH07-59
09 Feb 2007
0.15-0.3m: Meets SCS

MW18-124S
31 Jul 2018
0.76-1.37m: Meets SCS
1.52-2.13m: Meets SCS

BH07-56
09 Feb 2007 0.05-0.91m
Benzo(a)pyrene_____0.35
Fluoranthene_____0.84

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS

MW17-108S
11 Oct 2017
0.61-1.22m: Meets SCS
3.05-3.2m: Meets SCS

BH07-53
08 Feb 2007
0-0.15m: Meets SCS
1.22-1.47m: Meets SCS

OW07-32
22 Feb 2007 0-1.07m
Benzo(a)anthracene__0.6
Benzo(a)pyrene_____0.54
Dibenzo(a,h)anthracene_0.12
Fluoranthene_____0.78
Indeno(1,2,3-Cd)Pyrene_0.46

BH07-69
09 Feb 2007
0.08-1.22m: Meets SCS

I
22 Jan 1991
0.5-0.5m: Meets SCS

TP13-04
02 Dec 2013
0.1-0.3m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

TP13-09
03 Dec 2013 0.3-0.5m
Benzo(a)anthracene__0.9
Benzo(a)pyrene_____0.95
Benzo(b&j)fluoranthene_1.3
Dibenzo(a,h)anthracene_0.15
Fluoranthene_____1.8
Indeno(1,2,3-Cd)Pyrene_0.68

BH07-71
09 Feb 2007
0.05-1.22m: Meets SCS

BH07-60
09 Feb 2007
0-0.15m: Meets SCS

TP13-03
02 Dec 2013
0.1-0.3m: Meets SCS

JS15
22 Jan 1991
0.3-0.7m: Meets SCS

BH07-55
08 Feb 2007
0.91-1.22m: Meets SCS

BH07-47
08 Feb 2007
1.22-1.8m: Meets SCS

BH07-41
08 Feb 2007 0-0.61m
Benzo(a)pyrene_____0.53
Benzo(b)fluoranthene0.9
Fluoranthene_____1.6
Indeno(1,2,3-Cd)Pyrene_0.57

TP17-300
04 Oct 2017 0.3-0.61m
2-(1-)Methylnaphthalene_4.47 (4.93)
Anthracene_____1.77 (2.04)
Benzo(a)anthracene__14.6 (16.2)
Benzo(a)pyrene_____14.3 (16.1)
Benzo(b)fluoranthene__9.26 (10.5)
Benzo(g,h,i)perylene__18.8 (20.1)
Benzo(k)fluoranthene__3.52 (3.71)
Chrysene_____22.2 (25.7)
Dibenzo(a,h)anthracene_11.9 (13.2)
Fluoranthene_____1.42 (1.61)
Indeno(1,2,3-Cd)Pyrene_6.48 (7.86)
Naphthalene_____2.46 (2.75)

0.91-1.22m: Meets SCS

TP13-01
02 Dec 2013
0.1-0.3m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

BH07-70
09 Feb 2007
0.05-1.22m: Meets SCS

BH07-66
09 Feb 2007
0.05-1.22m: Meets SCS

BH17-201
10 Oct 2017 0-0.61m
Fluoranthene_____0.836

0.61-0.91m: Meets SCS

TP13-10
03 Dec 2013
0.1-0.3m: Meets SCS

BH07-54
08 Feb 2007
1.22-2m: Meets SCS

BH07-49
09 Feb 2007
1.22-1.83m: Meets SCS

BH17-202
10 Oct 2017
0-0.61m: Meets SCS
1.22-1.83m: Meets SCS

MW17-101D
20 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.68m: Meets SCS

MW18-129D
23 Jul 2018
1.52-2.13m: Meets SCS

TP18-316
05 Jul 2018
0.3-0.6m: Meets SCS

BH07-68
09 Feb 2007 0-0.05m
Dibenzo(a,h)anthracene_0.31

TP18-318
06 Jul 2018
0.6-0.6m: Meets SCS

MW18-125S
31 Jul 2018
1.52-2.13m: Meets SCS

BH07-57
08 Feb 2007
0.05-1.22m: Meets SCS

MW17-105D
24 Oct 2017 0.15-0.46m
2-(1-)Methylnaphthalene_1.26
Benzo(a)anthracene__1.37
Benzo(a)pyrene_____1.21
Benzo(b)fluoranthene1.36
Benzo(k)fluoranthene1.07
Fluoranthene_____2.5
Indeno(1,2,3-Cd)Pyrene_1.04

1.22-1.83m: Meets SCS

BH17-200
10 Oct 2017
0.91-1.07m: Meets SCS
1.22-1.83m: Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

MW18-123D
27 Jun 2018
0.76-1.37m: Meets SCS

MW18-126D
31 Jul 2018
0-0.6m: Meets SCS

7
22 Jan 1991
0.4-0.9m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

BH07-65
09 Feb 2007
0.05-0.61m: Meets SCS

D
22 Jan 1991
0.1-0.8m: Meets SCS

TP17-303
04 Oct 2017
0.3-0.61m: Meets SCS
1.22-1.52m: Meets SCS

TP13-02
02 Dec 2013
1.22-1.42m: Meets SCS

BH07-64
08 Feb 2007 0.05-1.22m
Benzo(a)pyrene_____0.44

CW10
22 Jan 1991
0.6-0.9m: Meets SCS

MW18-122D
26 Jul 2018
0.76-1.37m: Meets SCS

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

MW17-102D
26 Oct 2017 0.15-1.22m
Anthracene_____0.69
Benzo(a)anthracene__1.9
Benzo(a)pyrene_____1.65
Benzo(b)fluoranthene1.74
Benzo(k)fluoranthene1.39
Dibenzo(a,h)anthracene_0.25
Fluoranthene_____4.27
Indeno(1,2,3-Cd)Pyrene_1.36

26 Oct 2017 1.83-2.13m
Benzo(a)pyrene_____0.356
Fluoranthene_____1.06

OW07-34D
22 Feb 2007 0-1.22m
Acenaphthene_____94
Anthracene_____160
Benzo(a)anthracene__200
Benzo(a)pyrene_____130
Benzo(b&j)fluoranthene190
Benzo(g,h,i)perylene70
Benzo(k)fluoranthene66
Chrysene_____180
Dibenzo(a,h)anthracene_26
Fluoranthene_____660
Fluorene_____150
Indeno(1,2,3-Cd)Pyrene_80
Naphthalene_____220
Phenanthrene_____900
Pyrene_____470

TP18-315
05 Jul 2018 0.6-0.6m
Benzo(a)anthracene__0.865
Benzo(a)pyrene_____0.749
Benzo(b)fluoranthene0.928
Dibenzo(a,h)anthracene_0.105
Fluoranthene_____1.43

05 Jul 2018 1.21-1.52m
Anthracene_____0.833
Benzo(a)anthracene__2.42
Benzo(a)pyrene_____1.98
Benzo(b)fluoranthene2.62
Benzo(k)fluoranthene0.864
Dibenzo(a,h)anthracene_0.266
Fluoranthene_____5.64
Indeno(1,2,3-Cd)Pyrene_1
Naphthalene_____0.672

TP13-11
03 Dec 2013 0.1-0.3m
2-(1-)Methylnaphthalene_2 (1.6)
Anthracene_____(0.89)
Acenaphthylene_____0.16
Benzo(a)anthracene__1.5 (1.9)
Benzo(a)pyrene_____1 (1.2)
Benzo(b&j)fluoranthene_1.7 (1.9)
Dibenzo(a,h)anthracene_0.16 (0.19)
Fluoranthene_____3.7 (4.9)
Indeno(1,2,3-Cd)Pyrene_0.53 (0.58)
Naphthalene_____1.2 (1.1)

TP17-306
04 Oct 2017 0.91-1.22m
Benzo(a)anthracene__1
Benzo(a)pyrene_____1.33
Benzo(b)fluoranthene1.85
Dibenzo(a,h)anthracene_0.236
Fluoranthene_____1.19
Indeno(1,2,3-Cd)Pyrene_0.769

04 Oct 2017 1.52-1.83m
Anthracene_____0.887
Benzo(a)anthracene__2.19
Benzo(a)pyrene_____1.99
Benzo(b)fluoranthene2.38
Benzo(k)fluoranthene1.16
Dibenzo(a,h)anthracene_0.399
Fluoranthene_____4.18
Indeno(1,2,3-Cd)Pyrene_1.4

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
2-(1-)Methylnaphthalene	0.99µg/g	4.93µg/g	TP17-300
Acenaphthene	7.9µg/g	94µg/g	OW07-34D
Acenaphthylene	0.15µg/g	1µg/g	TP13-08
Anthracene	0.67µg/g	160µg/g	OW07-34D
Benzo(a)anthracene	0.5µg/g	200µg/g	OW07-34D
Benzo(a)pyrene	0.3µg/g	130µg/g	OW07-34D
Benzo(b&j)fluoranthene	0.78µg/g	190µg/g	OW07-34D
Benzo(g,h,i)perylene	6.6µg/g	70µg/g	OW07-34D
Benzo(k)fluoranthene	0.78µg/g	66µg/g	OW07-34D
Chrysene	7µg/g	180µg/g	OW07-34D
Dibenzo(a,h)anthracene	0.1µg/g	26µg/g	OW07-34D
Fluoranthene	0.69µg/g	660µg/g	OW07-34D
Fluorene	62µg/g	150µg/g	OW07-34D
Indeno(1,2,3-Cd)Pyrene	0.38µg/g	80µg/g	OW07-34D
Naphthalene	0.6µg/g	220µg/g	OW07-34D
Phenanthrene	6.2µg/g	900µg/g	OW07-34D
Pyrene	78µg/g	470µg/g	OW07-34D

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-7
Soil Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
A

EAST
A'

TP17-300 (3.65m)
BH07-67 (6.33m)
TP18-317 (17.86m)
BH07-66 (18.3m)
OW07-37 (0.94m)
MW18-116D (5.87m)
MW18-116S (5.89m)
OW07-32 (7.77m)
MW17-103D (5.64m)
MW17-103S (4.76m)
BH07-56 (7.03m)
MW17-100S (6.63m)
MW17-106S (18.02m)
MW17-106D (18.92m)
BH18-206 (14.15m)
MW17-101S (8.9m)
MW17-101D (7.11m)
TP13-08 (1.76m)
MW18-128D (1.17m)
OW23D (3.39m)
OW23S (0.71m)
OW13-39D (2.33m)
OW13-39S (0.99m)

BH07-66
09 Feb 2007
0.05-1.22m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

MW17-101D
20 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.68m: Meets SCS

*See Plan View

*See Plan View

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

BH07-56
09 Feb 2007 0.05-0.91m
Benzo(a)pyrene_____0.35
Fluoranthene_____0.84

OW07-32
22 Feb 2007 0-1.07m
Benzo(a)anthracene__0.6
Benzo(a)pyrene_____0.54
Dibenzo(a,h)anthracene_0.12
Fluoranthene_____0.78
Indeno(1,2,3-Cd)Pyrene_0.46

MW17-103D
25 Oct 2017 0.3-0.46m
Benzo(a)anthracene__0.661
Benzo(a)pyrene_____0.748
Benzo(b)fluoranthene0.902
Dibenzo(a,h)anthracene_0.15
Indeno(1,2,3-Cd)Pyrene_0.673

25 Oct 2017 1.22-1.83m
Benzo(a)pyrene_____0.307

TP17-300
04 Oct 2017 0.3-0.61m
2-(1-)Methylnaphthalene_4.47 (4.93)
Anthracene_____1.77 (2.04)
Benzo(a)anthracene__14.6 (16.2)
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Benzo(k)fluoranthene__3.52 (3.71)
Chrysene_____22.2 (25.7)
Dibenzo(a,h)anthracene_11.9 (13.2)
Fluoranthene_____1.42 (1.61)
Indeno(1,2,3-Cd)Pyrene_6.48 (7.86)
Naphthalene_____2.46 (2.75)

0.91-1.22m: Meets SCS

TP13-08
03 Dec 2013 0.1-0.3m
2-(1-)Methylnaphthalene_(1.6)
Acenaphthylene_____0.48 (1)
Anthracene_____4.3 (10)
Benzo(a)anthracene__11 (22)
Benzo(a)pyrene_____8.9 (17)
Benzo(b&j)fluoranthene_12 (19)
Benzo(g,h,i)perylene__(7.8)
Benzo(k)fluoranthene__4.5 (7.3)
Chrysene_____9.1 (18)
Dibenzo(a,h)anthracene_1.5 (2.4)
Fluoranthene_____28 (58)
Indeno(1,2,3-Cd)Pyrene_5.9 (8.8)
Naphthalene_____0.72 (1.5)
Phenanthrene_____17 (48)

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

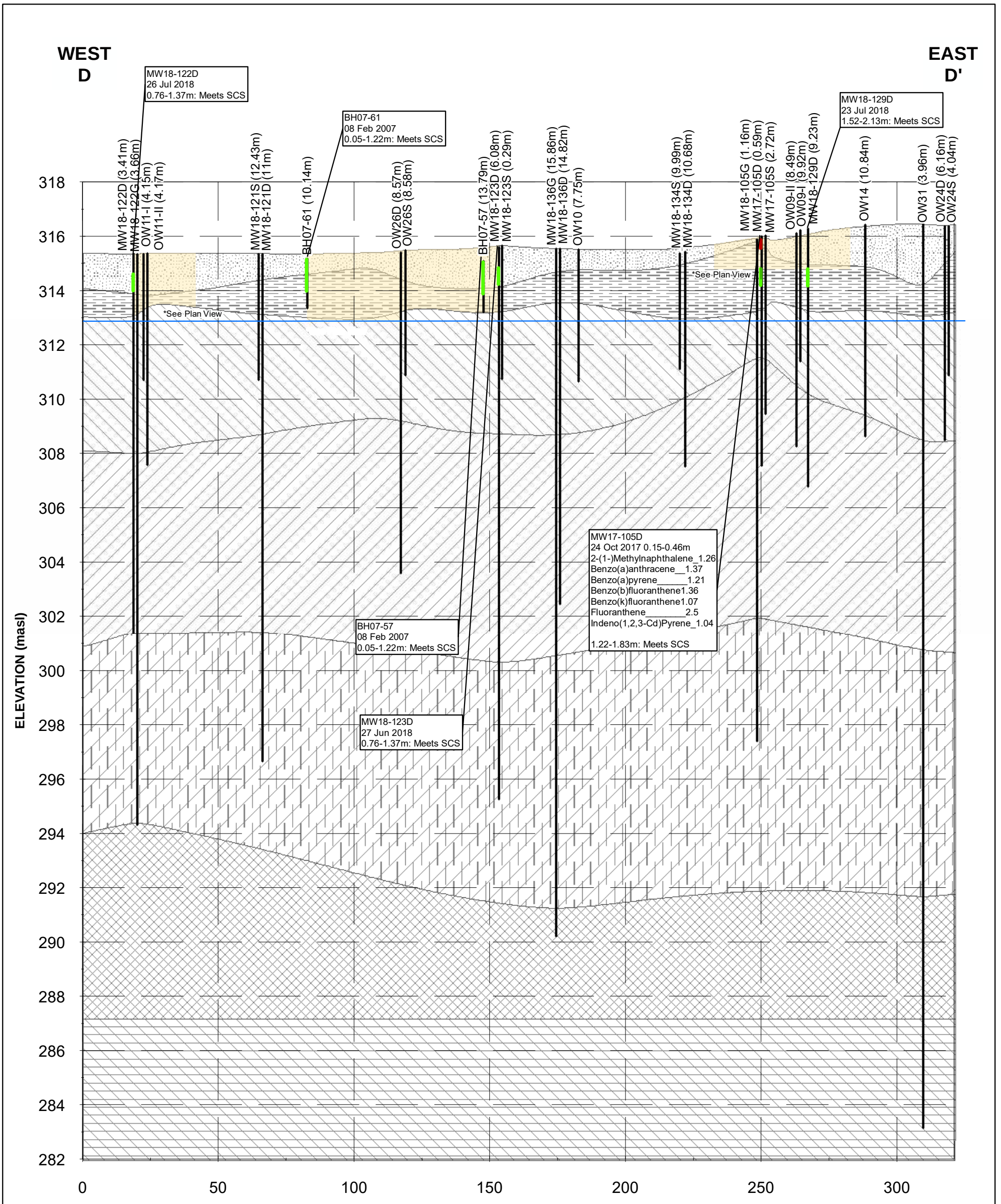
DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-7a
Section A-A' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

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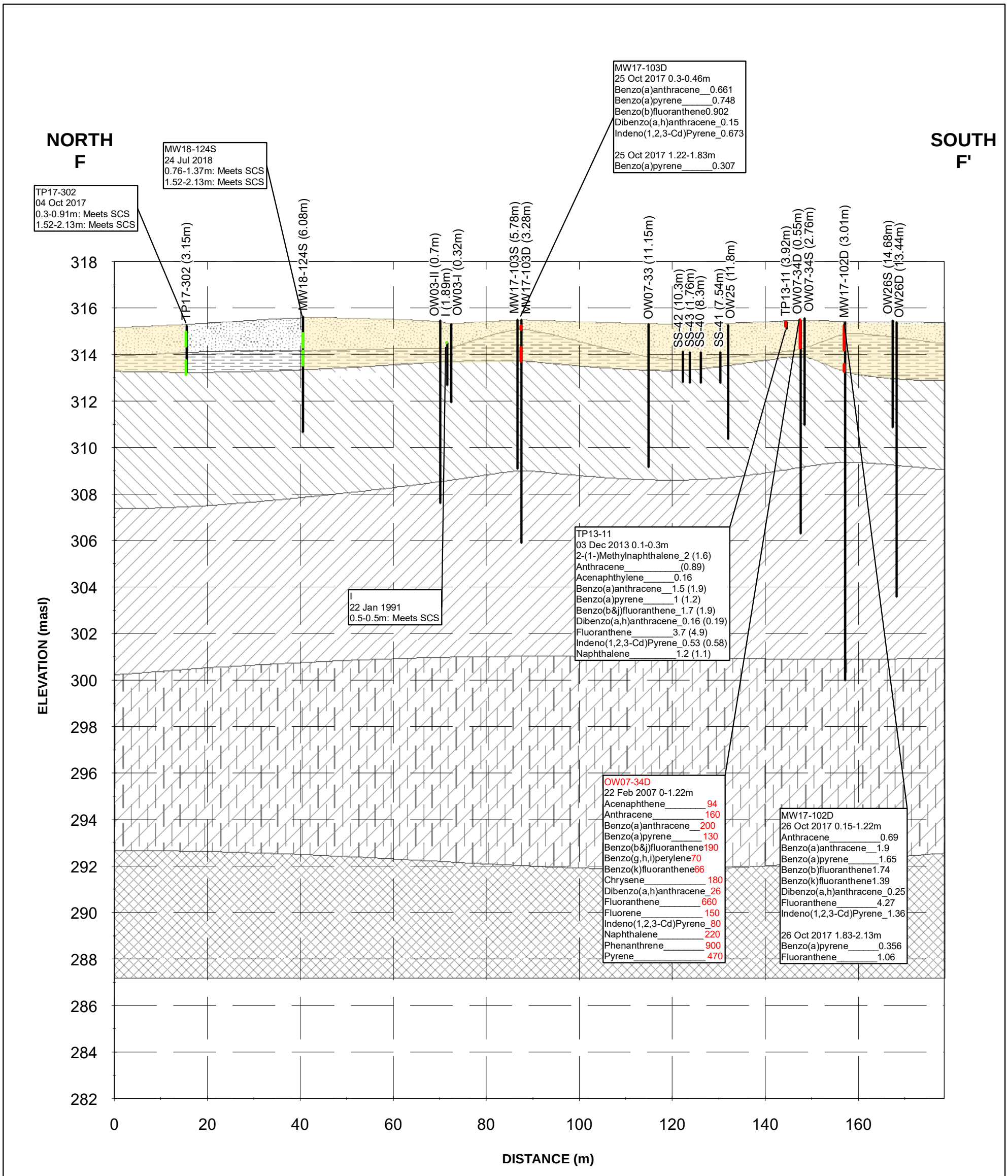
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-7b
Section D-D' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-7c
Section F-F' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Trichloroethylene	0.061µg/g	1µg/g	OW13-39S

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

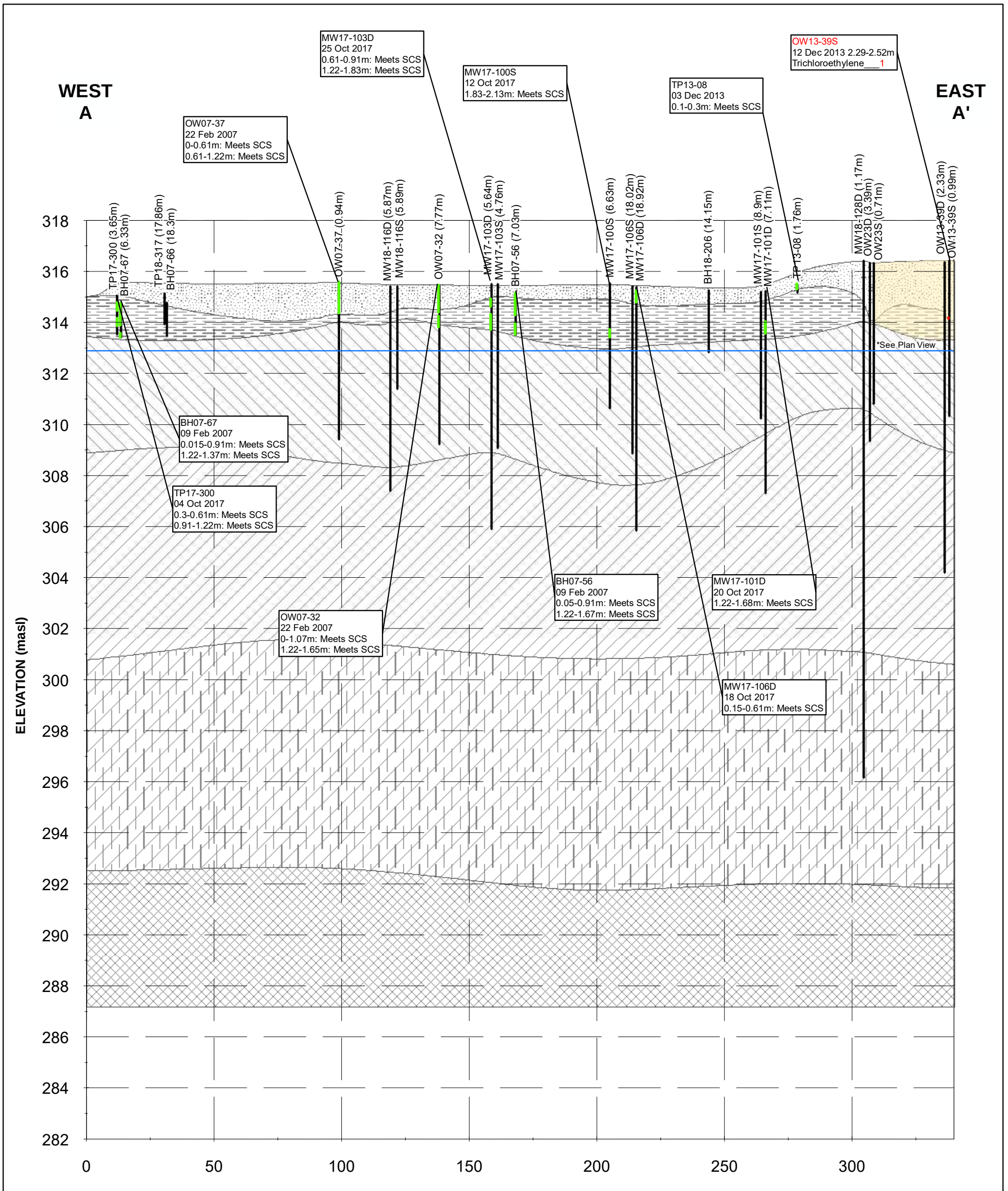
- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-8
Soil Exceedances - VOC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\SO_VOCS.MXD SCYR 2/1/2019 7:08:19 AM



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

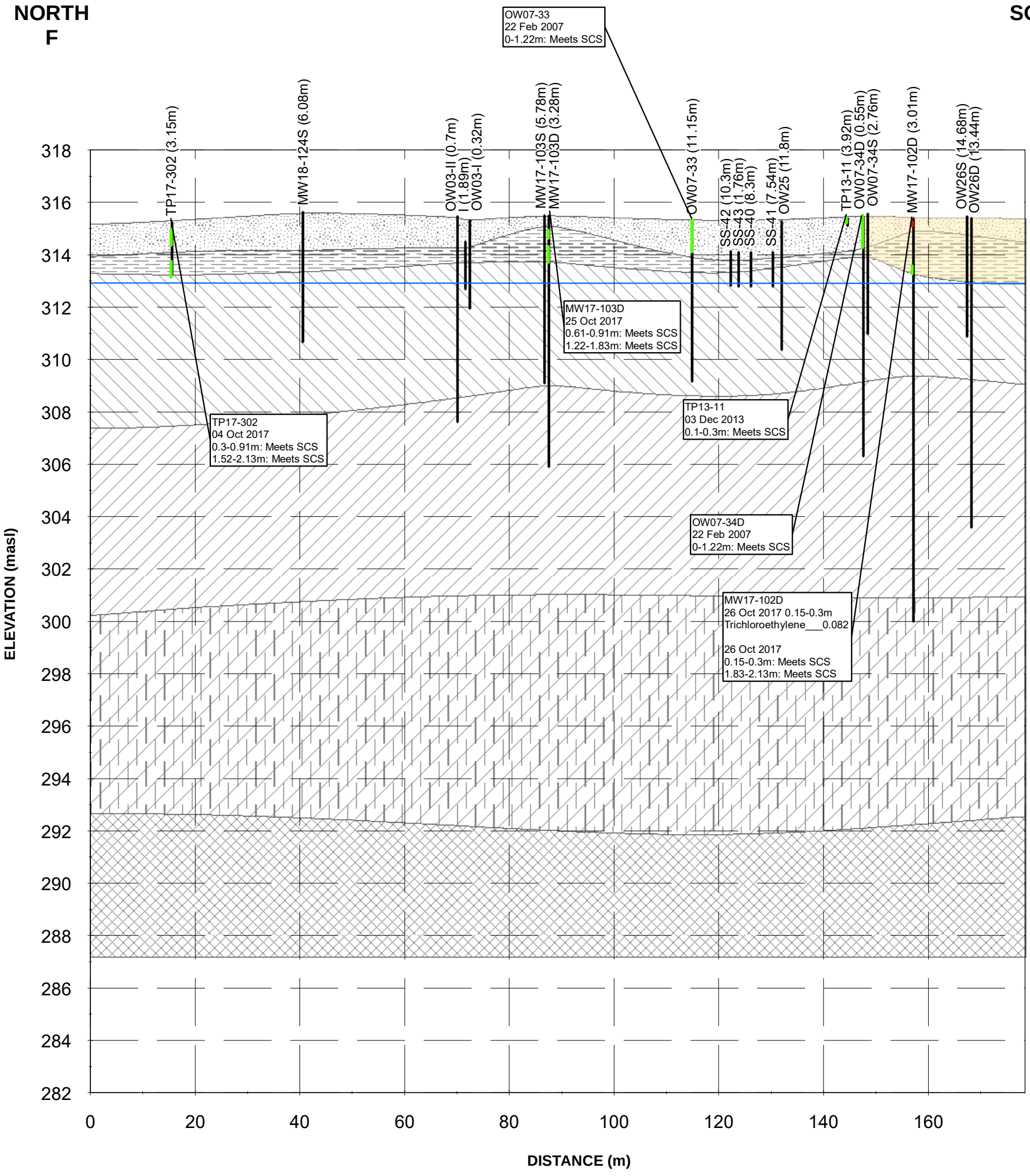
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-8a
Section A-A' - Soil Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
F

SOUTH
F'



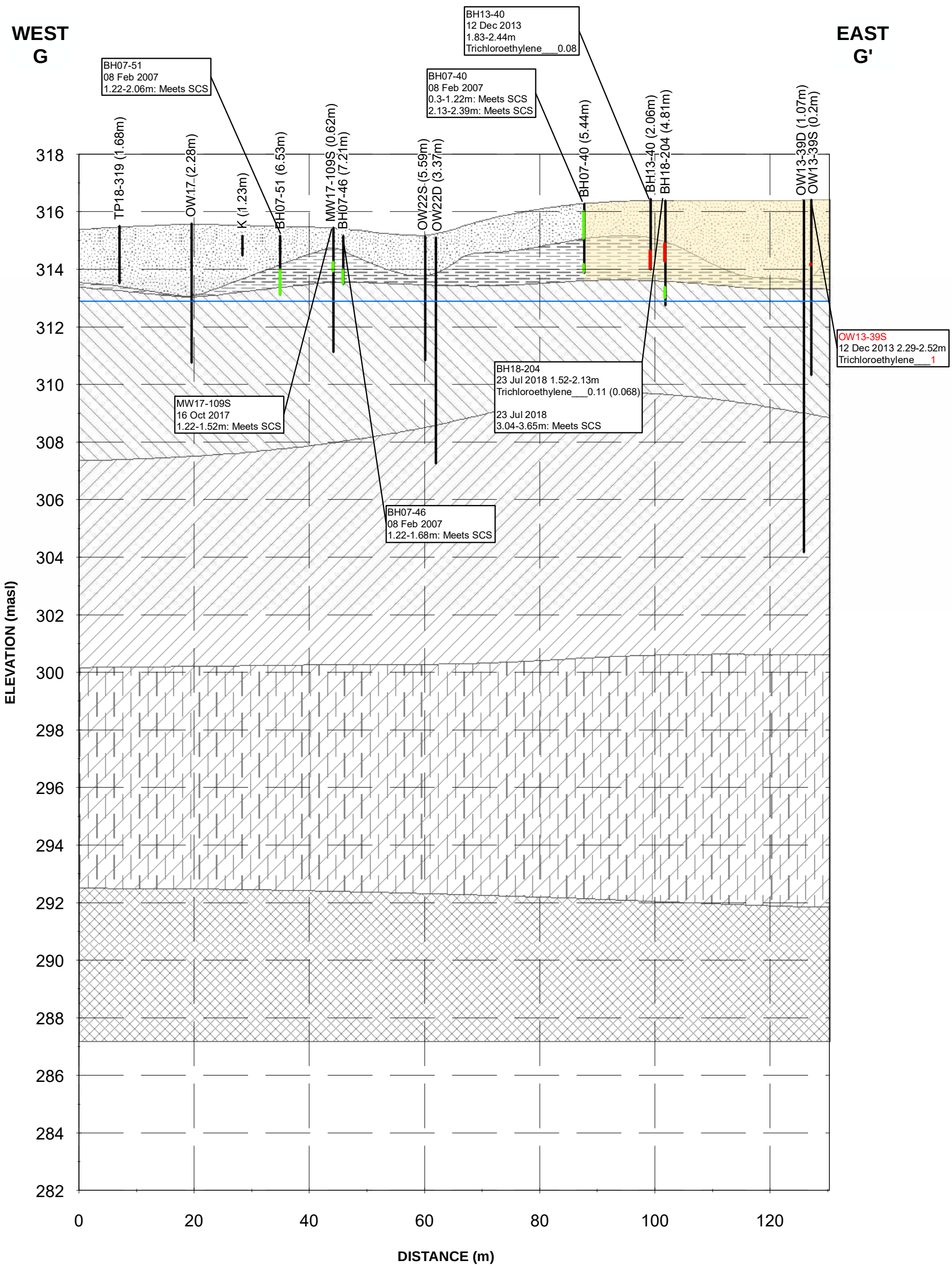
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-8b
Section F-F' - Soil Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill

Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-8c
Section G-G' - Soil Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

MW17-104D
17 Oct 2017
0.61-1.22m: Meets SCS

MW17-110S
16 Oct 2017
0-0.61m: Meets SCS

TP17-301
04 Oct 2017
0.3-0.91m: Meets SCS
1.22-1.52m: Meets SCS

BH17-200
10 Oct 2017
0.91-1.07m: Meets SCS
1.22-1.83m: Meets SCS

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS
0.91-1.22m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

MW17-108S
11 Oct 2017
0.61-1.22m: Meets SCS

MW17-105D
24 Oct 2017
0.15-0.46m: Meets SCS
1.22-1.83m: Meets SCS

MW17-101D
20 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.68m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS
1.22-1.83m: Meets SCS

MW17-102D
26 Oct 2017
0.15-1.22m: Meets SCS

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-9
Soil Exceedances - CP
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

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BH07-42
22 Feb 2007
0-0.61m: Meets SCS

BH07-45
08 Feb 2007
1.22-1.78m: Meets SCS

BH07-51
08 Feb 2007
0-1.22m: Meets SCS

KE13
22 Jan 1991
0.1-0.7m: Meets SCS

MW17-109S
16 Oct 2017
0-0.3m: Meets SCS

BH07-40
08 Feb 2007
0.3-1.22m: Meets SCS
2.13-2.39m: Meets SCS

12
22 Jan 1991
0.2-0.4m: Meets SCS

BH07-52
08 Feb 2007
0-1.22m: Meets SCS

BH07-46
08 Feb 2007
0.05-1.22m: Meets SCS
1.22-1.68m: Meets SCS

TP13-08
03 Dec 2013 0.1-0.3m
PCB, Total_____0.4

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS

TP18-316
05 Jul 2018
0-0.3m: Meets SCS
0.3-0.6m: Meets SCS

BH07-59
09 Feb 2007
0.15-0.3m: Meets SCS

TP13-04
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-41
08 Feb 2007
0-0.61m: Meets SCS

BH07-56
09 Feb 2007
0.05-0.91m: Meets SCS

TP13-01
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-58
09 Feb 2007
0.05-0.61m: Meets SCS

JS15 JSE25
22 Jan 1991
0.1-0.2m: Meets SCS

BH07-47
08 Feb 2007
1.22-1.8m: Meets SCS

MW17-101D
20 Oct 2017
0.15-0.46m: Meets SCS

TP13-03
02 Dec 2013
0.1-0.3m: Meets SCS

OW07-32
22 Feb 2007
0-1.07m: Meets SCS
1.22-1.65m: Meets SCS

BH07-49
09 Feb 2007
1.22-1.83m: Meets SCS

BH07-70
09 Feb 2007
0.05-1.22m: Meets SCS

SS-45
06 Jul 1999
1-1.3m: Meets SCS

C11
08 Feb 1991
0.34-0.4m: Meets SCS

SS-44
06 Jul 1999
1-1.3m: Meets SCS

BH07-68
09 Feb 2007
0-0.05m: Meets SCS
0.05-0.61m: Meets SCS

BH17-201
10 Oct 2017
0-0.3m: Meets SCS

BH07-57
08 Feb 2007
0.05-1.22m: Meets SCS

CS-58
22 Jul 1999
1-1.3m: Meets SCS

BH07-66
09 Feb 2007
0.05-1.22m: Meets SCS
1.22-1.32m: Meets SCS

EW8
22 Jan 1991
0.2-0.3m: Meets SCS

TP18-318
06 Jul 2018
0.6-0.6m: Meets SCS

SS-43
06 Jul 1999
1-1.3m: Meets SCS

MW18-125S
31 Jul 2018
0-0.6m: Meets SCS
1.52-2.13m: Meets SCS

BH07-67
09 Feb 2007 0.05-0.91m
PCB, Total_____1.5

1.22-1.37m: Meets SCS

BH07-65
09 Feb 2007
0.05-0.61m: Meets SCS
0.61-2.03m: Meets SCS

SS-41
06 Jul 1999 1-1.3m
PCB, Total_____0.54

TP17-306
04 Oct 2017 0.91-1.22m
PCB, Total_____0.945

ESW8
22 Jan 1991
0.4-0.4m: Meets SCS

MW17-111S
12 Oct 2017
0-0.3m: Meets SCS

SS-40
06 Jul 1999
1-1.3m: Meets SCS

CS-60
22 Jul 1999
1-1.3m: Meets SCS

TP17-300
04 Oct 2017 0-0.3m
PCB, Total_____1.28 (1.65)

0.3-0.61m: Meets SCS

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

MW18-126D
31 Jul 2018
1.52-2.13m: Meets SCS

BH07-50
08 Feb 2007
0.05-1m: Meets SCS
1.22-1.67m: Meets SCS

SS-42
06 Jul 1999
1-1.3m: Meets SCS

OW07-34D
22 Feb 2007
0-1.22m: Meets SCS
1.22-1.57m: Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
PCB, Total	0.35µg/g	1.65µg/g	TP17-300

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-10
Soil Exceedances - PCB
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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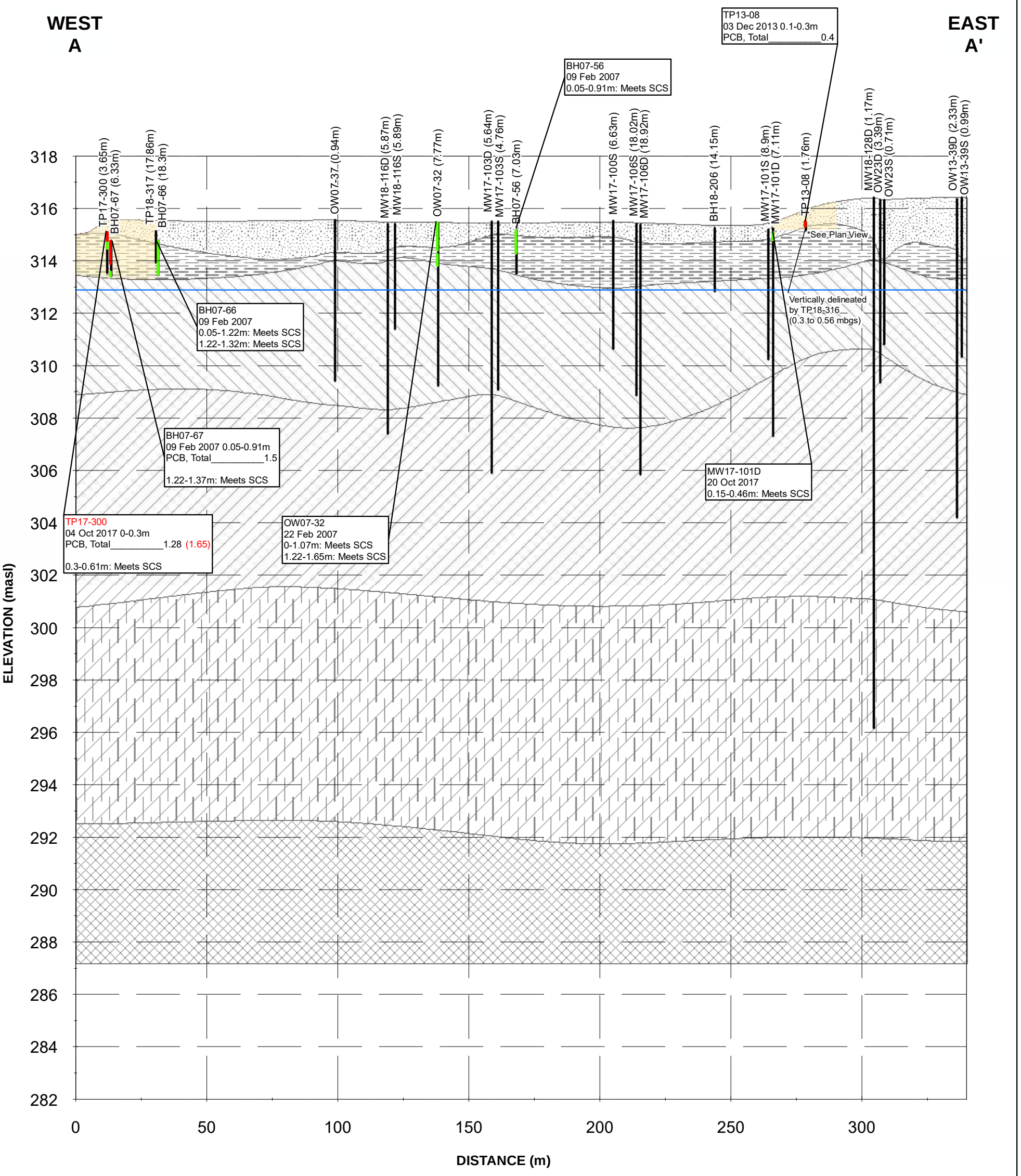


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

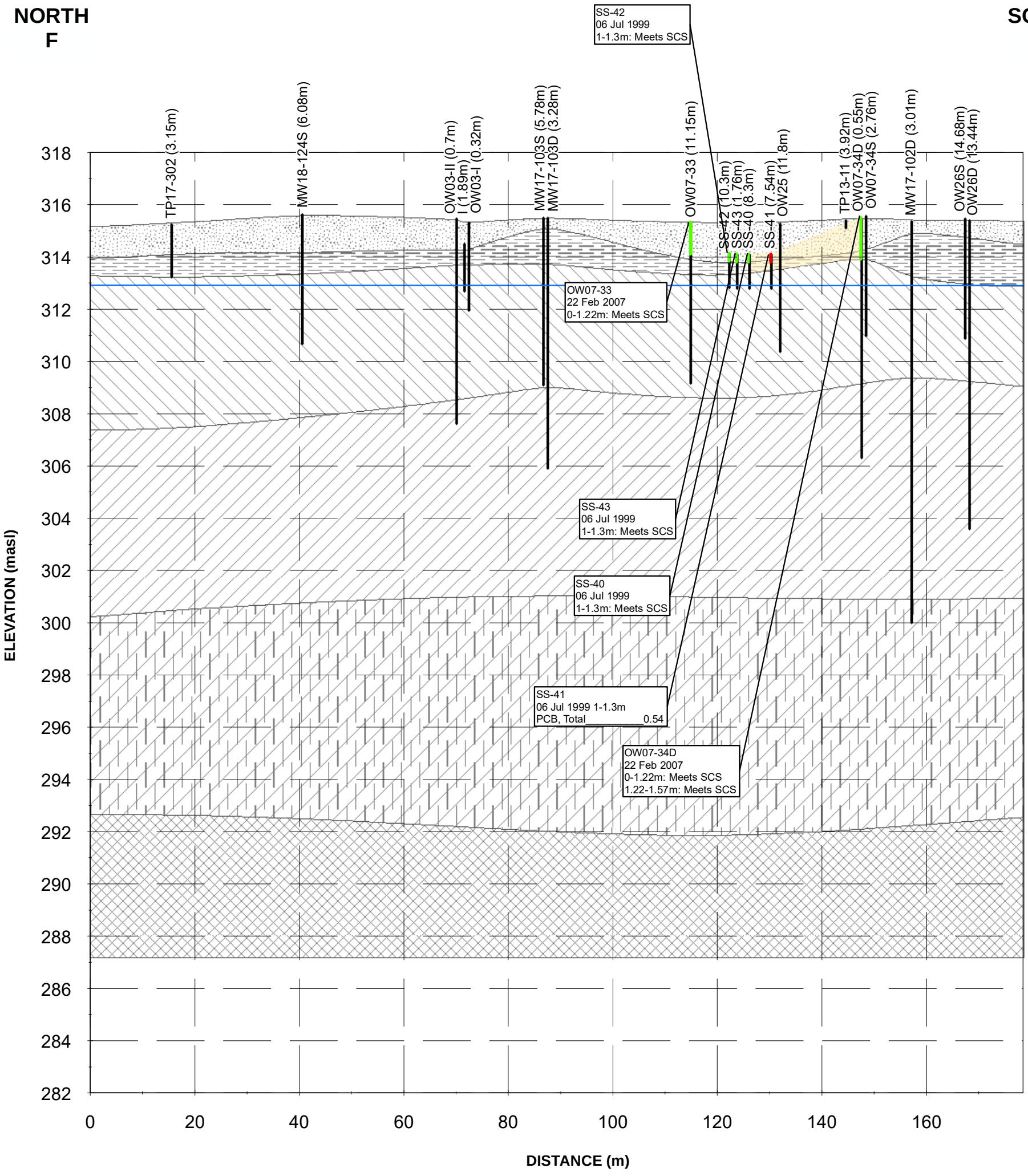
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-10a
Section A-A' - Soil Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
F

SOUTH
F'



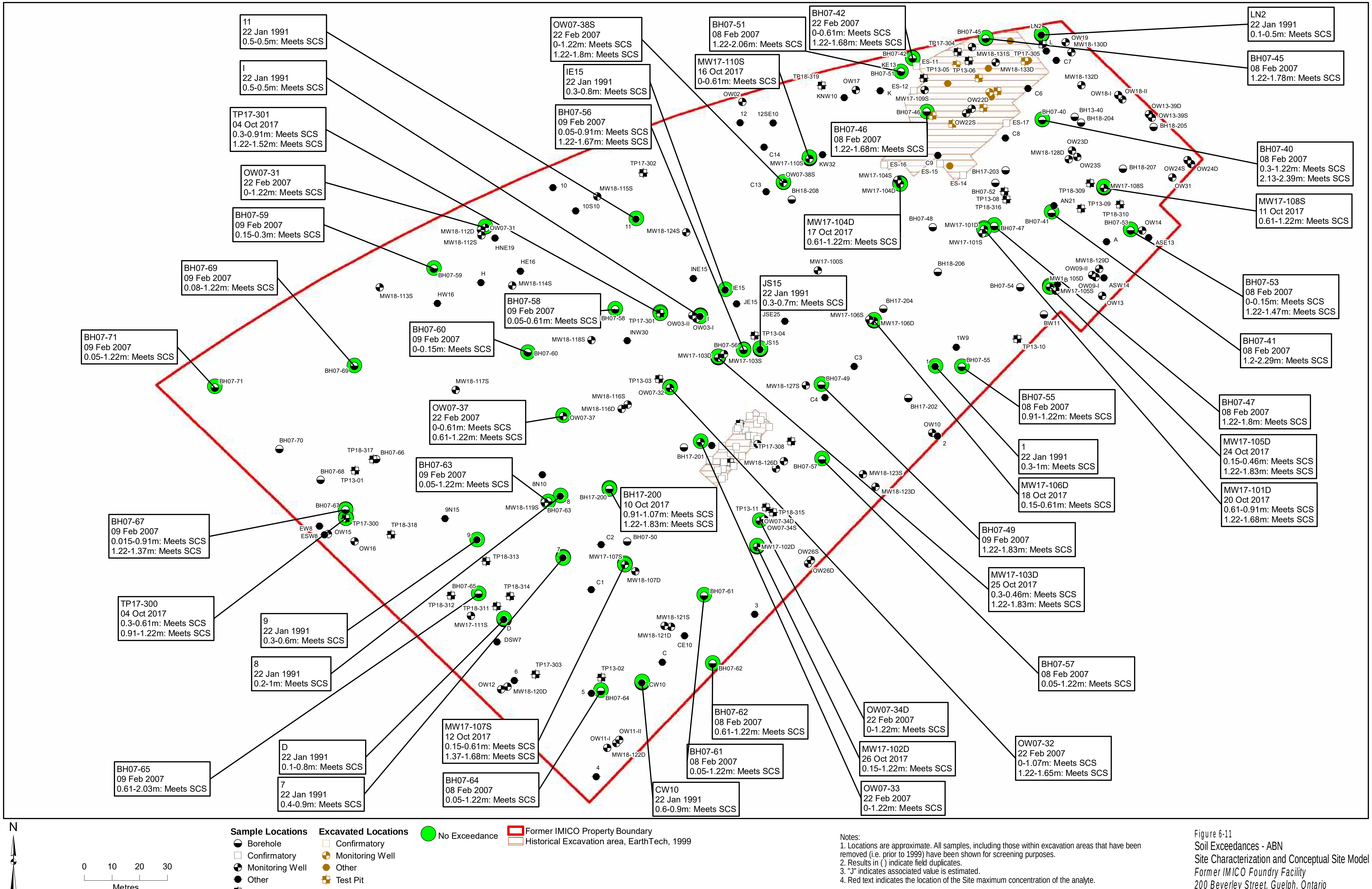
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-10b
Section F-F' - Soil Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

No Exceedance

Former IMICO Property Boundary

Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-11
Soil Exceedances - ABN
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m.

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OW22S
1.36-4.1m
24 Mar 2010
Zinc__2600

17 Jun 2011
Zinc__2900

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__3200

25 Oct 2013: Meets SCS

20 Oct 2014
Zinc__1000

19 Nov 2015
Zinc__1800

25 Oct 2016: Meets SCS

06 Sep 2017
Uranium__25.9

21 Mar 2018
Zinc__1740
Uranium: Meets SCS

13 Apr 2018
Zinc__1390
Uranium: Meets SCS

OW02
0.91-3.96m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
05 Sep 2017: Meets SCS

OW07-31
1.5-6.22m
29 Mar 2007: Meets SCS

05 Sep 2017
Arsenic__45.7

21 Mar 2018
Arsenic__33.9

MW18-112D
6.4-7.92m
02 Aug 2018
Arsenic__32.7

MW18-112G
22 Nov 2018
19.35-20.88m: Meets SCS

MW18-112S
3.42-4.95m
02 Aug 2018
Arsenic__42.5

MW18-113D
17 Dec 2018
18.29-19.81m: Meets SCS

MW18-113S
03 Aug 2018
3.37-4.9m: Meets SCS

MW18-114D
19.2-20.73m
10 Dec 2018
Antimony_____6.2

21 Dec 2018: Meets SCS

MW18-114S
02 Aug 2018
3.37-4.9m: Meets SCS

MW18-116S
03 Aug 2018
2.51-4.03m: Meets SCS

MW18-117S
02 Aug 2018
3.35-4.87m: Meets SCS

MW18-116D
03 Aug 2018
6.5-8.02m: Meets SCS

OW07-37
3.1-6.15m
29 Mar 2007
Zinc__1630

06 Sep 2017: Meets SCS

OW07-33
3.1-6.15m
29 Mar 2007: Meets SCS

31 Aug 2017
Lead__15

01 Sep 2017
Lead__15.6

20 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS

OW15
05 Sep 2017
1.75-4.8m: Meets SCS

OW16
1.82-4.87m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
05 Sep 2017: Meets SCS

OW12
1.76-4.81m
23 Mar 2010: Meets SCS

07 Oct 2010
Zinc__910

16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
05 Sep 2017: Meets SCS

OW23D
6.55-7.77m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

MW18-115D
12 Dec 2018
19.2-20.73m: Meets SCS

MW18-115S
02 Aug 2018
3.2-4.72m: Meets SCS

OW03-II
6.33-7.85m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

OW03-I
1.07-3.35m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

MW18-118S
02 Aug 2018
3.25-4.77m: Meets SCS

MW17-103S
02 Nov 2017
2.44-3.96m: Meets SCS

MW18-119S
03 Aug 2018
3.45-4.97m: Meets SCS

MW17-107S
01 Nov 2017
2.72-4.85m: Meets SCS

MW17-111S
02 Nov 2017
3.43-4.95m: Meets SCS

MW18-120D
30 Jul 2018
18.59-20.11m: Meets SCS

MW18-121S
03 Aug 2018
3.12-4.64m: Meets SCS

OW11-II
6.28-7.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS

01 Sep 2017
Cobalt__5.74 (5.79)

20 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS

OW11-I
1.6-4.65m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
01 Sep 2017: Meets SCS

OW22D
6.71-7.47m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

MW17-109S
02 Nov 2017
2.79-4.32m: Meets SCS

OW17
05 Sep 2017
1.79-4.84m: Meets SCS

OW07-38S
29 Mar 2007
1.79-4.84m: Meets SCS

OW07-38S
06 Sep 2017
1.79-4.84m: Meets SCS

MW17-110S
02 Nov 2017
3-4.52m: Meets SCS

MW17-104S
01 Nov 2017
1.22-3.66m: Meets SCS

MW17-104D
01 Nov 2017
6.1-7.62m: Meets SCS

OW23S
2.52-5.26m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Mar 2018: Meets SCS

MW17-100S
31 Oct 2017
3.38-4.9m: Meets SCS

MW17-106S
01 Nov 2017
3.05-4.57m: Meets SCS

OW07-32
3.17-6.22m
29 Mar 2007
Zinc__1290

06 Sep 2017
Zinc__1270

OW25
1.98-4.72m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
01 Sep 2017: Meets SCS

MW18-131S
3.2-4.72m
31 Jul 2018
Zinc__1160

MW18-130D
31 Jul 2018
6.4-7.92m: Meets SCS

MW18-133D
31 Jul 2018
17.17-18.69m: Meets SCS

MW18-135S
11 Dec 2018
9.75-11.28m: Meets SCS

MW17-101S
01 Nov 2017
1.22-4.27m: Meets SCS

MW17-101D
6.3-7.82m
01 Nov 2017
Arsenic__44.8

21 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS

MW17-105D
31 Oct 2017
6.93-8.46m: Meets SCS

MW17-105S
31 Oct 2017
3.2-4.72m: Meets SCS

OW09-II
6.33-7.85m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS

16 Jun 2011
Lead__16

20 Sep 2011
Lead__11

12 Dec 2012
Lead__17

24 Oct 2013: Meets SCS
22 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
30 Aug 2017: Meets SCS
20 Mar 2018: Meets SCS

13 Apr 2018
Lead__14.3

OW09-I
1.79-4.84m
24 Mar 2010: Meets SCS

07 Oct 2010
Zinc__1800

16 Jun 2011
Zinc__1500

19 Sep 2011
Zinc__2000

12 Dec 2012
Zinc__1900

24 Oct 2013
Zinc__2500

22 Oct 2014
Zinc__2600

18 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__2600

30 Aug 2017
Zinc__1180

OW07-34D
6.12-9.17m
29 Mar 2007: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
01 Sep 2017: Meets SCS

OW07-34S
1.55-4.6m
29 Mar 2007: Meets SCS
01 Sep 2017: Meets SCS

OW10
1.8-4.85m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

OW26S
3.08-4.6m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS

11 Dec 2012
Zinc__900

24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
31 Aug 2017: Meets SCS

OW26D
10.28-11.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
31 Aug 2017: Meets SCS

MW18-132D
31 Jul 2018
7.97-9.49m: Meets SCS

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW14
6.29-7.81m
23 Mar 2010
Zinc__1300

07 Oct 2010
Zinc__3700

16 Jun 2011
Zinc__2100

20 Sep 2011
Zinc__3200

30 Aug 2017
Zinc__1300

OW18-II
6.32-7.84m
23 Mar 2010
Zinc__960

17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2013
Zinc__910

24 Oct 2014: Meets SCS

25 Oct 2016
Zinc__1000

29 Aug 2017: Meets SCS

MW17-108S
31 Oct 2017
1.93-4.98m: Meets SCS

OW13
6.48-8m
24 Mar 2010
Zinc__1700

07 Oct 2010
Zinc__1900

16 Jun 2011
Zinc__1500

20 Sep 2011
Zinc__1900

12 Dec 2012: Meets SCS

30 Aug 2017
Zinc__1010

MW18-129D
30 Jul 2018
7.97-9.49m: Meets SCS

OW19
1.77-4.82m
23 Mar 2010
Zinc__4500

16 Jun 2011
Zinc__2600

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__1800

25 Oct 2013
Zinc__1900

22 Oct 2014
Zinc__2500

20 Nov 2015
Zinc__3700

25 Oct 2016
Zinc__2700

07 Sep 2017
Zinc__1360

OW24D
6.55-7.77m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
21 Oct 2014: Meets SCS

07 Sep 2017
Zinc__949

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS

20 Sep 2011
Zinc__1300

12 Dec 2012: Meets SCS

25 Oct 2013
Zinc__1100

21 Oct 2014
Zinc__1200

07 Sep 2017: Meets SCS

OW31
19 Sep 2016
28.9-33.32m: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010
Zinc__1300

16 Jun 2011
Zinc__1100

20 Sep 2011
Zinc__1300

12 Dec 2012
Zinc__1100

25 Oct 2013
Zinc__1100

24 Oct 2014
Zinc__900

20 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__1600

29 Aug 2017
Zinc__1720

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Arsenic	25µg/L	45.7µg/L	OW07-31
Lead	10µg/L	17µg/L	OW09-II
Zinc	890µg/L	4500µg/L	OW19

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

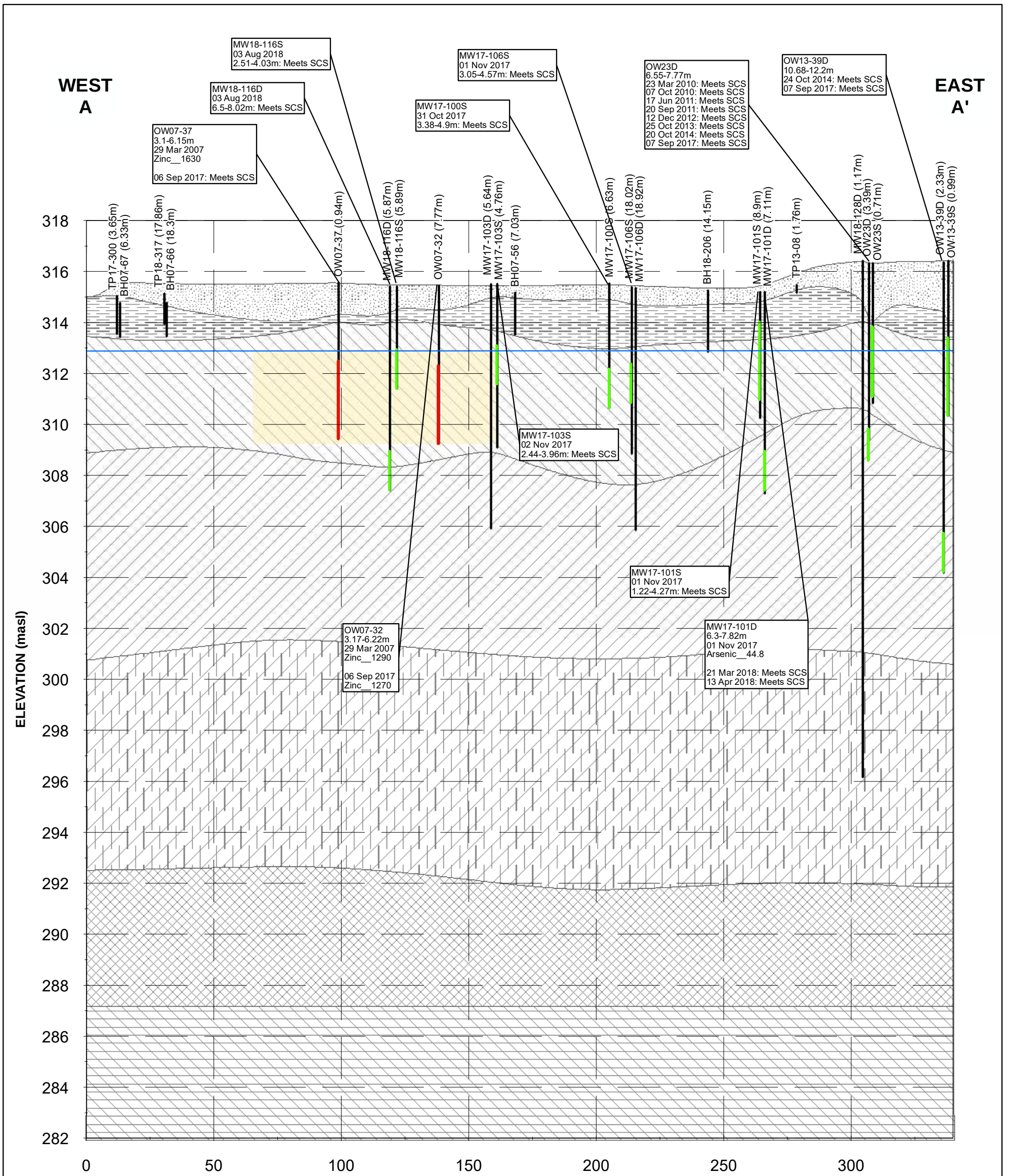
No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-12
Groundwater Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12a
Section A-A' - Groundwater Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
C

SOUTH
C'

MW18-132D
31 Jul 2018
7.97-9.49m: Meets SCS

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW19 (2.56m)
MW18-130D (1.69m)
MW18-132D (4.5m)
OW18-I (1.29m)
OW18-II (1.22m)
OW13-39D (3.52m)
OW13-39S (3.45m)
BH18-205 (1.9m)
OW24S (1.1m)
OW31 (7.37m)
OW24D (0.3m)

OW19
1.77-4.82m
23 Mar 2010
Zinc__4500

16 Jun 2011
Zinc__2600

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__1800

25 Oct 2013
Zinc__1900

22 Oct 2014
Zinc__2500

20 Nov 2015
Zinc__3700

25 Oct 2016
Zinc__2700

07 Sep 2017
Zinc__1360

OW24D
6.55-7.77m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
21 Oct 2014: Meets SCS

07 Sep 2017
Zinc__949

OW31
19 Sep 2016
28.9-33.32m: Meets SCS

MW18-130D
31 Jul 2018
6.4-7.92m: Meets SCS

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS

20 Sep 2011
Zinc__1300

12 Dec 2012: Meets SCS

25 Oct 2013
Zinc__1100

21 Oct 2014
Zinc__1200

07 Sep 2017: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010
Zinc__1300

16 Jun 2011
Zinc__1100

20 Sep 2011
Zinc__1300

12 Dec 2012
Zinc__1100

25 Oct 2013
Zinc__1100

24 Oct 2014
Zinc__900

20 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__1600

29 Aug 2017
Zinc__1720

OW18-II
6.32-7.84m
23 Mar 2010
Zinc__960

17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2013
Zinc__910

24 Oct 2014: Meets SCS

25 Oct 2016
Zinc__1000

29 Aug 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
77.14

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17c
Section C-C' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
C

SOUTH
C'

MW18-132D
31 Jul 2018
7.97-9.49m: Meets SCS

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW19 (2.56m)
MW18-130D (1.69m)
MW18-132D (4.5m)
OW18-I (1.29m)
OW18-II (1.22m)
OW13-39D (3.52m)
OW13-39S (3.45m)
BH18-205 (1.9m)
OW24S (1.1m)
OW31 (7.37m)
OW24D (0.3m)

OW19
1.77-4.82m
23 Mar 2010
Zinc__4500

16 Jun 2011
Zinc__2600

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__1800

25 Oct 2013
Zinc__1900

22 Oct 2014
Zinc__2500

20 Nov 2015
Zinc__3700

25 Oct 2016
Zinc__2700

07 Sep 2017
Zinc__1360

OW24D
6.55-7.77m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
21 Oct 2014: Meets SCS

07 Sep 2017
Zinc__949

OW31
19 Sep 2016
28.9-33.32m: Meets SCS

MW18-130D
31 Jul 2018
6.4-7.92m: Meets SCS

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS

20 Sep 2011
Zinc__1300

12 Dec 2012: Meets SCS

25 Oct 2013
Zinc__1100

21 Oct 2014
Zinc__1200

07 Sep 2017: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010
Zinc__1300

16 Jun 2011
Zinc__1100

20 Sep 2011
Zinc__1300

12 Dec 2012
Zinc__1100

25 Oct 2013
Zinc__1100

24 Oct 2014
Zinc__900

20 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__1600

29 Aug 2017
Zinc__1720

OW18-II
6.32-7.84m
23 Mar 2010
Zinc__960

17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2013
Zinc__910

24 Oct 2014: Meets SCS

25 Oct 2016
Zinc__1000

29 Aug 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
77.14

DISTANCE (m)

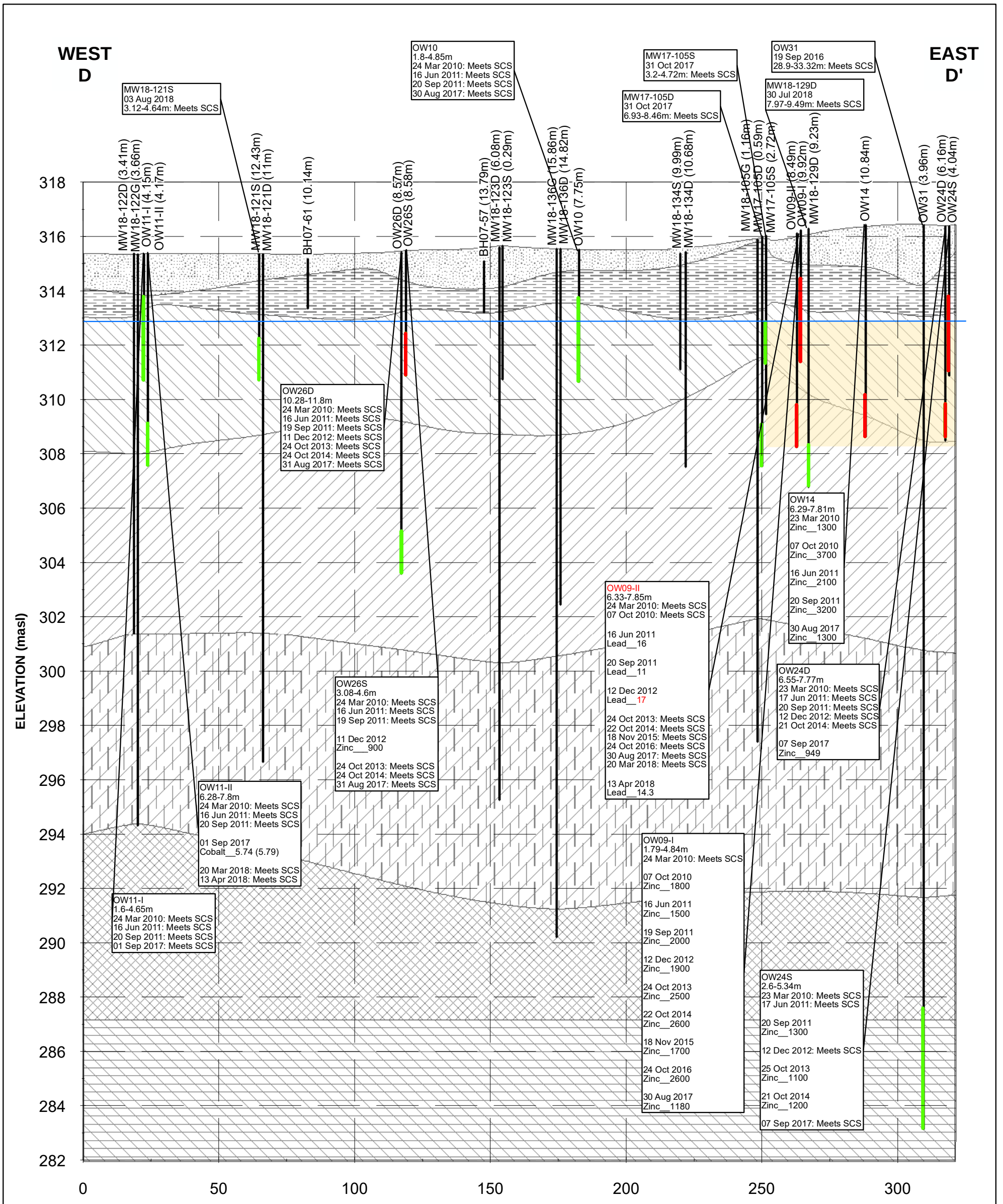
Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12b
Section C-C' - Groundwater Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

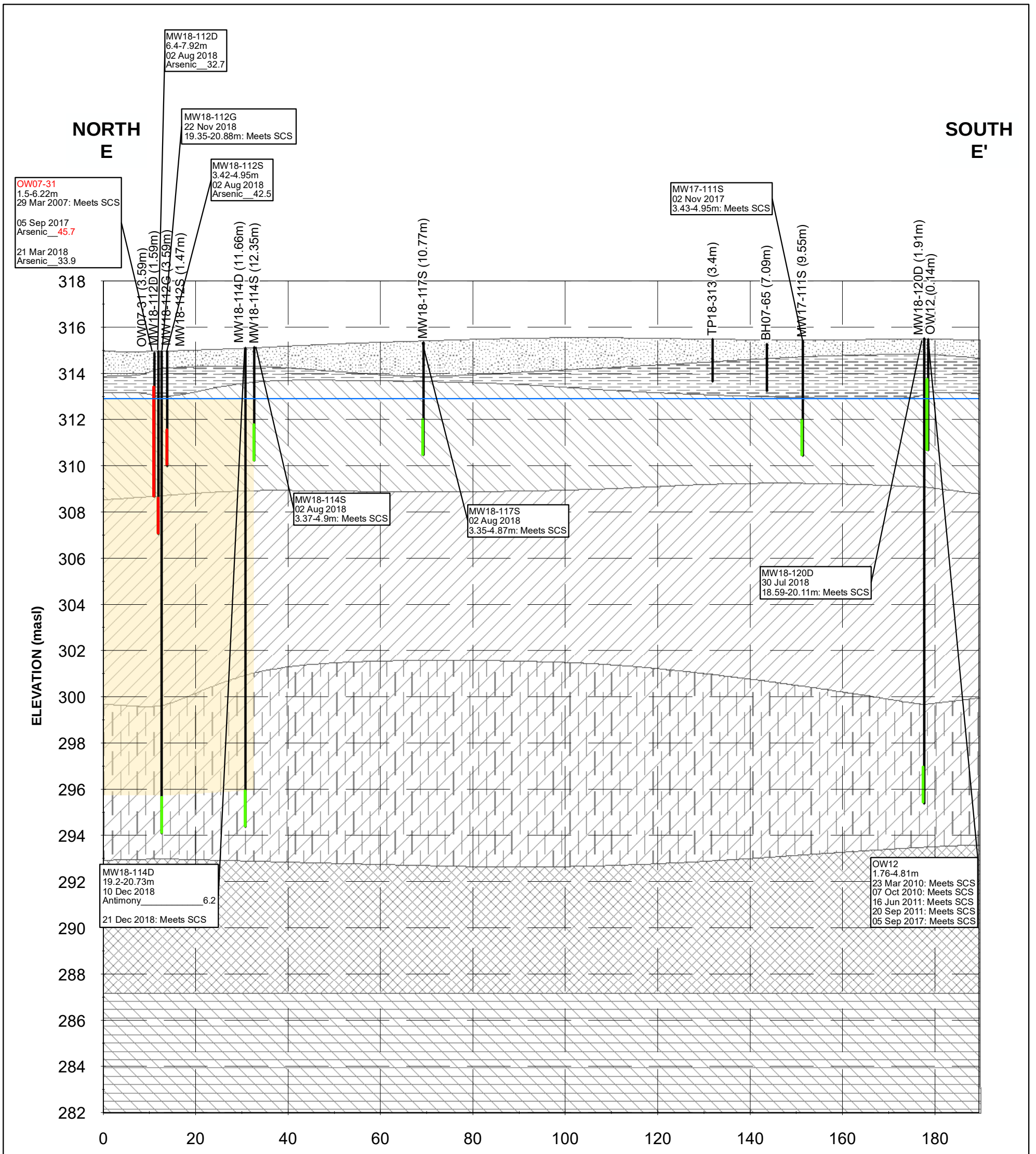


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12c
Section D-D' - Groundwater Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

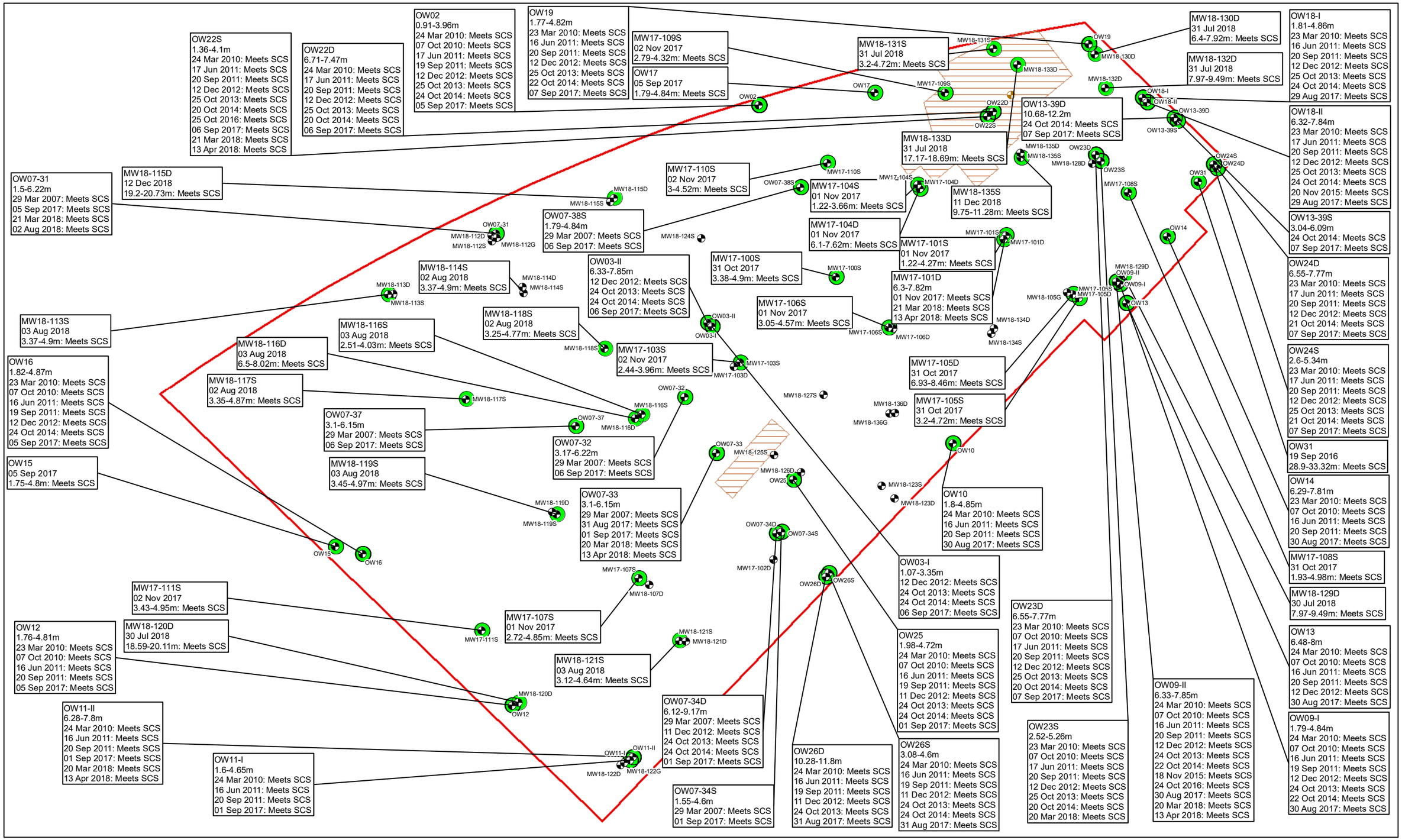


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12d
Section E-E' - Groundwater Exceedances - Metals
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



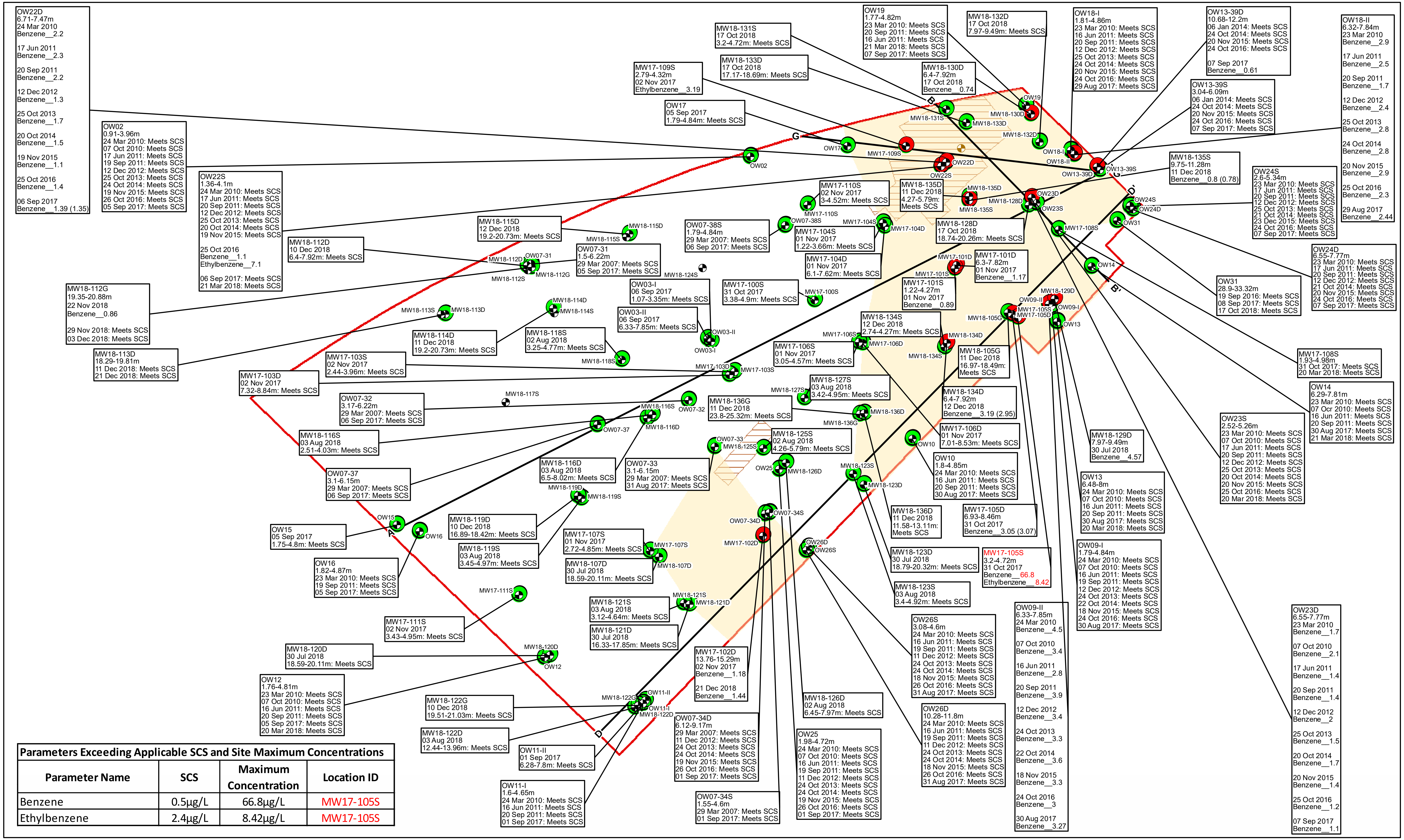
Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-13
Groundwater Exceedances - Inorganics
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

DRAFT

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_INORGANICS.MXD SCYR 2/1/2019 11:08:24 AM



Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Benzene	0.5µg/L	66.8µg/L	MW17-105S
Ethylbenzene	2.4µg/L	8.42µg/L	MW17-105S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

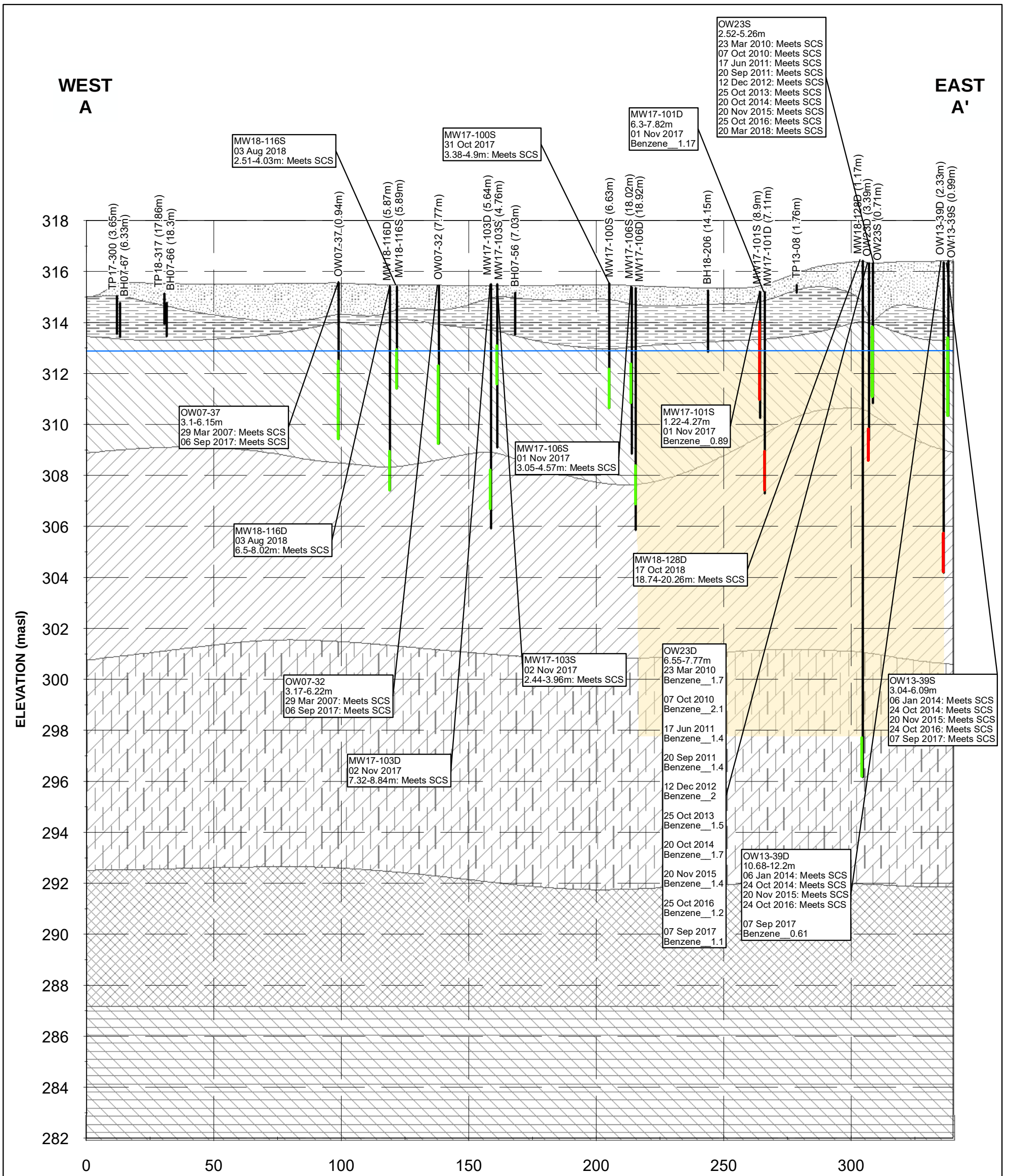
Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

DRAFT

Figure 6-14
Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFT\GW_BTEX.MXD SCYR 1/7/2019 1:19:24 PM



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-14a
Section A-A' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'

MW18-131S
17 Oct 2018
3.2-4.72m: Meets SCS

MW18-133D
17 Oct 2018
17.17-18.69m: Meets SCS

MW18-128D
17 Oct 2018
18.74-20.26m: Meets SCS

MW18-131S (1.68m)
MW18-133D (3.21m)
OW22S (16.51m)
OW22D (13.69m)
BH07-40 (0.71m)
OW23D (0.9m)
MW18-128D (1.91m)
OW23S (0.94m)
TP18-309 (1.77m)
MW17-108S (0.41m)
TP18-310 (0.52m)
BH07-53 (4.32m)
OW14 (0.74m)

OW23D
6.55-7.77m
23 Mar 2010
Benzene__1.7

07 Oct 2010
Benzene__2.1

17 Jun 2011
Benzene__1.4

20 Sep 2011
Benzene__1.4

12 Dec 2012
Benzene__2

25 Oct 2013
Benzene__1.5

20 Oct 2014
Benzene__1.7

20 Nov 2015
Benzene__1.4

25 Oct 2016
Benzene__1.2

07 Sep 2017
Benzene__1.1

OW22D
6.71-7.47m
24 Mar 2010
Benzene__2.2

17 Jun 2011
Benzene__2.3

20 Sep 2011
Benzene__2.2

12 Dec 2012
Benzene__1.3

25 Oct 2013
Benzene__1.7

20 Oct 2014
Benzene__1.5

19 Nov 2015
Benzene__1.1

25 Oct 2016
Benzene__1.4

06 Sep 2017
Benzene__1.39 (1.35)

OW22S
1.36-4.1m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS

25 Oct 2016
Benzene__1.1
Ethylbenzene__7.1

06 Sep 2017: Meets SCS
21 Mar 2018: Meets SCS

MW17-108S
1.93-4.98m
31 Oct 2017: Meets SCS
20 Mar 2018: Meets SCS

OW23S
2.52-5.26m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
20 Mar 2018: Meets SCS

OW14
6.29-7.81m
23 Mar 2010: Meets SCS
07 Ocr 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS
21 Mar 2018: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100

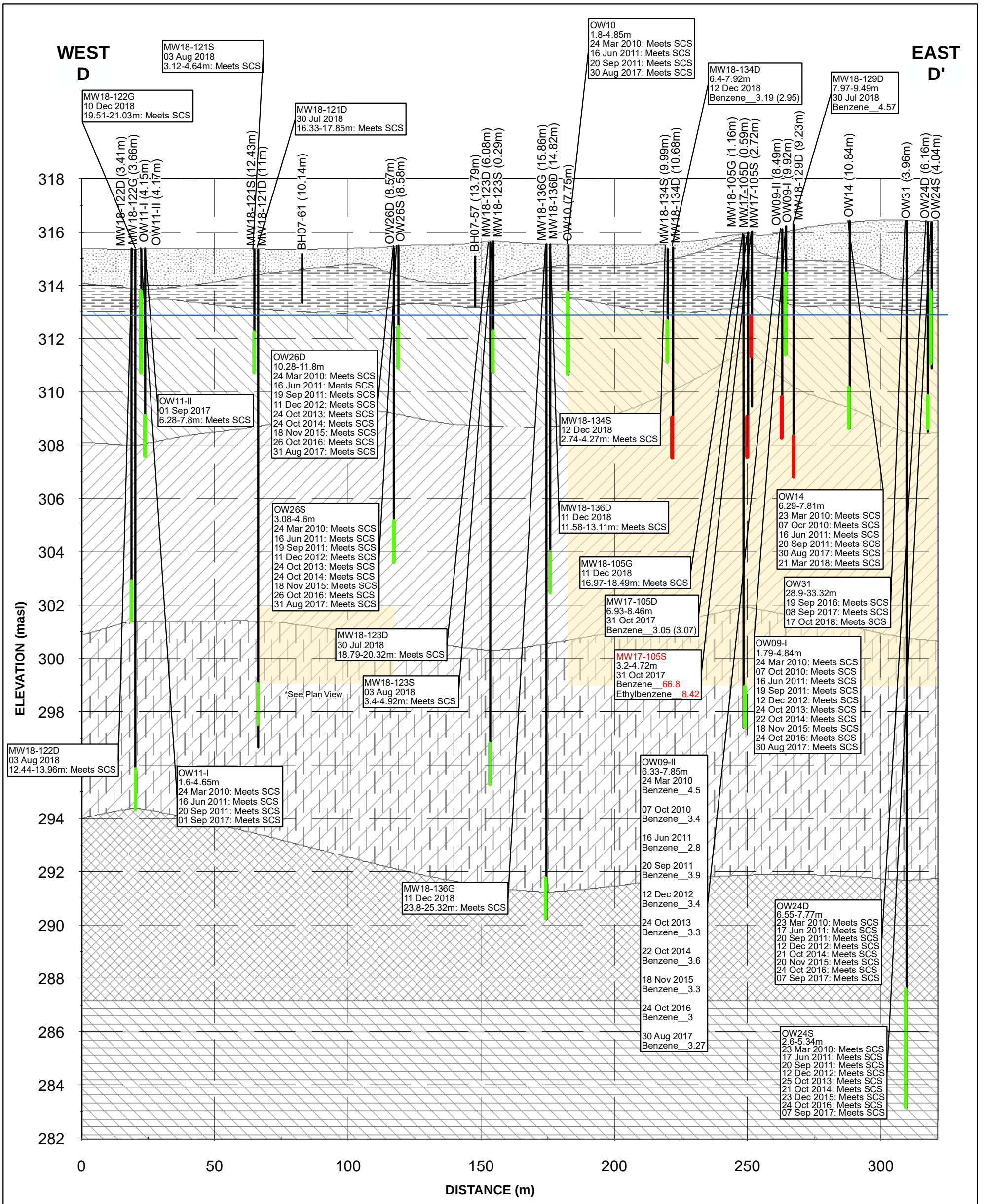
DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-14b
Section B-B' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.*See Plan View. Vertical delineation is based on extent of horizontal delineation along section location.

Figure 6-14c
Section D-D' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

WEST
G

EAST
G'

OW17
05 Sep 2017
1.79-4.84m: Meets SCS

TP18-319 (1.68m)
OW17 (2.28m)
K (1.23m)
BH07-51 (6.53m)
MW17-109S (0.62m)
BH07-46 (7.21m)
OW22S (5.59m)
OW22D (3.37m)
BH07-40 (5.44m)
BH13-40 (2.06m)
BH18-204 (4.81m)
OW13-39D (1.07m)
OW13-39S (0.2m)

MW17-109S
2.79-4.32m
02 Nov 2017
Ethylbenzene__3.19

OW22D
6.71-7.47m
24 Mar 2010
Benzene__2.2

17 Jun 2011
Benzene__2.3

20 Sep 2011
Benzene__2.2

12 Dec 2012
Benzene__1.3

25 Oct 2013
Benzene__1.7

20 Oct 2014
Benzene__1.5

19 Nov 2015
Benzene__1.1

25 Oct 2016
Benzene__1.4

06 Sep 2017
Benzene__1.39 (1.35)

OW13-39D
10.68-12.2m
06 Jan 2014: Meets SCS
24 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS

07 Sep 2017
Benzene__0.61

OW13-39D vertically delineated
by MW18-128D.
See BTEX cross-section A-A'

OW22S
1.36-4.1m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS

25 Oct 2016
Benzene__1.1
Ethylbenzene__7.1

06 Sep 2017: Meets SCS
21 Mar 2018: Meets SCS

OW13-39S
3.04-6.09m
06 Jan 2014: Meets SCS
24 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
07 Sep 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120

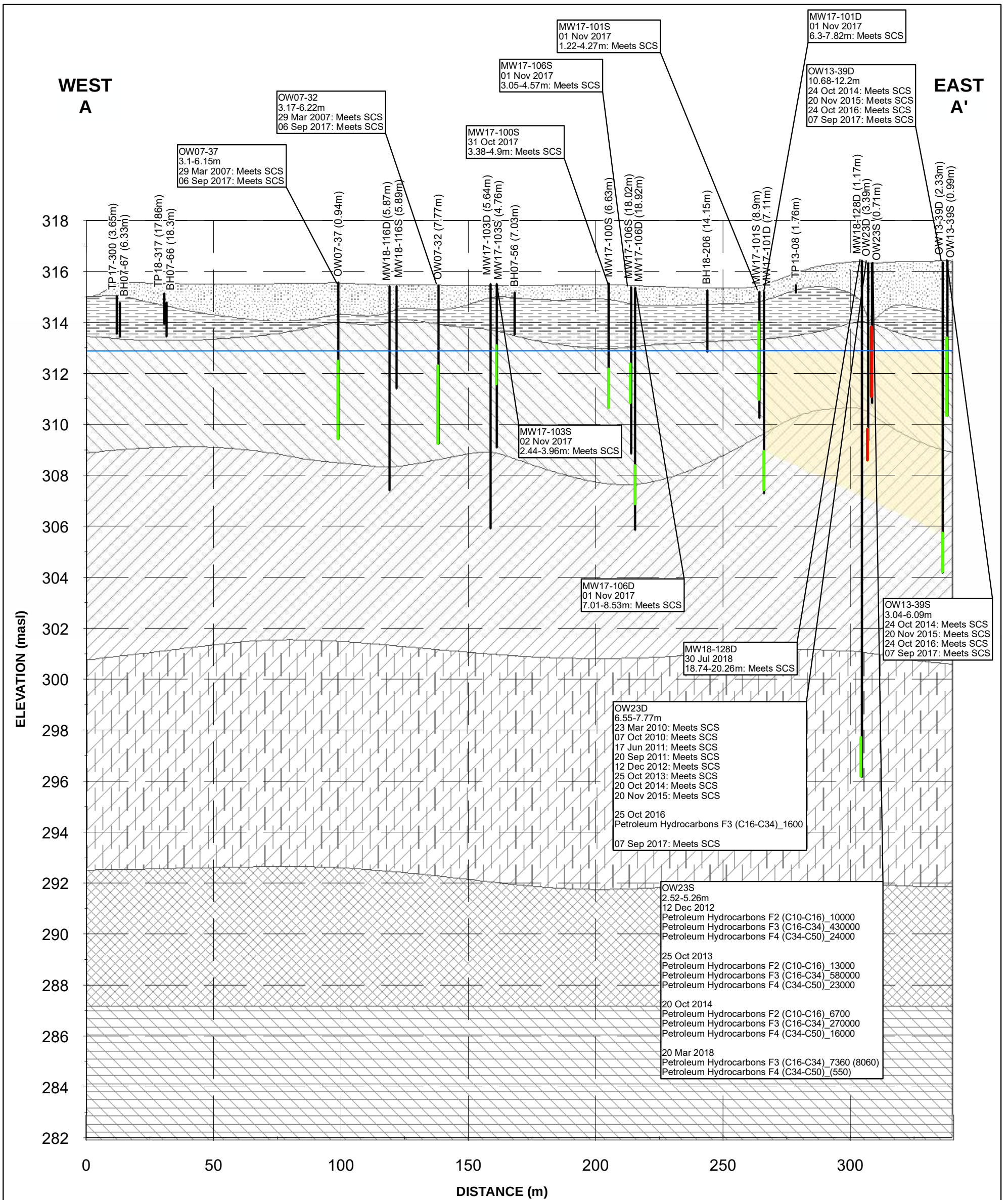
DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-14d
Section G-G' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15a
Section A-A' - Groundwater Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'

MW18-128D
30 Jul 2018
18.74-20.26m: Meets SCS

MW18-131S
31 Jul 2018
3.2-4.72m: Meets SCS

OW14
6.29-7.81m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

OW22D
6.71-7.47m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
06 Sep 2017: Meets SCS

MW17-108S
1.93-4.98m
31 Oct 2017: Meets SCS
20 Mar 2018: Meets SCS

OW23D
6.55-7.77m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2016
Petroleum Hydrocarbons F3 (C16-C34)_1600

07 Sep 2017: Meets SCS

OW23S
2.52-5.26m
12 Dec 2012
Petroleum Hydrocarbons F2 (C10-C16)_10000
Petroleum Hydrocarbons F3 (C16-C34)_430000
Petroleum Hydrocarbons F4 (C34-C50)_24000

25 Oct 2013
Petroleum Hydrocarbons F2 (C10-C16)_13000
Petroleum Hydrocarbons F3 (C16-C34)_580000
Petroleum Hydrocarbons F4 (C34-C50)_23000

20 Oct 2014
Petroleum Hydrocarbons F2 (C10-C16)_6700
Petroleum Hydrocarbons F3 (C16-C34)_270000
Petroleum Hydrocarbons F4 (C34-C50)_16000

20 Mar 2018
Petroleum Hydrocarbons F3 (C16-C34)_7360 (8060)
Petroleum Hydrocarbons F4 (C34-C50)_(550)

OW22S
1.36-4.1m
12 Dec 2012
Petroleum Hydrocarbons F2 (C10-C16)_830
Petroleum Hydrocarbons F3 (C16-C34)_7800

25 Oct 2013
Petroleum Hydrocarbons F2 (C10-C16)_630
Petroleum Hydrocarbons F3 (C16-C34)_6000

20 Oct 2014
Petroleum Hydrocarbons F2 (C10-C16)_1400
Petroleum Hydrocarbons F3 (C16-C34)_13000
Petroleum Hydrocarbons F4 (C34-C50)_810

19 Nov 2015
Petroleum Hydrocarbons F2 (C10-C16)_5600
Petroleum Hydrocarbons F3 (C16-C34)_39000
Petroleum Hydrocarbons F4 (C34-C50)_2200

25 Oct 2016
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_530
Petroleum Hydrocarbons F1 (C6-C10)_550
Petroleum Hydrocarbons F2 (C10-C16)_210000
Petroleum Hydrocarbons F3 (C16-C34)_850000
Petroleum Hydrocarbons F4 (C34-C50)_37000

06 Sep 2017
Petroleum Hydrocarbons F2 (C10-C16)_6170
Petroleum Hydrocarbons F3 (C16-C34)_57500
Petroleum Hydrocarbons F4 (C34-C50)_4060

ELEVATION (masl)

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15b
Section B-B' - Groundwater Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
C

SOUTH
C'

OW19 (2.56m)
MW18-130D (1.69m)
MW18-132D (4.5m)
OW18-I (1.29m)
OW18-II (1.22m)
OW13-39D (3.52m)
OW13-39S (3.45m)
BH18-205 (1.9m)
OW24S (1.1m)
OW31 (7.37m)
OW24D (0.3m)

MW18-132D
7.97-9.49m
17 Oct 2018: Meets SCS

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
07 Sep 2017: Meets SCS

OW31
28.9-33.32m
19 Sep 2016: Meets SCS
08 Sep 2017: Meets SCS

OW19
1.77-4.82m
23 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
07 Sep 2017: Meets SCS

MW18-130D
6.4-7.92m
17 Oct 2018: Meets SCS

OW24D
6.55-7.77m
23 Mar 2010
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_600
Petroleum Hydrocarbons F1 (C6-C10)_600

17 Jun 2011
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_830
Petroleum Hydrocarbons F1 (C6-C10)_830

20 Sep 2011
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_1100
Petroleum Hydrocarbons F1 (C6-C10)_1100

07 Sep 2017: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
29 Aug 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
07 Sep 2017: Meets SCS

OW18-II
6.32-7.84m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS

20 Nov 2015
Petroleum Hydrocarbons F2 (C10-C16)_210

25 Oct 2016: Meets SCS
29 Aug 2017: Meets SCS

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
07 Sep 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
77.14

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15c
Section C-C' - Groundwater Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

WEST
D

EAST
D'

OW11-I
1.6-4.65m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
01 Sep 2017: Meets SCS

OW11-II
01 Sep 2017
6.28-7.8m: Meets SCS

MW17-105D
31 Oct 2017
6.93-8.46m: Meets SCS

OW14
6.29-7.81m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

OW31
28.9-33.32m
19 Sep 2016: Meets SCS
08 Sep 2017: Meets SCS

MW18-122D (3.41m)
MW18-122G (3.66m)
OW11-I (4.15m)
OW11-II (4.17m)
MW18-121S (12.43m)
MW18-121D (11m)
BH07-61 (10.14m)
OW26D (8.57m)
OW26S (8.58m)
BH07-57 (13.79m)
MW18-123D (6.08m)
MW18-123S (0.29m)
MW18-136G (15.86m)
MW18-136D (14.82m)
OW10 (7.75m)
MW18-134S (9.99m)
MW18-134D (10.68m)
MW18-105G (1.16m)
MW17-105D (0.59m)
MW17-105S (2.72m)
OW09-II (8.49m)
OW09-I (9.92m)
MW18-129D (9.23m)
OW14 (10.84m)
OW31 (3.96m)
OW24D (6.16m)
OW24S (4.04m)

OW26D
10.28-11.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS
31 Aug 2017: Meets SCS

MW17-105S
31 Oct 2017
3.2-4.72m: Meets SCS

OW10
1.8-4.85m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

OW26S
3.08-4.6m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS
31 Aug 2017: Meets SCS

OW09-II
6.33-7.85m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
22 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
30 Aug 2017: Meets SCS

OW09-I
1.79-4.84m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
22 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
30 Aug 2017: Meets SCS

OW24D
6.55-7.77m
23 Mar 2010
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_600
Petroleum Hydrocarbons F1 (C6-C10)_600

17 Jun 2011
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_830
Petroleum Hydrocarbons F1 (C6-C10)_830

20 Sep 2011
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_ 1100
Petroleum Hydrocarbons F1 (C6-C10)_1100

07 Sep 2017: Meets SCS

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
07 Sep 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15d
Section D-D' - Groundwater Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\CROSSSECTIOND_GW_PHC.MXD SCYR 2/1/2019 9:05:35 AM

NORTH
F

SOUTH
F'

TP17-302 (3.15m)
MW18-124S (6.08m)
OW03-II (0.7m)
I (1.89m)
OW03-I (0.32m)
MW17-103S (5.78m)
MW17-103D (3.28m)
OW07-33 (11.15m)
SS-42 (10.3m)
SS-43 (1.76m)
SS-40 (8.3m)
SS-41 (7.54m)
OW25 (11.8m)
TP13-11 (3.92m)
OW07-34D (0.55m)
OW07-34S (2.76m)
MW17-102D (3.01m)
OW26S (14.68m)
OW26D (13.44m)

OW03-I
06 Sep 2017
1.07-3.35m: Meets SCS

OW07-34S
1.55-4.6m
29 Mar 2007: Meets SCS
01 Sep 2017: Meets SCS

OW03-II
06 Sep 2017
6.33-7.85m: Meets SCS

MW17-103S
02 Nov 2017
2.44-3.96m: Meets SCS

OW07-34D
6.12-9.17m
29 Mar 2007: Meets SCS
01 Sep 2017: Meets SCS

OW07-33
3.1-6.15m
29 Mar 2007: Meets SCS
31 Aug 2017: Meets SCS
01 Sep 2017: Meets SCS

MW17-102D
02 Nov 2017
13.76-15.29m: Meets SCS

OW26S
3.08-4.6m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS
31 Aug 2017: Meets SCS

OW26D
10.28-11.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS
31 Aug 2017: Meets SCS

OW25
1.98-4.72m
24 Mar 2010
Petroleum Hydrocarbons F2 (C10-C16)_190
Petroleum Hydrocarbons F3 (C16-C34)_3300

07 Oct 2010
Petroleum Hydrocarbons F3 (C16-C34)_4100

16 Jun 2011
Petroleum Hydrocarbons F3 (C16-C34)_760

19 Sep 2011: Meets SCS

11 Dec 2012
Petroleum Hydrocarbons F3 (C16-C34)_2100

24 Oct 2013: Meets SCS

24 Oct 2014
Petroleum Hydrocarbons F2 (C10-C16)_160
Petroleum Hydrocarbons F3 (C16-C34)_4900

19 Nov 2015
Petroleum Hydrocarbons F3 (C16-C34)_5500

26 Oct 2016
Petroleum Hydrocarbons F2 (C10-C16)_920
Petroleum Hydrocarbons F3 (C16-C34)_5200

01 Sep 2017: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120
140
160

DISTANCE (m)

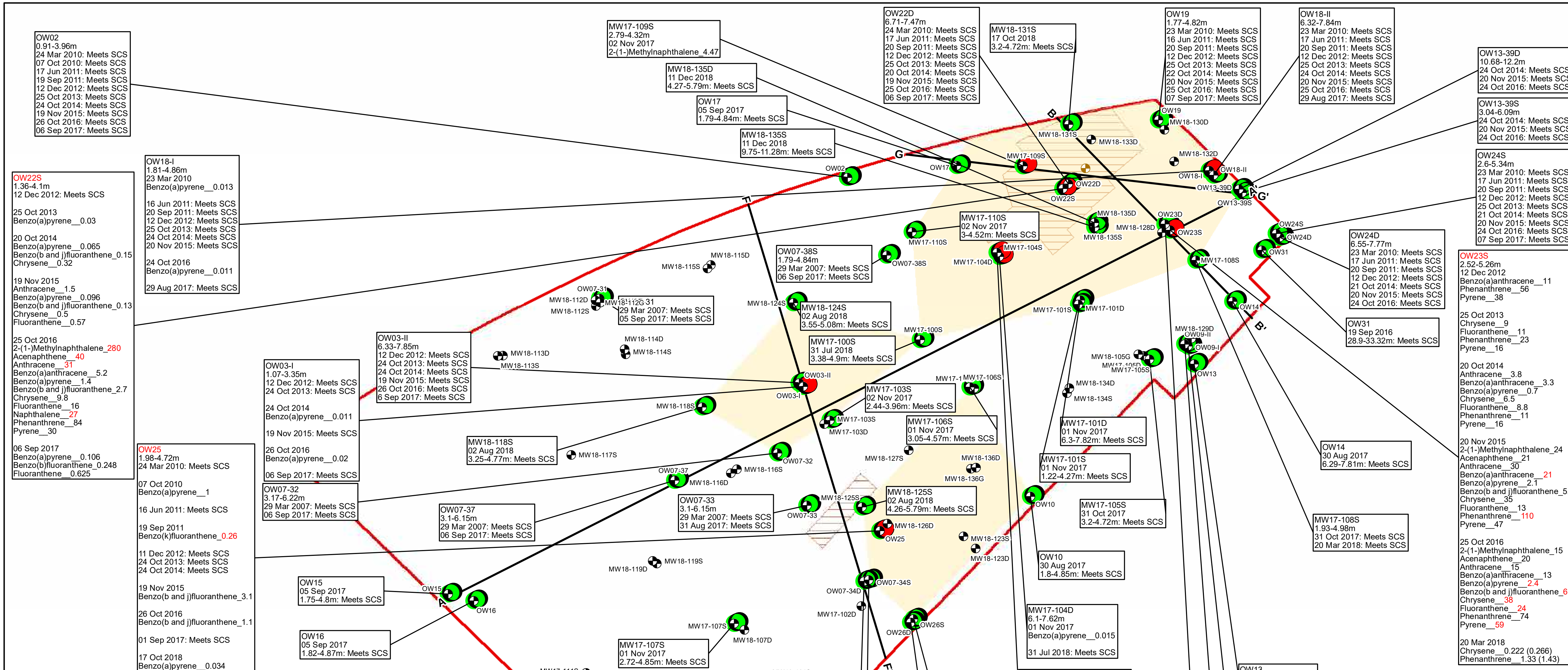
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15e
Section F-F' - Groundwater Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:



Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
2-(1-)Methylnaphthalene	3.2µg/L	280µg/L	OW22S
Acenaphthene	4.1µg/L	40µg/L	OW22S
Anthracene	1µg/L	31µg/L	OW22S
Benzo(a)anthracene	1µg/L	21µg/L	OW23S
Benzo(a)pyrene	0.01µg/L	2.4µg/L	OW23S
Benzo(b&j)fluoranthene	0.1µg/L	6.1µg/L	OW23S
Benzo(k)fluoranthene	0.1µg/L	0.26µg/L	OW25
Chrysene	0.1µg/L	38µg/L	OW23S
Fluoranthene	0.41µg/L	24µg/L	OW23S
Naphthalene	7µg/L	27µg/L	OW22S
Phenanthrene	1µg/L	110µg/L	OW23S
Pyrene	4.1µg/L	59µg/L	OW23S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

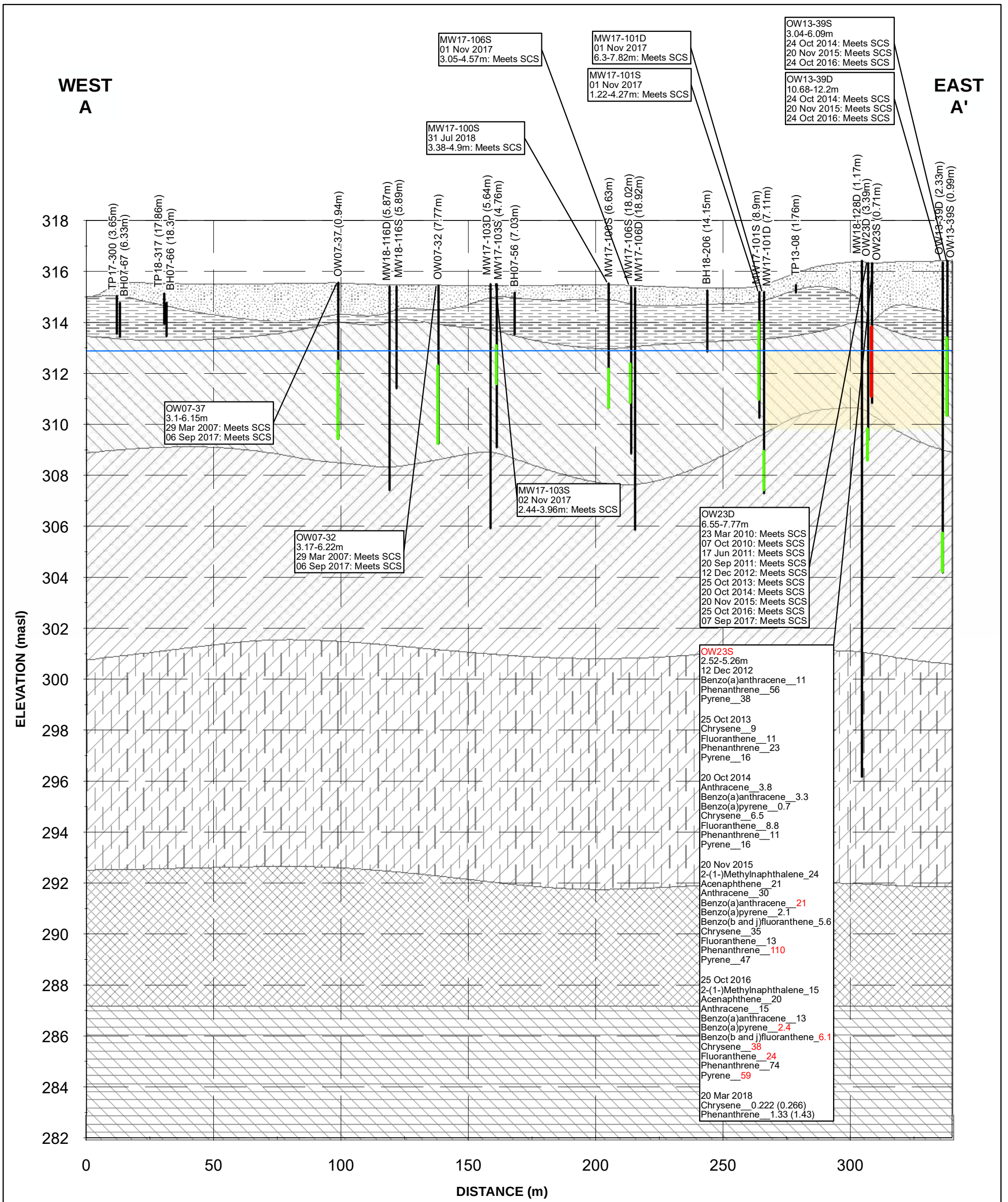
No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-16
Groundwater Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-16a
Section A-A' - Groundwater Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'

MW18-131S (1.68m)
MW18-133D (3.21m)
OW22S (16.51m)
OW22D (13.69m)
BH07-40 (0.71m)
OW23D (0.9m)
MW18-128D (1.91m)
OW23S (0.94m)
TP18-309 (1.77m)
MW17-108S (0.41m)
TP18-310 (0.52m)
BH07-53 (4.32m)
OW14 (0.74m)

MW18-131S
3.2-4.72m
17 Oct 2018: Meets SCS

MW17-108S
1.93-4.98m
31 Oct 2017: Meets SCS
20 Mar 2018: Meets SCS

OW14
30 Aug 2017
6.29-7.81m: Meets SCS

OW23D
6.55-7.77m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
07 Sep 2017: Meets SCS

OW22D
6.71-7.47m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
06 Sep 2017: Meets SCS

OW22S
1.36-4.1m
12 Dec 2012: Meets SCS

25 Oct 2013
Benzo(a)pyrene__0.03

20 Oct 2014
Benzo(a)pyrene__0.065
Benzo(b and j)fluoranthene_0.15
Chrysene__0.32

19 Nov 2015
Anthracene__1.5
Benzo(a)pyrene__0.096
Benzo(b and j)fluoranthene_0.13
Chrysene__0.5
Fluoranthene__0.57

25 Oct 2016
2-(1-)Methylnaphthalene_280
Acenaphthene__40
Anthracene__31
Benzo(a)anthracene__5.2
Benzo(a)pyrene__1.4
Benzo(b and j)fluoranthene_2.7
Chrysene__9.8
Fluoranthene__16
Naphthalene__27
Phenanthrene__84
Pyrene__30

06 Sep 2017
Benzo(a)pyrene__0.106
Benzo(b)fluoranthene_0.248
Fluoranthene__0.625

OW23S
2.52-5.26m
12 Dec 2012
Benzo(a)anthracene__11
Phenanthrene__56
Pyrene__38

25 Oct 2013
Chrysene__9
Fluoranthene__11
Phenanthrene__23
Pyrene__16

20 Oct 2014
Anthracene__3.8
Benzo(a)anthracene__3.3
Benzo(a)pyrene__0.7
Chrysene__6.5
Fluoranthene__8.8
Phenanthrene__11
Pyrene__16

20 Nov 2015
2-(1-)Methylnaphthalene_24
Acenaphthene__21
Anthracene__30
Benzo(a)anthracene__21
Benzo(a)pyrene__2.1
Benzo(b and j)fluoranthene_5.6
Chrysene__35
Fluoranthene__13
Phenanthrene__110
Pyrene__47

25 Oct 2016
2-(1-)Methylnaphthalene_15
Acenaphthene__20
Anthracene__15
Benzo(a)anthracene__13
Benzo(a)pyrene__2.4
Benzo(b and j)fluoranthene_6.1
Chrysene__38
Fluoranthene__24
Phenanthrene__74
Pyrene__59

20 Mar 2018
Chrysene__0.222 (0.266)
Phenanthrene__1.33 (1.43)

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-16b
Section B-B' - Groundwater Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

NORTH
F

SOUTH
F'

MW18-124S
02 Aug 2018
3.55-5.08m: Meets SCS

MW17-103S
02 Nov 2017
2.44-3.96m: Meets SCS

OW07-33
3.1-6.15m
29 Mar 2007: Meets SCS
31 Aug 2017: Meets SCS

OW07-34S
1.55-4.6m
29 Mar 2007: Meets SCS
01 Sep 2017: Meets SCS

TP17-302 (3.15m)
MW18-124S (6.08m)
OW03-II (0.7m)
I (1.89m)
OW03-I (0.32m)
MW17-103S (5.78m)
MW17-103D (3.28m)
OW07-33 (11.15m)
SS-42 (10.3m)
SS-43 (1.76m)
SS-40 (8.3m)
SS-41 (7.54m)
OW25 (11.8m)
TP13-11 (3.92m)
OW07-34D (0.55m)
OW07-34S (2.76m)
MW17-102D (3.01m)
OW26S (14.68m)
OW26D (13.44m)

OW03-II
6.33-7.85m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS
6 Sep 2017: Meets SCS

OW03-I
1.07-3.35m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS

24 Oct 2014
Benzo(a)pyrene__0.011

19 Nov 2015: Meets SCS

26 Oct 2016
Benzo(a)pyrene__0.02

06 Sep 2017: Meets SCS

OW25
1.98-4.72m
24 Mar 2010: Meets SCS

07 Oct 2010
Benzo(a)pyrene__1

16 Jun 2011: Meets SCS

19 Sep 2011
Benzo(k)fluoranthene_0.26

11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS

19 Nov 2015
Benzo(b and j)fluoranthene_3.1

26 Oct 2016
Benzo(b and j)fluoranthene_1.1

01 Sep 2017: Meets SCS

17 Oct 2018
Benzo(a)pyrene__0.034 (0.015)

OW07-34D
6.12-9.17m
29 Mar 2007: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS

OW26S
3.08-4.6m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS

OW26D
10.28-11.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
26 Oct 2016: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100
120
140
160

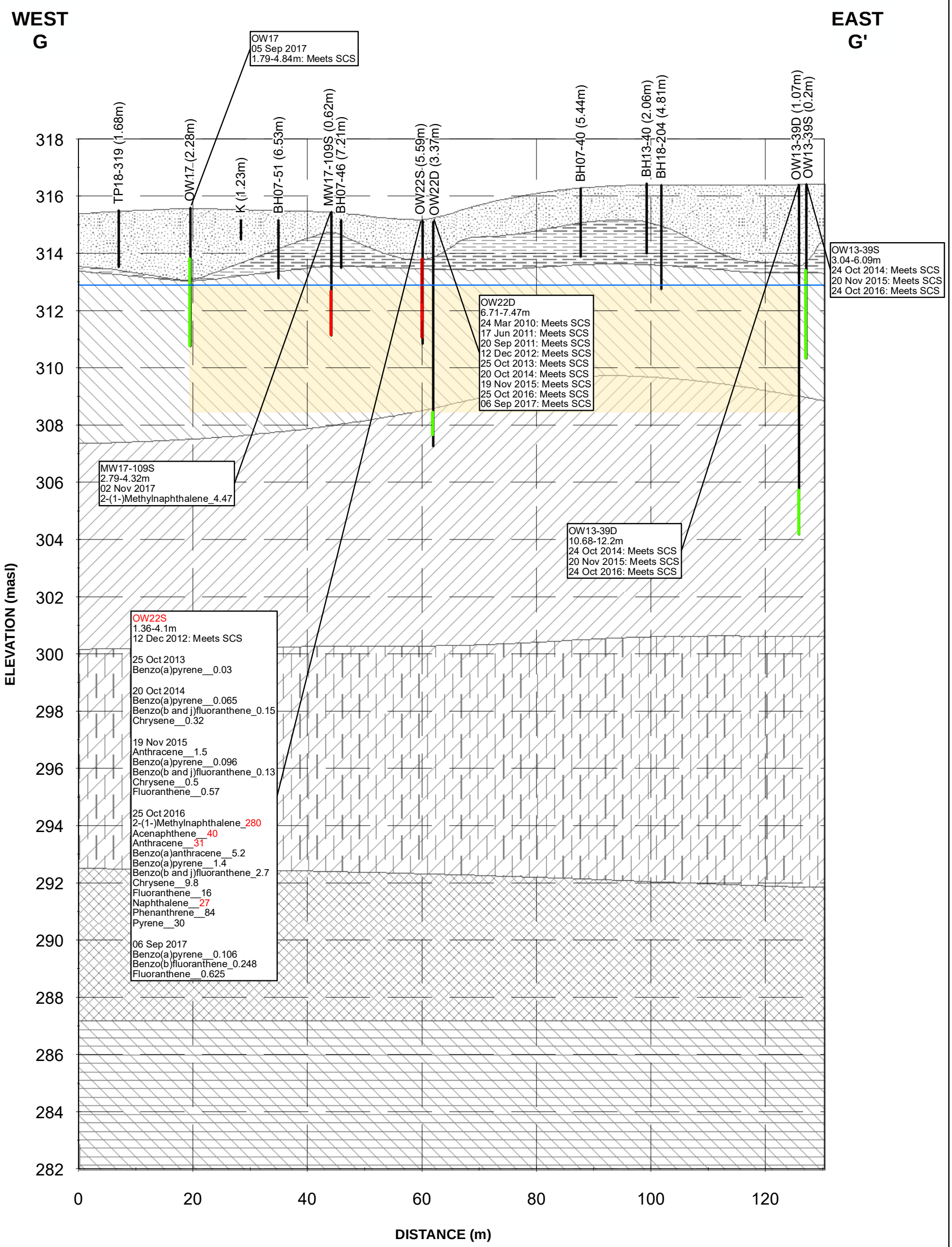
DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-16c
Section F-F' - Groundwater Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

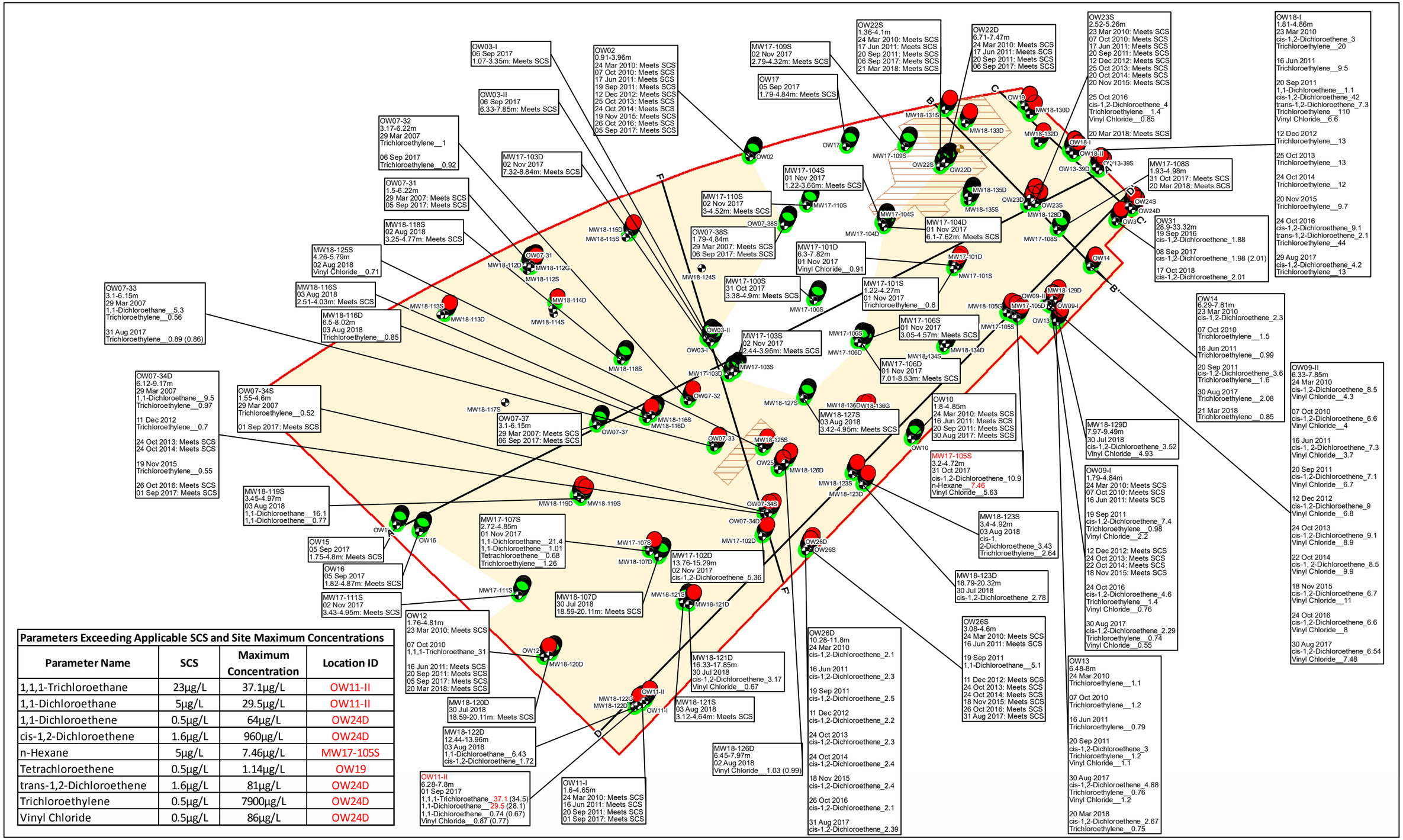


Approximate Groundwater Elevation
Exceedance
No Exceedance
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-16d
Section G-G' - Soil Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
1,1,1-Trichloroethane	23µg/L	37.1µg/L	OW11-II
1,1-Dichloroethane	5µg/L	29.5µg/L	OW11-II
1,1-Dichloroethene	0.5µg/L	64µg/L	OW24D
cis-1,2-Dichloroethene	1.6µg/L	960µg/L	OW24D
n-Hexane	5µg/L	7.46µg/L	MW17-105S
Tetrachloroethene	0.5µg/L	1.14µg/L	OW19
trans-1,2-Dichloroethene	1.6µg/L	81µg/L	OW24D
Trichloroethylene	0.5µg/L	7900µg/L	OW24D
Vinyl Chloride	0.5µg/L	86µg/L	OW24D

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

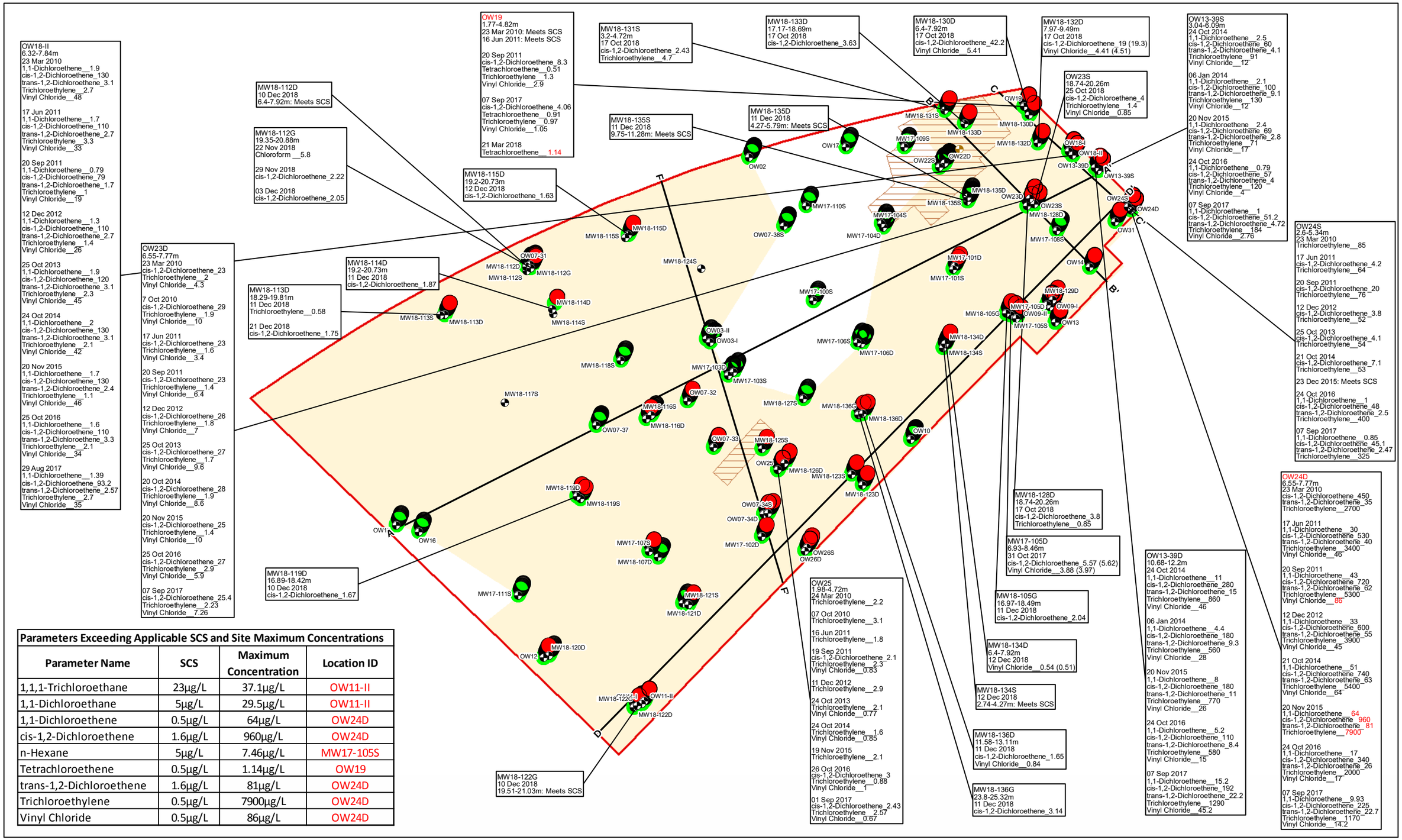
Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

DRAFT

Figure 6-17 (Part 1)
Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

\\BROOKSIDEFILES\GIS_SHARE\ENBG\00_PROJ\G\GUELPHCITYOF\IMICO\GIS\MAPFILES\IMICO\PHASETWO\DRAFTI\GW_VOCS_PART1.MXD SCYR 2/1/2019 9:36:30 AM



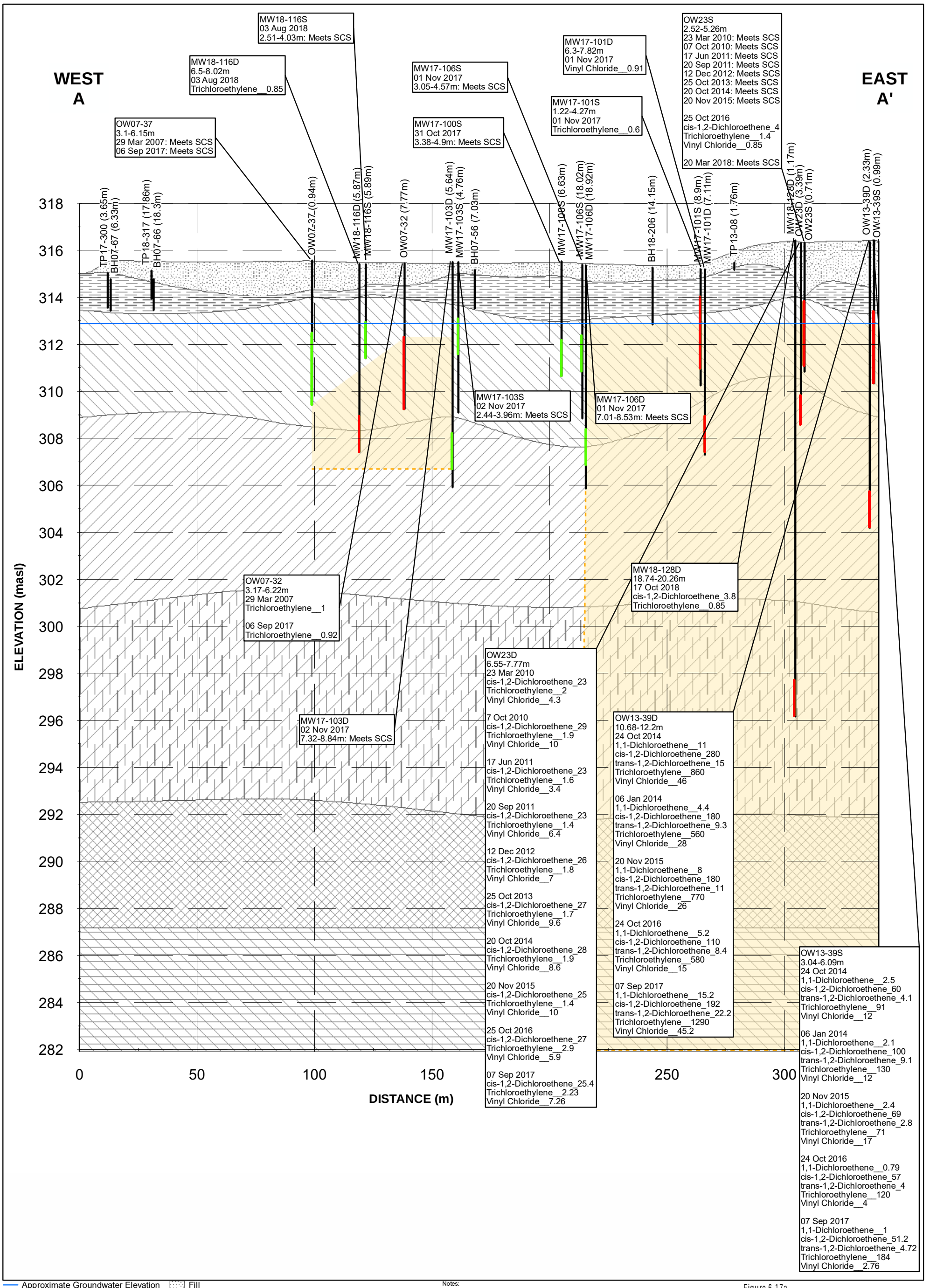
Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
1,1,1-Trichloroethane	23µg/L	37.1µg/L	OW11-II
1,1-Dichloroethane	5µg/L	29.5µg/L	OW11-II
1,1-Dichloroethene	0.5µg/L	64µg/L	OW24D
cis-1,2-Dichloroethene	1.6µg/L	960µg/L	OW24D
n-Hexane	5µg/L	7.46µg/L	MW17-105S
Tetrachloroethene	0.5µg/L	1.14µg/L	OW19
trans-1,2-Dichloroethene	1.6µg/L	81µg/L	OW24D
Trichloroethylene	0.5µg/L	7900µg/L	OW24D
Vinyl Chloride	0.5µg/L	86µg/L	OW24D

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-17 (Part 2)
Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m:

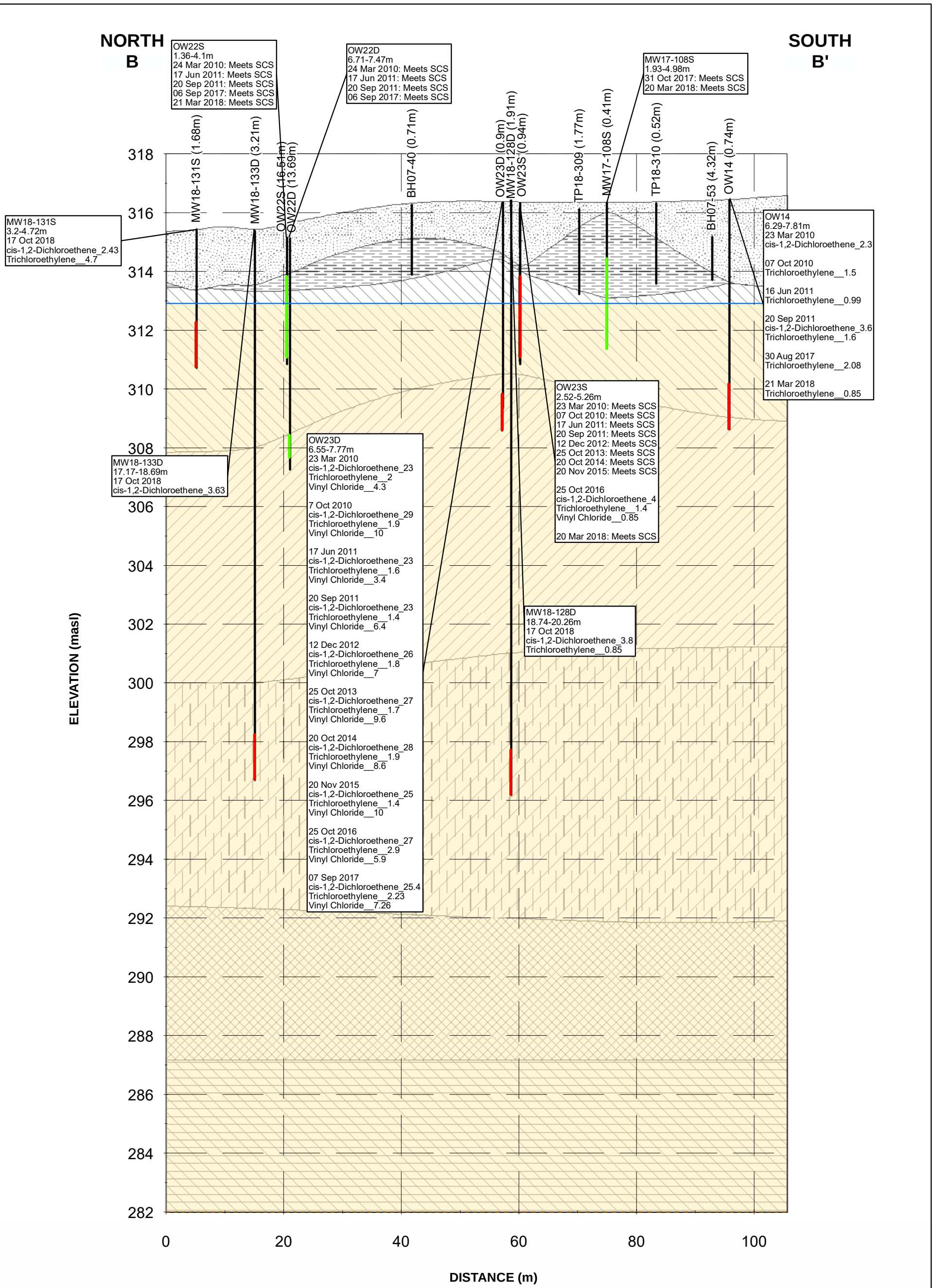


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Vertical Delineation Inferred Extent

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17a
Section A-A' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



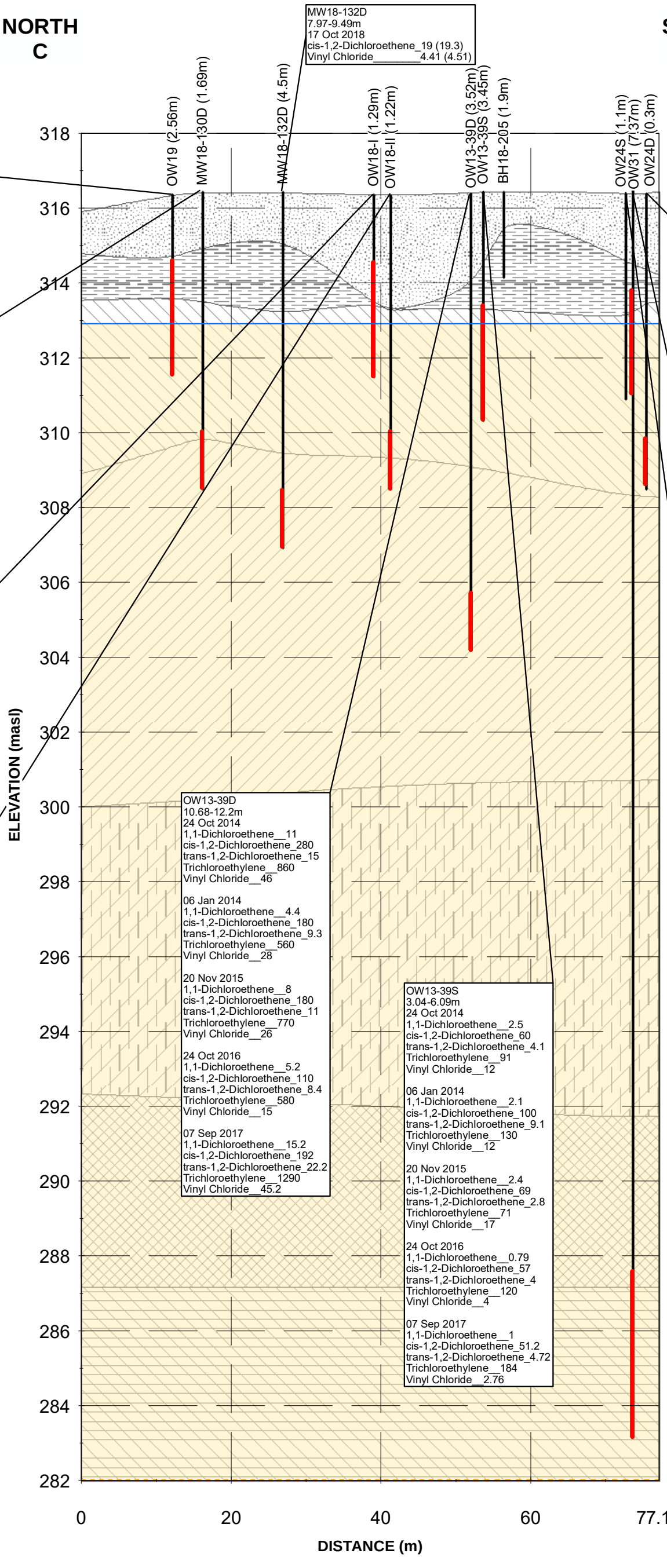
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Vertical Delineation Inferred Extent
- Fill
- Silt (Native)
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17b
Section B-B' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
C

SOUTH
C'



OW19
1.77-4.82m
23 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS

20 Sep 2011
cis-1,2-Dichloroethene_8.3
Tetrachloroethene__0.51
Trichloroethylene__1.3
Vinyl Chloride__2.9

07 Sep 2017
cis-1,2-Dichloroethene_4.06
Tetrachloroethene__0.91
Trichloroethylene__0.97
Vinyl Chloride__1.05

21 Mar 2018
Tetrachloroethene__1.14

MW18-130D
6.4-7.92m
17 Oct 2018
cis-1,2-Dichloroethene_42.2
Vinyl Chloride_____5.41

OW18-I
1.81-4.86m
23 Mar 2010
cis-1,2-Dichloroethene_3
Trichloroethylene__20

16 Jun 2011
Trichloroethylene__9.5

20 Sep 2011
1,1-Dichloroethene__1.1
cis-1,2-Dichloroethene_42
trans-1,2-Dichloroethene_7.3
Trichloroethylene__110
Vinyl Chloride__6.6

12 Dec 2012
Trichloroethylene__13

25 Oct 2013
Trichloroethylene__13

24 Oct 2014
Trichloroethylene__12

20 Nov 2015
Trichloroethylene__9.7

24 Oct 2016
cis-1,2-Dichloroethene_9.1
trans-1,2-Dichloroethene_2.1
Trichloroethylene__44

29 Aug 2017
cis-1,2-Dichloroethene_4.2
Trichloroethylene__13

OW18-II
6.32-7.84m
23 Mar 2010
1,1-Dichloroethene__1.9
cis-1,2-Dichloroethene_130
trans-1,2-Dichloroethene_3.1
Trichloroethylene__2.7
Vinyl Chloride__48

17 Jun 2011
1,1-Dichloroethene__1.7
cis-1,2-Dichloroethene_110
trans-1,2-Dichloroethene_2.7
Trichloroethylene__3.3
Vinyl Chloride__33

20 Sep 2011
1,1-Dichloroethene__0.79
cis-1,2-Dichloroethene_79
trans-1,2-Dichloroethene_1.7
Trichloroethylene__1
Vinyl Chloride__19

12 Dec 2012
1,1-Dichloroethene__1.3
cis-1,2-Dichloroethene_110
trans-1,2-Dichloroethene_2.7
Trichloroethylene__1.4
Vinyl Chloride__26

25 Oct 2013
1,1-Dichloroethene__1.9
cis-1,2-Dichloroethene_120
trans-1,2-Dichloroethene_3.1
Trichloroethylene__2.3
Vinyl Chloride__45

24 Oct 2014
1,1-Dichloroethene__2
cis-1,2-Dichloroethene_130
trans-1,2-Dichloroethene_3.1
Trichloroethylene__2.1
Vinyl Chloride__42

20 Nov 2015
1,1-Dichloroethene__1.7
cis-1,2-Dichloroethene_130
trans-1,2-Dichloroethene_2.4
Trichloroethylene__1.1
Vinyl Chloride__46

25 Oct 2016
1,1-Dichloroethene__1.6
cis-1,2-Dichloroethene_110
trans-1,2-Dichloroethene_3.3
Trichloroethylene__2.1
Vinyl Chloride__34

29 Aug 2017
1,1-Dichloroethene__1.39
cis-1,2-Dichloroethene_93.2
trans-1,2-Dichloroethene_2.57
Trichloroethylene__2.7
Vinyl Chloride__35

MW18-132D
7.97-9.49m
17 Oct 2018
cis-1,2-Dichloroethene_19 (19.3)
Vinyl Chloride_____4.41 (4.51)

OW13-39D
10.68-12.2m
24 Oct 2014
1,1-Dichloroethene__11
cis-1,2-Dichloroethene_280
trans-1,2-Dichloroethene_15
Trichloroethylene__860
Vinyl Chloride__46

06 Jan 2014
1,1-Dichloroethene__4.4
cis-1,2-Dichloroethene_180
trans-1,2-Dichloroethene_9.3
Trichloroethylene__560
Vinyl Chloride__28

20 Nov 2015
1,1-Dichloroethene__8
cis-1,2-Dichloroethene_180
trans-1,2-Dichloroethene_11
Trichloroethylene__770
Vinyl Chloride__26

24 Oct 2016
1,1-Dichloroethene__5.2
cis-1,2-Dichloroethene_110
trans-1,2-Dichloroethene_8.4
Trichloroethylene__580
Vinyl Chloride__15

07 Sep 2017
1,1-Dichloroethene__15.2
cis-1,2-Dichloroethene_192
trans-1,2-Dichloroethene_22.2
Trichloroethylene__1290
Vinyl Chloride__45.2

OW13-39S
3.04-6.09m
24 Oct 2014
1,1-Dichloroethene__2.5
cis-1,2-Dichloroethene_60
trans-1,2-Dichloroethene_4.1
Trichloroethylene__91
Vinyl Chloride__12

06 Jan 2014
1,1-Dichloroethene__2.1
cis-1,2-Dichloroethene_100
trans-1,2-Dichloroethene_9.1
Trichloroethylene__130
Vinyl Chloride__12

20 Nov 2015
1,1-Dichloroethene__2.4
cis-1,2-Dichloroethene_69
trans-1,2-Dichloroethene_2.8
Trichloroethylene__71
Vinyl Chloride__17

24 Oct 2016
1,1-Dichloroethene__0.79
cis-1,2-Dichloroethene_57
trans-1,2-Dichloroethene_4
Trichloroethylene__120
Vinyl Chloride__4

07 Sep 2017
1,1-Dichloroethene__1
cis-1,2-Dichloroethene_51.2
trans-1,2-Dichloroethene_4.72
Trichloroethylene__184
Vinyl Chloride__2.76

OW24D
6.55-7.77m
23 Mar 2010
cis-1,2-Dichloroethene_450
trans-1,2-Dichloroethene_35
Trichloroethylene__2700

17 Jun 2011
1,1-Dichloroethene__30
cis-1,2-Dichloroethene_530
trans-1,2-Dichloroethene_40
Trichloroethylene__3400
Vinyl Chloride__46

20 Sep 2011
1,1-Dichloroethene__43
cis-1,2-Dichloroethene_720
trans-1,2-Dichloroethene_62
Trichloroethylene__5300
Vinyl Chloride__86

12 Dec 2012
1,1-Dichloroethene__33
cis-1,2-Dichloroethene_600
trans-1,2-Dichloroethene_55
Trichloroethylene__3900
Vinyl Chloride__45

21 Oct 2014
1,1-Dichloroethene__51
cis-1,2-Dichloroethene_740
trans-1,2-Dichloroethene_63
Trichloroethylene__5400
Vinyl Chloride__64

20 Nov 2015
1,1-Dichloroethene__64
cis-1,2-Dichloroethene_960
trans-1,2-Dichloroethene_81
Trichloroethylene__7900

24 Oct 2016
1,1-Dichloroethene__17
cis-1,2-Dichloroethene_340
trans-1,2-Dichloroethene_26
Trichloroethylene__2000
Vinyl Chloride__17

07 Sep 2017
1,1-Dichloroethene__9.93
cis-1,2-Dichloroethene_225
trans-1,2-Dichloroethene_22.7
Trichloroethylene__1170
Vinyl Chloride__14.2

OW31
28.9-33.32m
19 Sep 2016
cis-1,2-Dichloroethene_1.88

08 Sep 2017
cis-1,2-Dichloroethene_1.98 (2.01)

17 Oct 2018
cis-1,2-Dichloroethene_2.01

OW24S
2.6-5.34m
23 Mar 2010
Trichloroethylene__85

17 Jun 2011
cis-1,2-Dichloroethene_4.2
Trichloroethylene__64

20 Sep 2011
cis-1,2-Dichloroethene_20
Trichloroethylene__76

12 Dec 2012
cis-1,2-Dichloroethene_3.8
Trichloroethylene__52

25 Oct 2013
cis-1,2-Dichloroethene_4.1
Trichloroethylene__54

21 Oct 2014
cis-1,2-Dichloroethene_7.1
Trichloroethylene__53

23 Dec 2015: Meets SCS

24 Oct 2016
1,1-Dichloroethene__1
cis-1,2-Dichloroethene_48
trans-1,2-Dichloroethene_2.5
Trichloroethylene__400

07 Sep 2017
1,1-Dichloroethene__0.85
cis-1,2-Dichloroethene_45.1
trans-1,2-Dichloroethene_2.47
Trichloroethylene__325

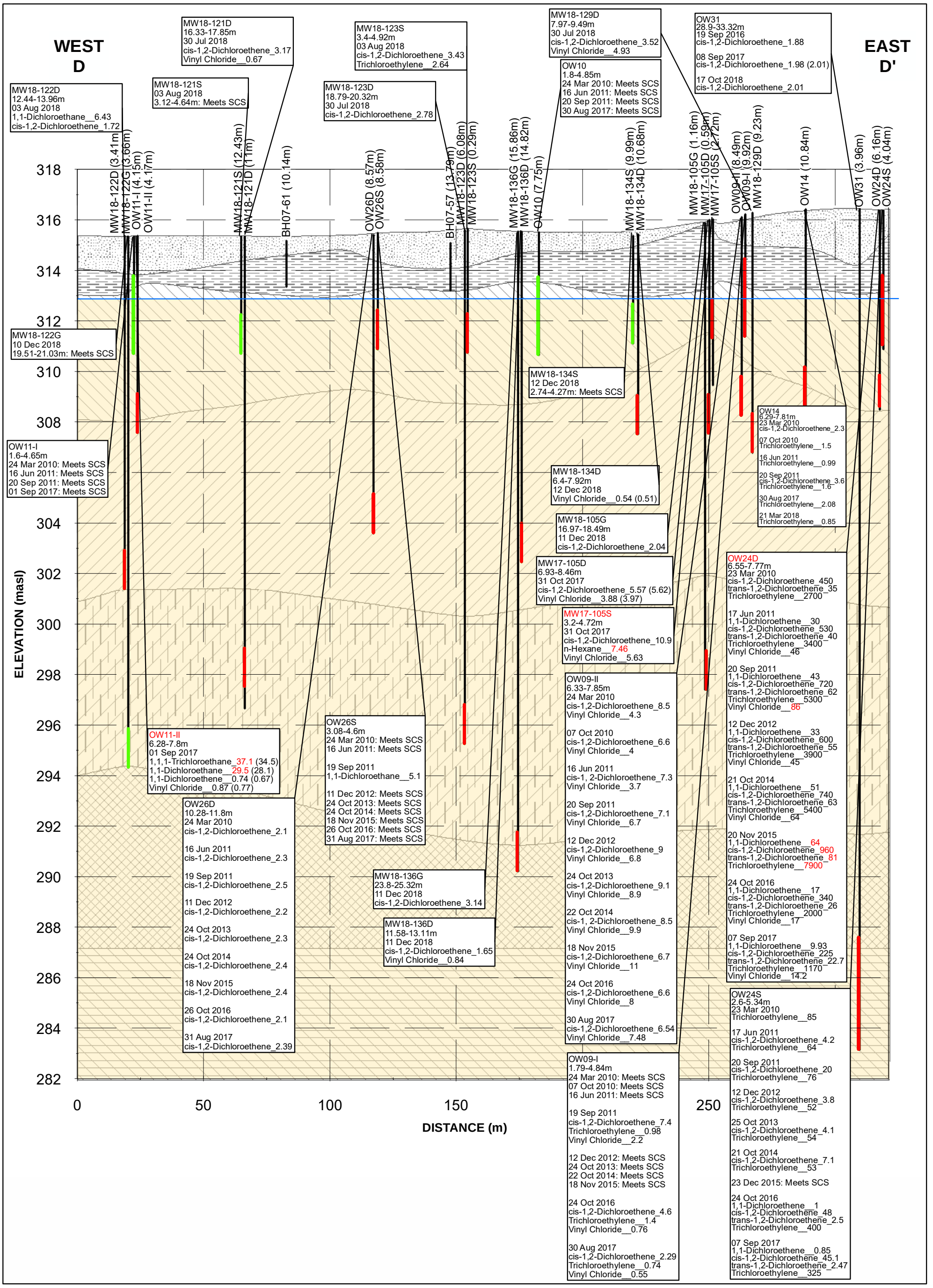
Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Vertical Delineation Inferred Extent

Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17c
Section C-C' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



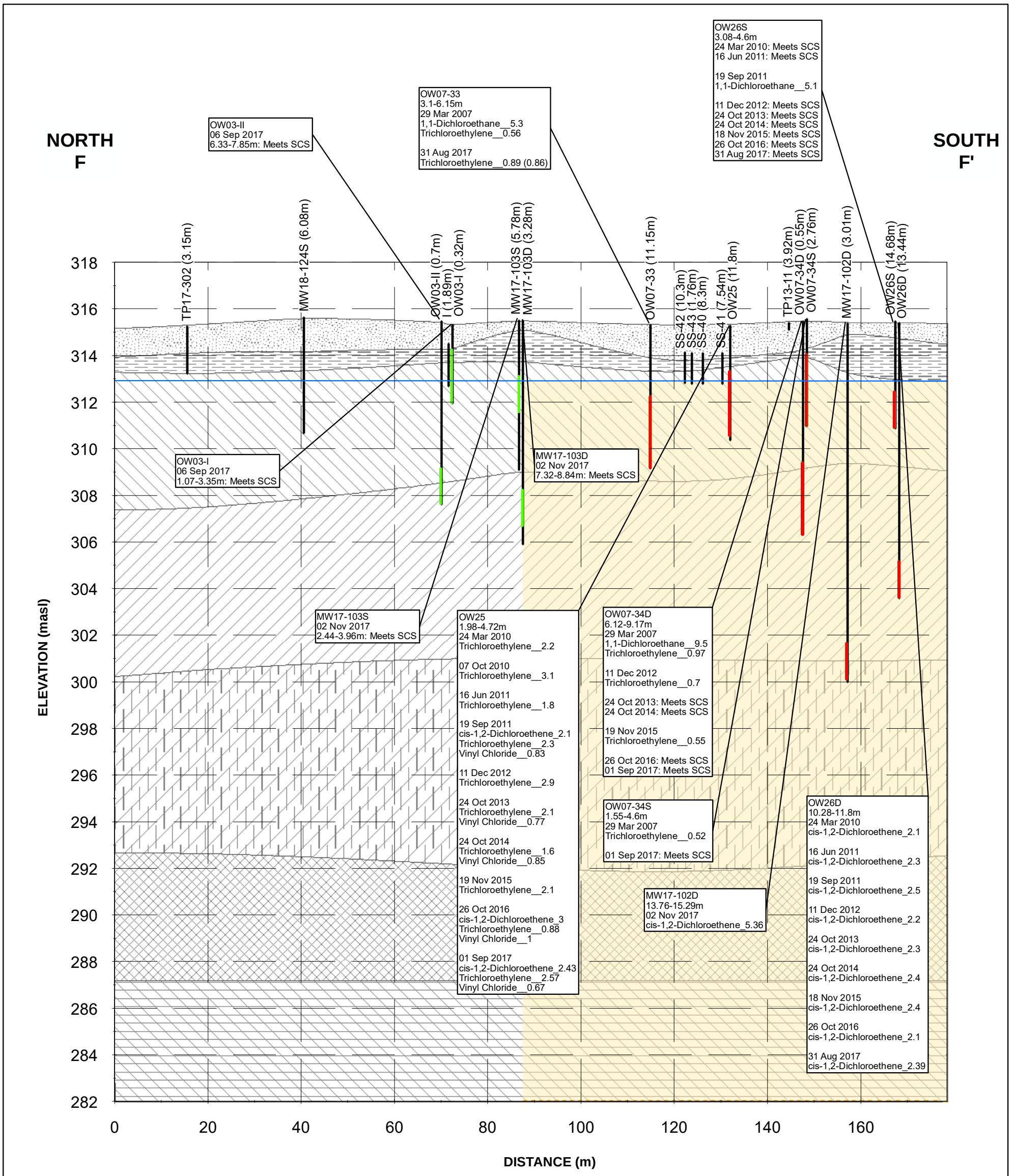
Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)

Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

DRAFT

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

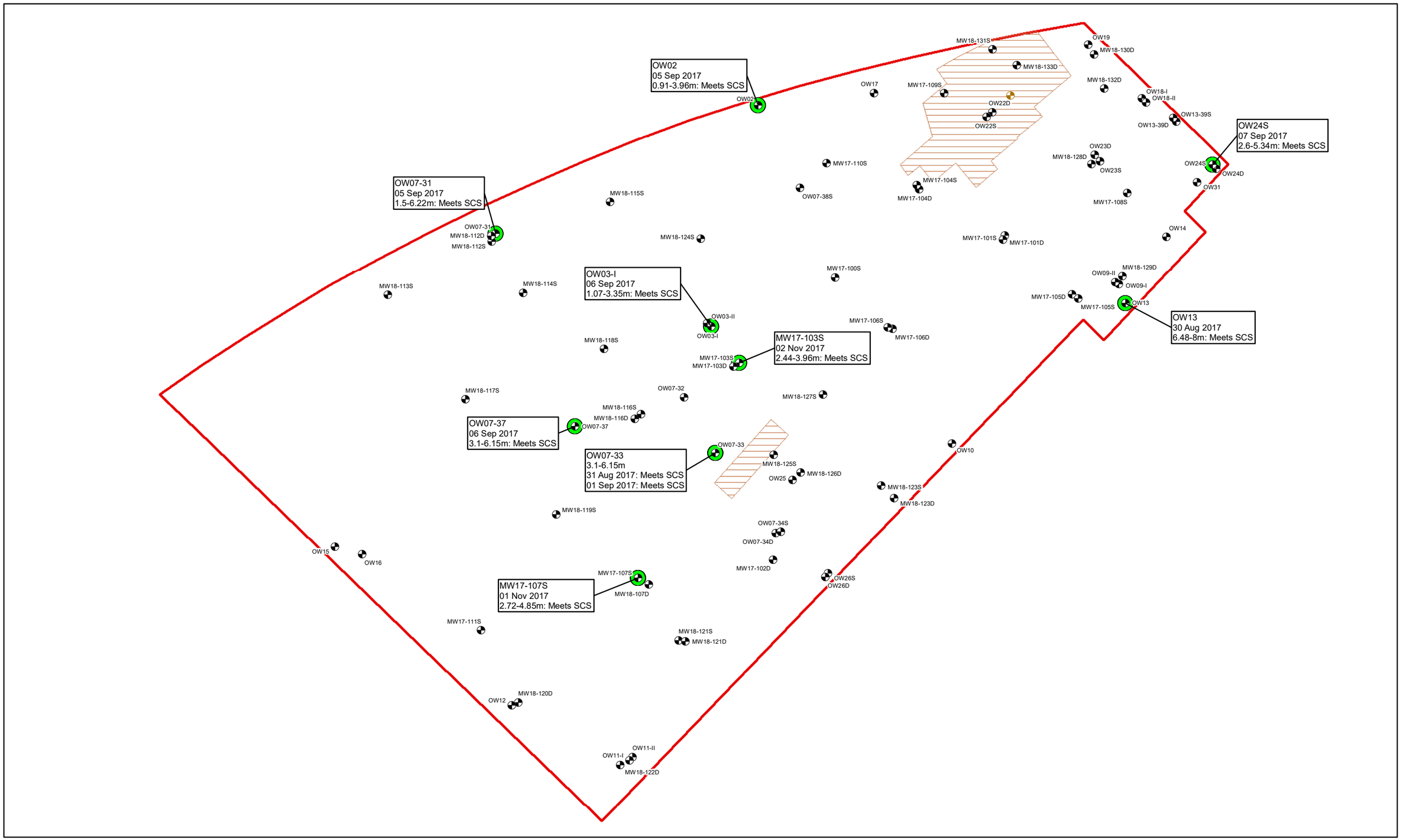
Figure 6-17d
Section D-D' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Vertical Delineation Inferred Extent
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17e
Section F-F' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

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Figure 6-18
Groundwater Exceedances - CPs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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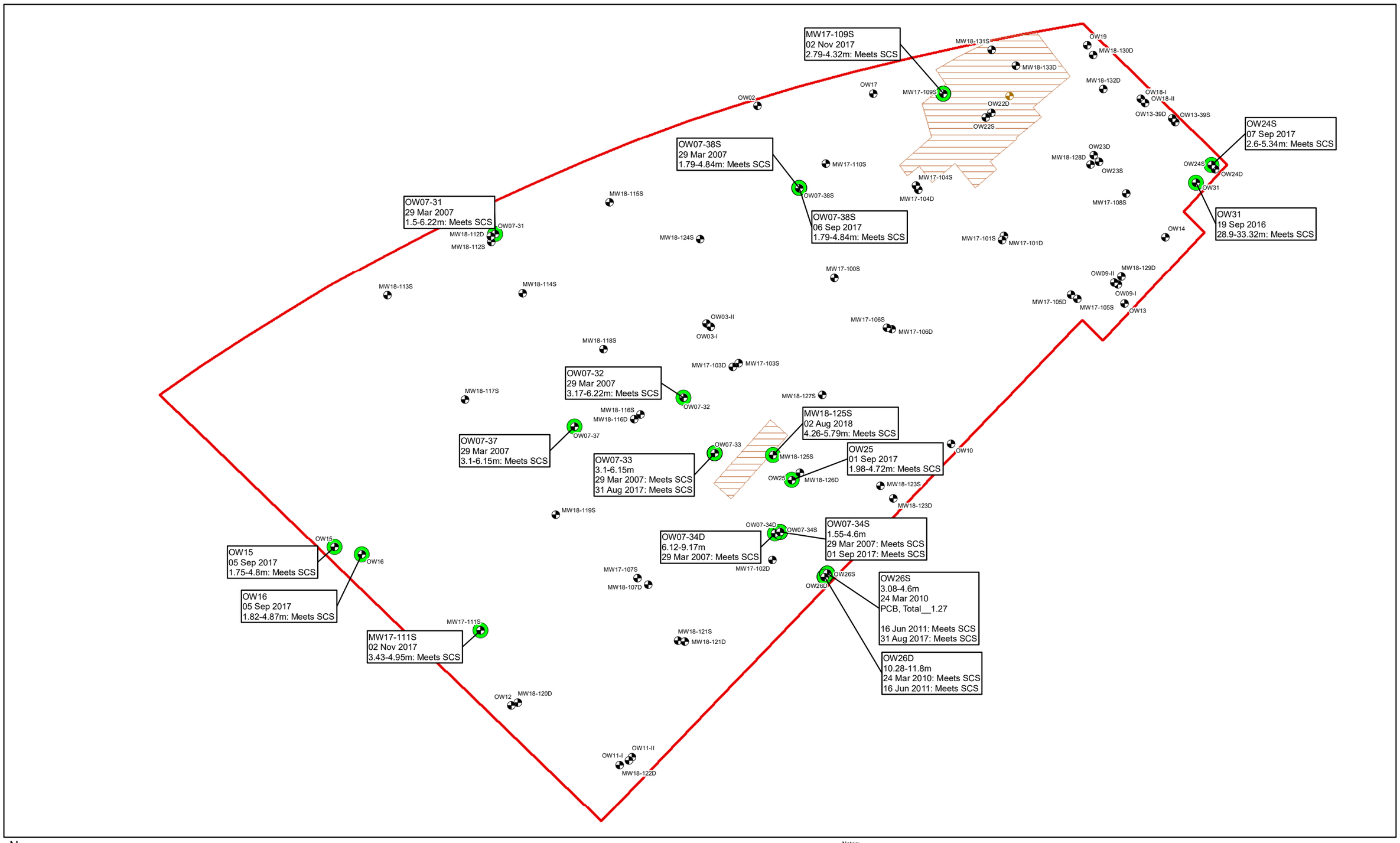

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

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Figure 6-19
Groundwater Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

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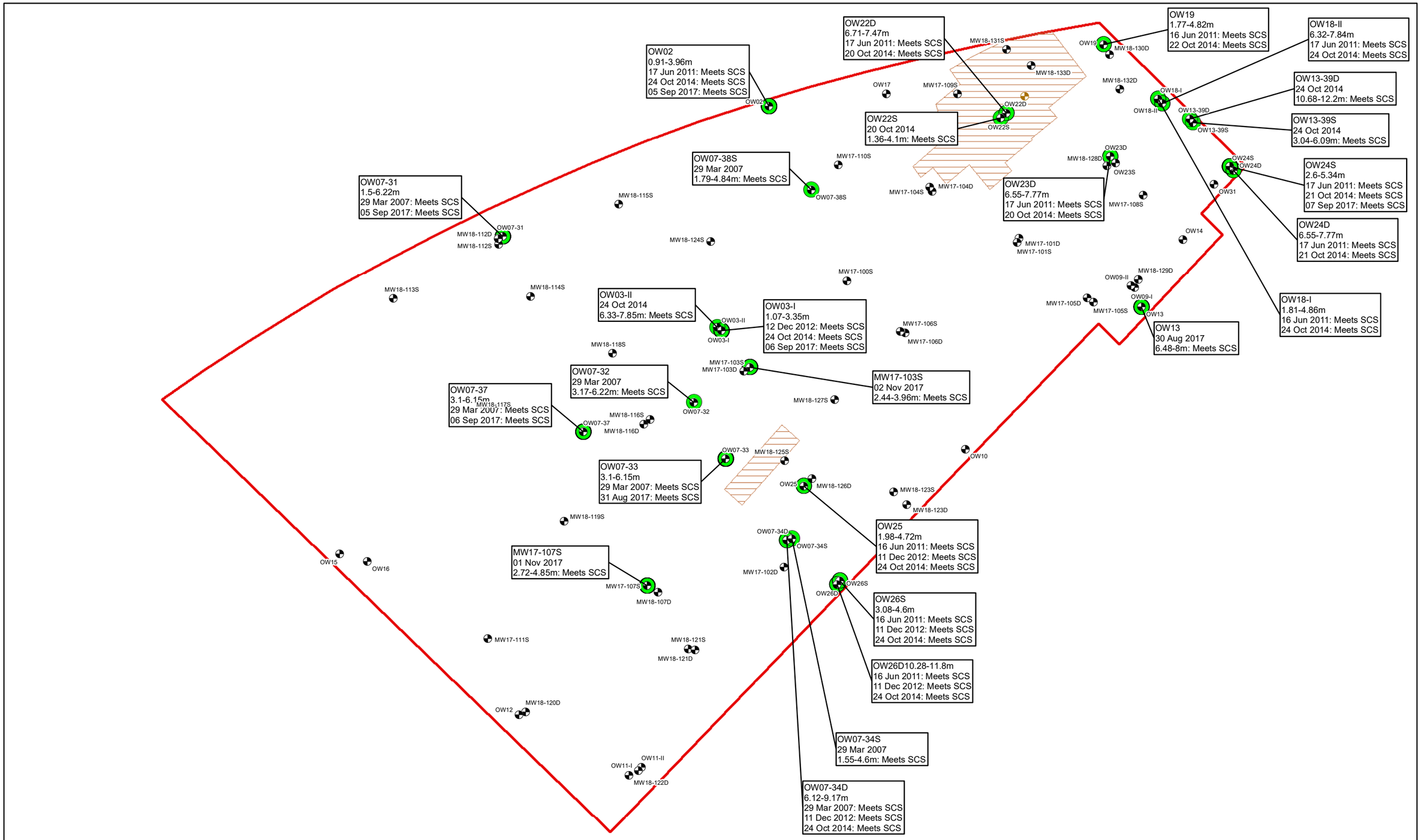

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

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Figure 6-20
Groundwater Exceedances - ABNs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

ch2m

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Attachment C
Sampling and Analysis Plan

Attachment C: Table C-1

Revision 7, January 17, 2019

Phase Two ESA Sampling and Analytical Plan: IMICO

Location ID	Existing or New Location	Media	Approx. Depth to Bedrock (m)	Approx. Depth of TP/BH/MW (m)	O.Reg. 511 Metals & Inorganics	O. Reg. 153/04 Hydride-forming Metals (Sb, As, Se)	O. Reg. 153/04 Metals only (Section 1.2.2 in Protocol Doc)	PAHs (lab filter for B(a)P)	PHCs	BTEX	VOCs	PCB Aroclors	Purpose and Justification
MW18-114D	Existing	Groundwater	--	--		1							Second resample for antimony to confirm meets the SCS. No exceedance in previous sample.
OW07-37	Existing	Groundwater	--	--			1						Second resample for zinc to confirm meets the SCS. No exceedance in previous sample.
OW23D	Existing	Groundwater	--	--					1				Second resample for PHC F3 to confirm meets the SCS. No exceedance in previous sample.
OW25	Existing	Groundwater	--	--					1				Second resample for PHC F2 and PHC F3 to confirm meets the SCS. No exceedance in previous sample.
OW24D	Existing	Groundwater	--	--					1				Second resample for PHC F1 to confirm meets the SCS. No exceedance in previous sample.
OW3-I	Existing	Groundwater	--	--				1					Second resample for benzo(a)pyrene to confirm meets the SCS. No exceedance in the previous sample.
OW25	Existing	Groundwater	--	--				1					Isolated benzo(a)pyrene exceedance, not vertically delineated. Two options (below) based on the results of this sample.
OW25	Existing	Groundwater	--	--				1					If the first benzo(a)pyrene sample from OW25 meets the SCS, complete a second PAHs resample at OW25.
MW18-126D	Existing	Groundwater	--	--				1					If the first benzo(a)pyrene sample at OW25 does not meet the SCS, do not resample OW25, but sample the deeper MW18-126D for vertical delineation.
TP19-320	New	Soil	--	--							2		Cardinal direction horizontal and vertical delineation of TCE soil impacts at MW17-102D. Sample generally between 0.15 and 0.3 mbgs and 1.83 and 2.13 mbgs (or right above bedrock) for vertical delineation.
TP19-321	New	Soil	--	--							2		Cardinal direction horizontal and vertical delineation of TCE soil impacts at MW17-102D. Sample generally between 0.15 and 0.3 mbgs and 1.83 and 2.13 mbgs (or right above bedrock) for vertical delineation.
TP19-322	New	Soil	--	--							2		Cardinal direction horizontal and vertical delineation of TCE soil impacts at MW17-102D. Sample generally between 0.15 and 0.3 mbgs and 1.83 and 2.13 mbgs (or right above bedrock) for vertical delineation.
TP19-323	New	Soil	--	--							2		Cardinal direction horizontal and vertical delineation of TCE soil impacts at MW17-102D. Sample generally between 0.15 and 0.3 mbgs and 1.83 and 2.13 mbgs (or right above bedrock) for vertical delineation.
BH19-209	New	Soil	--	--							2		Horizontal delineation of TCE impacts in soil north of BH13-40 and OW13-39S. Collect above the water table from surface and at depth.
BH19-210	New	Soil	--	--							2		Horizontal delineation of TCE impacts in soil south of BH18-204. Collect above the water table from surface and at depth.
BH19-211	New	Soil	--	--							2		Horizontal delineation of TCE impacts in soil south of BH18-205. Collect above the water table from surface and at depth.
BH17-100i	New	Soil	--	1	pH only								Additional sampling required at location of elevated pH. Advance borehole within 1-2 m of MW17-100S and collect sample from exact interval (0.3-0.46 mbgs). Ensure absolutely no concrete/ concrete dust from coring is in sample collected.
BH17-100ii	New	Soil	--	1	pH only								Additional sampling required at location of elevated pH. Advance borehole within 1-2 m of MW17-100S and collect sample from exact interval (0.3-0.46 mbgs). Ensure absolutely no concrete/ concrete dust from coring is in sample collected.
OW07-32	Existing	Groundwater	--	--								1	APEC-16 (Transformers) lists PCBs as COPCs in groundwater, but PCBs have not been sampled in groundwater to date within this APEC.

Notes:

mbgs - metres below ground surface
Standards refers to Ministry of Environment and Climate Change "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated July 1, 2011
RPI - Residential, Parkland and Institutional Property Use
The following field parameters will be measured in groundwater during well purging: pH, ORP, DO, Temperature turbidity and Specific Conductance

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

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Figure C-1
Proposed Sampling Locations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

ch2m

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Attachment D
Analytical Data Relied Upon in the Risk Assessment

Table D-1. Summary of COC Screening in Soil
Table 6 Site Condition Standards
200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS) [c]	Potential for Exceedance of Applicable SCS at Nearest Offsite Receptor?	Retained as a Contaminant for Risk Assessment? (Rationale)
2-(1-)Methylnaphthalene	MTNPH12	4.93	µg/g	0.0011	0.99	Yes	**Yes, included (Max > Table 6 SCS)**
Acenaphthene	83329	94	µg/g	0.005	7.9	Yes	**Yes, included (Max > Table 6 SCS)**
Acenaphthylene	208968	2	µg/g	0.005	0.15	Yes	**Yes, included (Max > Table 6 SCS)**
Anthracene	120127	160	µg/g	0.005	0.67	Yes	**Yes, included (Max > Table 6 SCS)**
Antimony	7440360	18.6	µg/g	0.2	7.5	Yes	**Yes, included (Max > Table 6 SCS)**
Arsenic	7440382	23	µg/g	0.3	18	Yes	**Yes, included (Max > Table 6 SCS)**
Benzene	71432	0.26	µg/g	0.002	0.21	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(a)anthracene	56553	200	µg/g	0.005	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(a)pyrene	50328	130	µg/g	0.005	0.3	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(b)fluoranthene	205992	190	µg/g	0.005	0.78	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(g,h,i)perylene	191242	70	µg/g	0.005	6.6	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(k)fluoranthene	207089	66	µg/g	0.005	0.78	Yes	**Yes, included (Max > Table 6 SCS)**
Cadmium	7440439	83.4	µg/g	0.1	1.2	Yes	**Yes, included (Max > Table 6 SCS)**
Chrysene	218019	180	µg/g	0.005	7	Yes	**Yes, included (Max > Table 6 SCS)**
Cobalt	7440484	393	µg/g	0.1	22	Yes	**Yes, included (Max > Table 6 SCS)**
Copper	7440508	2460	µg/g	0.2	140	Yes	**Yes, included (Max > Table 6 SCS)**
Dibenzo(a,h)anthracene	53703	26	µg/g	0.005	0.1	Yes	**Yes, included (Max > Table 6 SCS)**
Ethylbenzene	100414	4.1	µg/g	0.002	1.1	Yes	**Yes, included (Max > Table 6 SCS)**
Fluoranthene	206440	660	µg/g	0.005	0.69	Yes	**Yes, included (Max > Table 6 SCS)**
Fluorene	86737	150	µg/g	0.005	62	Yes	**Yes, included (Max > Table 6 SCS)**
Indeno(1,2,3-Cd)Pyrene	193395	80	µg/g	0.005	0.38	Yes	**Yes, included (Max > Table 6 SCS)**
Lead	7439921	10100	µg/g	0.3	120	Yes	**Yes, included (Max > Table 6 SCS)**
Mercury	7439976	0.319	µg/g	0.005	0.27	Yes	**Yes, included (Max > Table 6 SCS)**
Molybdenum	7439987	35	µg/g	0.3	6.9	Yes	**Yes, included (Max > Table 6 SCS)**
Naphthalene	91203	220	µg/g	0.005	0.6	Yes	**Yes, included (Max > Table 6 SCS)**
Nickel	7440020	117	µg/g	0.3	100	Yes	**Yes, included (Max > Table 6 SCS)**
PCB, Total	1336363	1.65	µg/g	0.01	0.35	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F2 (C10-C16)	PHC_F2	3600	µg/g	10	98	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F3 (C16-C34)	PHC_F3	23000	µg/g	50	300	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F4 (C34-C50)	PHC_F4	7300	µg/g	50	2800	Yes	**Yes, included (Max > Table 6 SCS)**
Phenanthrene	85018	900	µg/g	0.005	6.2	Yes	**Yes, included (Max > Table 6 SCS)**
Pyrene	129000	470	µg/g	0.005	78	Yes	**Yes, included (Max > Table 6 SCS)**
Thallium	7440280	6	µg/g	0.05	1	Yes	**Yes, included (Max > Table 6 SCS)**
Trichloroethylene	79016	1	µg/g	0.004	0.061	Yes	**Yes, included (Max > Table 6 SCS)**
Vanadium	7440622	100	µg/g	0.2	86	Yes	**Yes, included (Max > Table 6 SCS)**
Xylenes, Total	1330207	3.9	µg/g	0.002	3.1	Yes	**Yes, included (Max > Table 6 SCS)**
Zinc	7440666	67200	µg/g	0.2	340	Yes	**Yes, included (Max > Table 6 SCS)**
1,1,1,2-Tetrachloroethane	630206	0.05	µg/g	0.002	0.058	No	No, excluded (Max < or = Table 6 SCS)
1,1,1-Trichloroethane	71556	0.05	µg/g	0.002	0.38	No	No, excluded (Max < or = Table 6 SCS)
1,1,2,2-Tetrachloroethane	79345	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)

Table D-1. Summary of COC Screening in Soil
Table 6 Site Condition Standards
200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS) [c]	Potential for Exceedance of Applicable SCS at Nearest Offsite Receptor?	Retained as a Contaminant for Risk Assessment? (Rationale)
1,1,2-Trichloroethane	79005	0.05	µg/g	0.05	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,1'-Biphenyl	92524	0.25	µg/g	0.05	0.31	No	No, excluded (Max < or = Table 6 SCS)
1,1-Dichloroethane	75343	0.05	µg/g	0.002	0.47	No	No, excluded (Max < or = Table 6 SCS)
1,1-Dichloroethene	75354	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,2,4-Trichlorobenzene	120821	0.25	µg/g	0.007	0.36	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dibromoethane	106934	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichlorobenzene	95501	0.05	µg/g	0.002	1.2	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloroethane	107062	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloropropane	78875	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,3-Dichlorobenzene	541731	0.05	µg/g	0.002	4.8	No	No, excluded (Max < or = Table 6 SCS)
1,3-Dichloropropene	542756	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
1,4-Dichlorobenzene	106467	0.05	µg/g	0.002	0.083	No	No, excluded (Max < or = Table 6 SCS)
1,4-Dioxane	123911	0.2	mg/kg	0.2	1.8	No	No, excluded (Max < or = Table 6 SCS)
2,4 & 2,6-Dinitrotoluene	DINIT2426	0.35	µg/g	0.0071	0.5	No	No, excluded (Max < or = Table 6 SCS)
2,4,5-Trichlorophenol	95954	1.3	µg/g	0.1	4.4	No	No, excluded (Max < or = Table 6 SCS)
2,4,6-Trichlorophenol	88062	1.3	µg/g	0.1	2.1	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dichlorophenol	120832	0.1	µg/g	0.1	0.19	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dimethylphenol	105679	1.3	µg/g	0.1	38	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dinitrophenol	51285	1	µg/g	1	2	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dinitrotoluene	121142	1.3	µg/g	0.1	--	--	No, excluded (no standard available; all results non-detect)
2,6-Dinitrotoluene	606202	1.3	µg/g	0.1	--	--	No, excluded (no standard available; all results non-detect)
2-Butanone	78933	0.5	µg/g	0.041	16	No	No, excluded (Max < or = Table 6 SCS)
2-Chloronaphthalene	91587	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
2-Chlorophenol	95578	1.3	µg/g	0.1	1.6	No	No, excluded (Max < or = Table 6 SCS)
2-Hexanone	591786	0.47	µg/g	0.26	--	--	No, excluded (no standard available; all results non-detect)
3,3'-Dichlorobenzidine	91941	0.5	µg/g	0.1	1	No	No, excluded (Max < or = Table 6 SCS)
4-Bromophenyl Phenyl Ether	101553	0.5	µg/g	0.5	--	--	No, excluded (no standard available; all results non-detect)
4-Chloroaniline	106478	0.5	µg/g	0.1	0.5	No	No, excluded (Max < or = Table 6 SCS)
4-Chlorophenyl Phenylether	7005723	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
4-Methyl-2-Pentanone	108101	0.5	µg/g	0.5	1.7	No	No, excluded (Max < or = Table 6 SCS)
Acetone	67641	1	µg/g	0.13	16	No	No, excluded (Max < or = Table 6 SCS)
Aluminum	7429905	16000	µg/g	5	--	--	No, excluded (Max < or = OTR Value)
Barium	7440393	277	µg/g	0.2	390	No	No, excluded (Max < or = Table 6 SCS)
Beryllium	7440417	4	µg/g	0.2	4	No	No, excluded (Max < or = Table 6 SCS)
Bis (2-chloroethoxy) methane	111911	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
Bis (2-chloroethyl) ether	111444	0.5	µg/g	0.1	0.5	No	No, excluded (Max < or = Table 6 SCS)
bis (2-Chloroisopropyl) ether	39638329	0.5	µg/g	0.5	0.67	No	No, excluded (Max < or = Table 6 SCS)
Bis (2-ethylhexyl) phthalate	117817	1.3	µg/g	0.1	5	No	No, excluded (Max < or = Table 6 SCS)
Boron	7440428	23	µg/g	5	120	No	No, excluded (Max < or = Table 6 SCS)
Boron (HWS)	7440428	0.87	µg/g	0.1	1.5	No	No, excluded (Max < or = Table 6 SCS)

Table D-1. Summary of COC Screening in Soil
Table 6 Site Condition Standards
200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS) [c]	Potential for Exceedance of Applicable SCS at Nearest Offsite Receptor?	Retained as a Contaminant for Risk Assessment? (Rationale)
Bromodichloromethane	75274	0.05	µg/g	0.003	1.5	No	No, excluded (Max < or = Table 6 SCS)
Bromoform	75252	0.05	µg/g	0.002	0.27	No	No, excluded (Max < or = Table 6 SCS)
Bromomethane	74839	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
Butyl benzyl phthalate	85687	0.5	µg/g	0.5	--	--	No, excluded (no standard available; all results non-detect)
Carbon tetrachloride	56235	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
Chloride (Cl)	16887006	122	µg/g	0.2	--	--	No, excluded (Max < or = OTR Value)
Chlorobenzene	108907	0.05	µg/g	0.002	2.4	No	No, excluded (Max < or = Table 6 SCS)
Chlorodibromomethane	124481	0.05	µg/g	0.05	2.3	No	No, excluded (Max < or = Table 6 SCS)
Chloroethane	75003	0.08	µg/g	0.005	--	--	No, excluded (no standard available; all results non-detect)
Chloroform	67663	0.05	µg/g	0.002	0.05	No	No, excluded (Max < or = Table 6 SCS)
Chloromethane	74873	2	µg/g	0.002	--	--	No, excluded (no standard available; all results non-detect)
Chromium	7440473	84.7	µg/g	0.3	160	No	No, excluded (Max < or = Table 6 SCS)
Chromium, Hexavalent (Cr6+)	18540299	0.4	µg/g	0.2	8	No	No, excluded (Max < or = Table 6 SCS)
cis-1,2-Dichloroethene	156592	0.05	µg/g	0.002	1.9	No	No, excluded (Max < or = Table 6 SCS)
Cyanide	57125	0.05	µg/g	0.05	0.051	No	No, excluded (Max < or = Table 6 SCS)
Dichlorodifluoromethane	75718	0.05	µg/g	0.05	16	No	No, excluded (Max < or = Table 6 SCS)
Dichloromethane	75092	0.05	µg/g	0.002	0.1	No	No, excluded (Max < or = Table 6 SCS)
Diethylphthalate	84662	0.5	µg/g	0.1	0.5	No	No, excluded (Max < or = Table 6 SCS)
Dimethylphthalate	131113	0.5	µg/g	0.1	0.5	No	No, excluded (Max < or = Table 6 SCS)
Di-N-Butylphthalate	84742	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
Di-n-octyl phthalate	117840	0.5	µg/g	0.5	--	--	No, excluded (no standard available; all results non-detect)
Electrical Conductivity	COND	0.514	mS/cm	0.002	0.7	No	No, excluded (Max < or = Table 6 SCS)
Hexachlorobenzene	118741	0.5	µg/g	0.5	0.52	No	No, excluded (Max < or = Table 6 SCS)
Hexachlorocyclopentadiene	77474	2	µg/g	2	--	--	No, excluded (no standard available; all results non-detect)
Isophorone	78591	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
Manganese	7439965	1810	µg/g	1	--	--	No, excluded (Max < or = OTR Value)
Methyl tert-butyl ether (MTBE)	1634044	0.06	µg/g	0.004	0.75	No	No, excluded (Max < or = Table 6 SCS)
n-Hexane	110543	0.861	µg/g	0.05	2.8	No	No, excluded (Max < or = Table 6 SCS)
Nitrobenzene	98953	0.2	µg/g	0.2	--	--	No, excluded (no standard available; all results non-detect)
N-Nitrosodi-N-propylamine	621647	1	µg/g	1	--	--	No, excluded (no standard available; all results non-detect)
N-Nitrosodiphenylamine	86306	0.5	µg/g	0.5	--	--	No, excluded (no standard available; all results non-detect)
Pentachlorophenol	87865	0.1	µg/g	0.1	0.1	No	No, excluded (Max < or = Table 6 SCS)
Petroleum Hydrocarbons F1 (C6-C10)	PHC_F1	20	µg/g	5	55	No	No, excluded (Max < or = Table 6 SCS)
Phenol	108952	1.3	µg/g	0.01	9.4	No	No, excluded (Max < or = Table 6 SCS)
Potassium	7440097	2000	µg/g	10	--	--	No, excluded (Max < or = OTR Value)
Selenium	7782492	1	µg/g	0.22	2.4	No	No, excluded (Max < or = Table 6 SCS)
Silver	7440224	7.8	µg/g	0.2	20	No	No, excluded (Max < or = Table 6 SCS)
Sodium Absorption Ratio	SAR	2	SAR	0.1	5	No	No, excluded (Max < or = Table 6 SCS)
Styrene	100425	0.05	µg/g	0.002	0.7	No	No, excluded (Max < or = Table 6 SCS)
Tetrachloroethene	127184	0.05	µg/g	0.002	0.28	No	No, excluded (Max < or = Table 6 SCS)

Table D-1. Summary of COC Screening in Soil
Table 6 Site Condition Standards
200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit (MDL)	Applicable Site Condition Standard (SCS) [c]	Potential for Exceedance of Applicable SCS at Nearest Offsite Receptor?	Retained as a Contaminant for Risk Assessment? (Rationale)
Tin	7440315	9.6	µg/g	5	--	--	No, excluded (Max < or = CCME Value)
Titanium	7440326	532	µg/g	0.5	--	--	No, excluded (Max < or = OTR Value)
Toluene	108883	1.2	µg/g	0.002	2.3	No	No, excluded (Max < or = Table 6 SCS)
trans-1,2-Dichloroethene	156605	0.05	µg/g	0.003	0.084	No	No, excluded (Max < or = Table 6 SCS)
Trichlorofluoromethane	75694	0.08	µg/g	0.004	4	No	No, excluded (Max < or = Table 6 SCS)
Uranium	7440611	2.6	µg/g	0.05	23	No	No, excluded (Max < or = Table 6 SCS)
Vinyl Chloride	75014	0.02	µg/g	0.002	0.02	No	No, excluded (Max < or = Table 6 SCS)
Zirconium	7440677	19	µg/g	--	--	--	No, excluded (Max < or = OTR Value)

Source:
MECP. 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* April 15.
Notes:
Bold parameters are identified as COCs.

[a.] The representative maximum concentration (the maximum concentration of similar analytes or total concentration of multiple isomers) is used for comparison.

[b.] Column lists the greater of the maximum detected concentration and the maximum nondetect concentration.

[c.] Ontario Regulation 153/04, *Table 6: Full Depth Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition* for Residential/Parkland/Institutional Property Use (MECP, 2011).

-- = no value or not applicable
> = greater than
< = less than
µg/g = microgram per gram
COC = contaminant of concern
DND = Department of National Defence
EXP = Explosives
F = fraction
Max = maximum concentration
MDL = method detection limit
Ministry = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not available
No. = number
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
SCS = Site Condition Standard

Table D-2. Summary of COC Screening in Groundwater

Table 6 Site Condition Standards

200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit	Applicable SCS [c]	Potential for Exceedances of Applicable SCSs at Nearest Offsite Receptors?	Retained as a Contaminant for Risk Assessment? (Rationale)
1,1,1-Trichloroethane	71556	50	µg/L	0.1	23	Yes	**Yes, included (Max > Table 6 SCS)**
1,1-Dichloroethane	75343	50	µg/L	0.1	5	Yes	**Yes, included (Max > Table 6 SCS)**
1,1-Dichloroethene	75354	64	µg/L	0.1	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
2-(1-)Methylnaphthalene	MTNPH12	280	µg/L	0.028	3.2	Yes	**Yes, included (Max > Table 6 SCS)**
Acenaphthene	83329	40	µg/L	0.02	4.1	Yes	**Yes, included (Max > Table 6 SCS)**
Anthracene	120127	31	µg/L	0.02	1	Yes	**Yes, included (Max > Table 6 SCS)**
Arsenic	7440382	45.7	µg/L	0.1	25	Yes	**Yes, included (Max > Table 6 SCS)**
Benzene	71432	66.8	µg/L	0.1	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(a)anthracene	56553	21	µg/L	0.02	1	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(a)pyrene	50328	2.4	µg/L	0.01	0.01	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(b&j)fluoranthene	CH2MBZBJF	10	µg/L	0.05	0.1	Yes	**Yes, included (Max > Table 6 SCS)**
Benzo(k)fluoranthene	207089	10	µg/L	0.02	0.1	Yes	**Yes, included (Max > Table 6 SCS)**
Chrysene	218019	38	µg/L	0.02	0.1	Yes	**Yes, included (Max > Table 6 SCS)**
cis-1,2-Dichloroethene	156592	960	µg/L	0.1	1.6	Yes	**Yes, included (Max > Table 6 SCS)**
Ethylbenzene	100414	50	µg/L	0.1	2.4	Yes	**Yes, included (Max > Table 6 SCS)**
Fluoranthene	206440	24	µg/L	0.02	0.41	Yes	**Yes, included (Max > Table 6 SCS)**
Lead	7439921	17	µg/L	0.05	10	Yes	**Yes, included (Max > Table 6 SCS)**
Naphthalene	91203	27	µg/L	0.05	7	Yes	**Yes, included (Max > Table 6 SCS)**
n-Hexane	110543	250	µg/L	0.5	5	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F1 (C6-C10)	PHC_F1	1100	µg/L	25	420	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F2 (C10-C16)	PHC_F2	210000	µg/L	100	150	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F3 (C16-C34)	PHC_F3	850000	µg/L	100	500	Yes	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F4 (C34-C50)	PHC_F4	37000	µg/L	100	500	Yes	**Yes, included (Max > Table 6 SCS)**
Phenanthrene	85018	110	µg/L	0.02	1	Yes	**Yes, included (Max > Table 6 SCS)**
Pyrene	129000	59	µg/L	0.02	4.1	Yes	**Yes, included (Max > Table 6 SCS)**
Tetrachloroethene	127184	50	µg/L	0.1	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
trans-1,2-Dichloroethene	156605	81	µg/L	0.1	1.6	Yes	**Yes, included (Max > Table 6 SCS)**
Trichloroethylene	79016	7900	µg/L	0.1	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
Vinyl Chloride	75014	100	µg/L	0.17	0.5	Yes	**Yes, included (Max > Table 6 SCS)**
Zinc	7440666	4500	µg/L	0.005	890	Yes	**Yes, included (Max > Table 6 SCS)**
1,1,1,2-Tetrachloroethane	630206	1	µg/L	0.1	1.1	No	No, excluded (Max < or = Table 6 SCS)
1,1,2,2-Tetrachloroethane	79345	0.5	µg/L	0.2	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,1,2-Trichloroethane	79005	0.5	µg/L	0.2	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,1'-Biphenyl	92524	0.4	µg/L	0.05	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,2,4-Trichlorobenzene	120821	0.4	µg/L	0.3	3	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dibromoethane	106934	0.2	µg/L	0.2	0.2	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichlorobenzene	95501	2	µg/L	0.1	3	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloroethane	107062	0.5	µg/L	0.2	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloropropane	78875	0.5	µg/L	0.1	0.58	No	No, excluded (Max < or = Table 6 SCS)
1,3-Dichlorobenzene	541731	50	µg/L	0.1	59	No	No, excluded (Max < or = Table 6 SCS)
1,3-Dichloropropene	542756	0.5	µg/L	0.28	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,4-Dichlorobenzene	106467	0.5	µg/L	0.1	0.5	No	No, excluded (Max < or = Table 6 SCS)
1,4-Dioxane	123911	20	µg/L	20	50	No	No, excluded (Max < or = Table 6 SCS)
2,4 & 2,6-Dinitrotoluene	DINIT2426	0.57	µg/L	0.57	5	No	No, excluded (Max < or = Table 6 SCS)
2,4,5-Trichlorophenol	95954	0.2	µg/L	0.2	8.9	No	No, excluded (Max < or = Table 6 SCS)
2,4,6-Trichlorophenol	88062	0.2	µg/L	0.2	2	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dichlorophenol	120832	0.3	µg/L	0.3	20	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dimethylphenol	105679	0.5	µg/L	0.5	59	No	No, excluded (Max < or = Table 6 SCS)

Table D-2. Summary of COC Screening in Groundwater

Table 6 Site Condition Standards

200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit	Applicable SCS [c]	Potential for Exceedances of Applicable SCSs at Nearest Offsite Receptors?	Retained as a Contaminant for Risk Assessment? (Rationale)
2,4-Dinitrophenol	51285	1	µg/L	1	10	No	No, excluded (Max < or = Table 6 SCS)
2,4-Dinitrotoluene	121142	0.4	µg/L	0.4	--	--	No, excluded (no standard available; all results non-detect)
2,6-Dinitrotoluene	606202	0.4	µg/L	0.4	--	--	No, excluded (no standard available; all results non-detect)
2-Butanone	78933	1300	µg/L	0.3	1800	No	No, excluded (Max < or = Table 6 SCS)
2-Chlorophenol	95578	0.3	µg/L	0.3	8.9	No	No, excluded (Max < or = Table 6 SCS)
2-Hexanone	591786	0.3	µg/L	0.3	--	--	No, excluded (no standard available; all results non-detect)
3,3'-Dichlorobenzidine	91941	0.4	µg/L	0.4	0.5	No	No, excluded (Max < or = Table 6 SCS)
4-Chloroaniline	106478	0.4	µg/L	0.4	10	No	No, excluded (Max < or = Table 6 SCS)
4-Methyl-2-Pentanone	108101	250	µg/L	5	640	No	No, excluded (Max < or = Table 6 SCS)
Acenaphthylene	208968	0.553	µg/L	0.02	1	No	No, excluded (Max < or = Table 6 SCS)
Acetone	67641	2500	µg/L	0.5	2700	No	No, excluded (Max < or = Table 6 SCS)
Alkalinity, Carbonate (as CaCO3)	ALKC	10000	µg/L	1	--	--	No, excluded (Max < or = PGMIS Value)
Alkalinity, Hydroxide (as CaCO3)	ALKH	10000	µg/L	10	--	--	No, excluded (Max < or = PGMIS Value)
Aluminum	7429905	5	µg/L	5	--	--	No, excluded (Max < or = PGMIS Value)
Antimony	7440360	3.3	µg/L	0.1	6	No	No, excluded (Max < or = Table 6 SCS)
Barium	7440393	283	µg/L	0.1	1000	No	No, excluded (Max < or = Table 6 SCS)
Benzo(g,h,i)perylene	191242	0.1	µg/L	0.02	0.2	No	No, excluded (Max < or = Table 6 SCS)
Beryllium	7440417	1	µg/L	0.1	4	No	No, excluded (Max < or = Table 6 SCS)
Bis (2-chloroethyl) ether	111444	0.4	µg/L	0.4	5	No	No, excluded (Max < or = Table 6 SCS)
Bis (2-ethylhexyl) phthalate	117817	2	µg/L	2	10	No	No, excluded (Max < or = Table 6 SCS)
Bismuth	7440699	0.05	µg/L	0.05	--	--	No, excluded (no standard available; all results non-detect)
Boron	7440428	251	µg/L	10	5000	No	No, excluded (Max < or = Table 6 SCS)
Bromodichloromethane	75274	7.3	µg/L	0.1	16	No	No, excluded (Max < or = Table 6 SCS)
Bromoform	75252	5	µg/L	0.1	5	No	No, excluded (Max < or = Table 6 SCS)
Bromomethane	74839	0.5	µg/L	0.2	0.89	No	No, excluded (Max < or = Table 6 SCS)
Cadmium	7440439	1.33	µg/L	0.01	2.1	No	No, excluded (Max < or = Table 6 SCS)
Carbon tetrachloride	56235	0.2	µg/L	0.1	0.2	No	No, excluded (Max < or = Table 6 SCS)
Chloride (Cl)	16887006	327000	µg/L	0.5	790000	No	No, excluded (Max < or = Table 6 SCS)
Chlorobenzene	108907	25	µg/L	0.1	30	No	No, excluded (Max < or = Table 6 SCS)
Chlorodibromomethane	124481	10	µg/L	0.2	25	No	No, excluded (Max < or = Table 6 SCS)
Chloroethane	75003	50	µg/L	0.2	--	--	No, excluded (no standard available; all results non-detect)
Chloroform	67663	2	µg/L	0.1	2	No	No, excluded (Max < or = Table 6 SCS)
Chloromethane	74873	130	µg/L	0.4	--	--	No, excluded (no standard available; all results non-detect)
Chromium	7440473	13.3	µg/L	0.5	50	No	No, excluded (Max < or = Table 6 SCS)
Chromium, Hexavalent (Cr6+)	18540299	5	µg/L	1	25	No	No, excluded (Max < or = Table 6 SCS)
Cobalt	7440484	2.29	µg/L	0.1	3.8	No	No, excluded (Max < or = Table 6 SCS)
Copper	7440508	20	µg/L	0.02	69	No	No, excluded (Max < or = Table 6 SCS)
Cyanide	57125	20	µg/L	2	52	No	No, excluded (Max < or = Table 6 SCS)
Cyanide, Free	57125_F	2	µg/L	2	52	No	No, excluded (Max < or = Table 6 SCS)
Dibenzo(a,h)anthracene	53703	0.1	µg/L	0.02	0.2	No	No, excluded (Max < or = Table 6 SCS)
Dichlorodifluoromethane	75718	250	µg/L	0.5	590	No	No, excluded (Max < or = Table 6 SCS)
Dichloromethane	75092	25	µg/L	0.3	26	No	No, excluded (Max < or = Table 6 SCS)
Diethylphthalate	84662	0.2	µg/L	0.2	30	No	No, excluded (Max < or = Table 6 SCS)
Dimethylphthalate	131113	0.2	µg/L	0.2	30	No	No, excluded (Max < or = Table 6 SCS)
Fluorene	86737	83	µg/L	0.02	120	No	No, excluded (Max < or = Table 6 SCS)
Hardness (as CaCO3)	HARD	990000	µg/L	1	--	--	No, excluded (Max < or = PGMIS Value)
Indeno(1,2,3-Cd)Pyrene	193395	0.1	µg/L	0.02	0.2	No	No, excluded (Max < or = Table 6 SCS)
Magnesium	7439954	46000	µg/L	0.05	--	--	No, excluded (Max < or = PGMIS Value)

Table D-2. Summary of COC Screening in Groundwater

Table 6 Site Condition Standards

200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit	Applicable SCS [c]	Potential for Exceedances of Applicable SCSs at Nearest Offsite Receptors?	Retained as a Contaminant for Risk Assessment? (Rationale)
Mercury	7439976	0.02	µg/L	0.01	0.1	No	No, excluded (Max < or = Table 6 SCS)
Methyl tert-butyl ether (MTBE)	1634044	10	µg/L	0.2	15	No	No, excluded (Max < or = Table 6 SCS)
Molybdenum	7439987	52.4	µg/L	0.05	70	No	No, excluded (Max < or = Table 6 SCS)
Nickel	7440020	16.2	µg/L	0.5	100	No	No, excluded (Max < or = Table 6 SCS)
Nitrate, as NO3	14797558	1370	µg/L	0.02	--	--	No, excluded (Max < or = PGMIS Value)
Nitrate-Nitrite, as N, Total	NO3NO2N	160	µg/L	0.022	--	--	No, excluded (Max < or = PGMIS Value)
Nitrite, as NO2	14797650	100	µg/L	0.01	--	--	No, excluded (Max < or = PGMIS Value)
PCB, Total	1336363	0.2	µg/L	0.04	0.2	No	No, excluded (Max < or = Table 6 SCS)
Pentachlorophenol	87865	0.5	µg/L	0.5	30	No	No, excluded (Max < or = Table 6 SCS)
Perylene	198550	5	µg/L	0.05	--	--	No, excluded (no standard available; all results non-detect)
Phenol	108952	0.5	µg/L	0.5	890	No	No, excluded (Max < or = Table 6 SCS)
Phosphorus	7723140	50	µg/L	50	--	--	No, excluded (Max < or = PGMIS Value)
Phosphorus, Total Orthophosphate (As P)	PORTHO	760	µg/L	0.003	--	--	No, excluded (Max < or = PGMIS Value)
Selenium	7782492	6.26	µg/L	0.05	10	No	No, excluded (Max < or = Table 6 SCS)
Silver	7440224	0.5	µg/L	0.05	1.2	No	No, excluded (Max < or = Table 6 SCS)
Sodium	7440235	183000	µg/L	0.5	490000	No	No, excluded (Max < or = Table 6 SCS)
Strontium	7440246	1050	µg/L	1	--	--	No, excluded (Max < or = PGMIS Value)
Styrene	100425	5	µg/L	0.1	5.4	No	No, excluded (Max < or = Table 6 SCS)
Sulfate	14808798	910000	µg/L	0.3	--	--	No, excluded (Max < or = PGMIS Value)
Tellurium	13494809	0.2	µg/L	0.2	--	--	No, excluded (no standard available; all results non-detect)
Thallium	7440280	0.984	µg/L	0.01	2	No	No, excluded (Max < or = Table 6 SCS)
Thorium	7440291	0.1	µg/L	0.1	--	--	No, excluded (no standard available; all results non-detect)
Titanium	7440326	0.3	µg/L	0.3	--	--	No, excluded (Max < or = PGMIS Value)
Toluene	108883	10	µg/L	0.2	24	No	No, excluded (Max < or = Table 6 SCS)
Total dissolved solids	TDS	1200000	µg/L	1	--	--	No, excluded (Max < or = PGMIS Value)
Trichlorofluoromethane	75694	100	µg/L	0.2	150	No	No, excluded (Max < or = Table 6 SCS)
Tungsten	7440337	0.1	µg/L	0.1	--	--	No, excluded (no standard available; all results non-detect)
Uranium	7440611	17	µg/L	0.01	20	No	No, excluded (Max < or = Table 6 SCS)
Vanadium	7440622	5	µg/L	0.4	6.2	No	No, excluded (Max < or = Table 6 SCS)
Xylenes, Total	1330207	50	µg/L	0.1	72	No	No, excluded (Max < or = Table 6 SCS)
Zirconium	7440677	0.3	µg/L	0.3	--	--	No, excluded (no standard available; all results non-detect)

Source:

MECP. 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* April 15.

[a] The representative maximum concentration (the maximum concentration of similar analytes or total concentration of multiple isomers) is used for comparison.

[b] Column lists the greater of the maximum detected concentration and the maximum nondetect concentration.

[c] Ontario Regulation 153/04, *Table 6: Full Depth Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition* for Residential/Parkland/Institutional Property Use (MECP, 2011).

Notes:

Bold parameters are identified as COCs

-- = no value or not applicable
> = greater than
< = less than
µg/L = microgram(s) per litre
ABN = acid base neutral compounds
BTEX = benzene, toluene, ethylbenzene, and xylenes
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PGMIS = provincial grounwater monitoring information system
PHC = petroleum hydrocarbon
SCS = Site Condition Standard
VOC = volatile organic compound

Table D-2. Summary of COC Screening in Groundwater

Table 6 Site Condition Standards

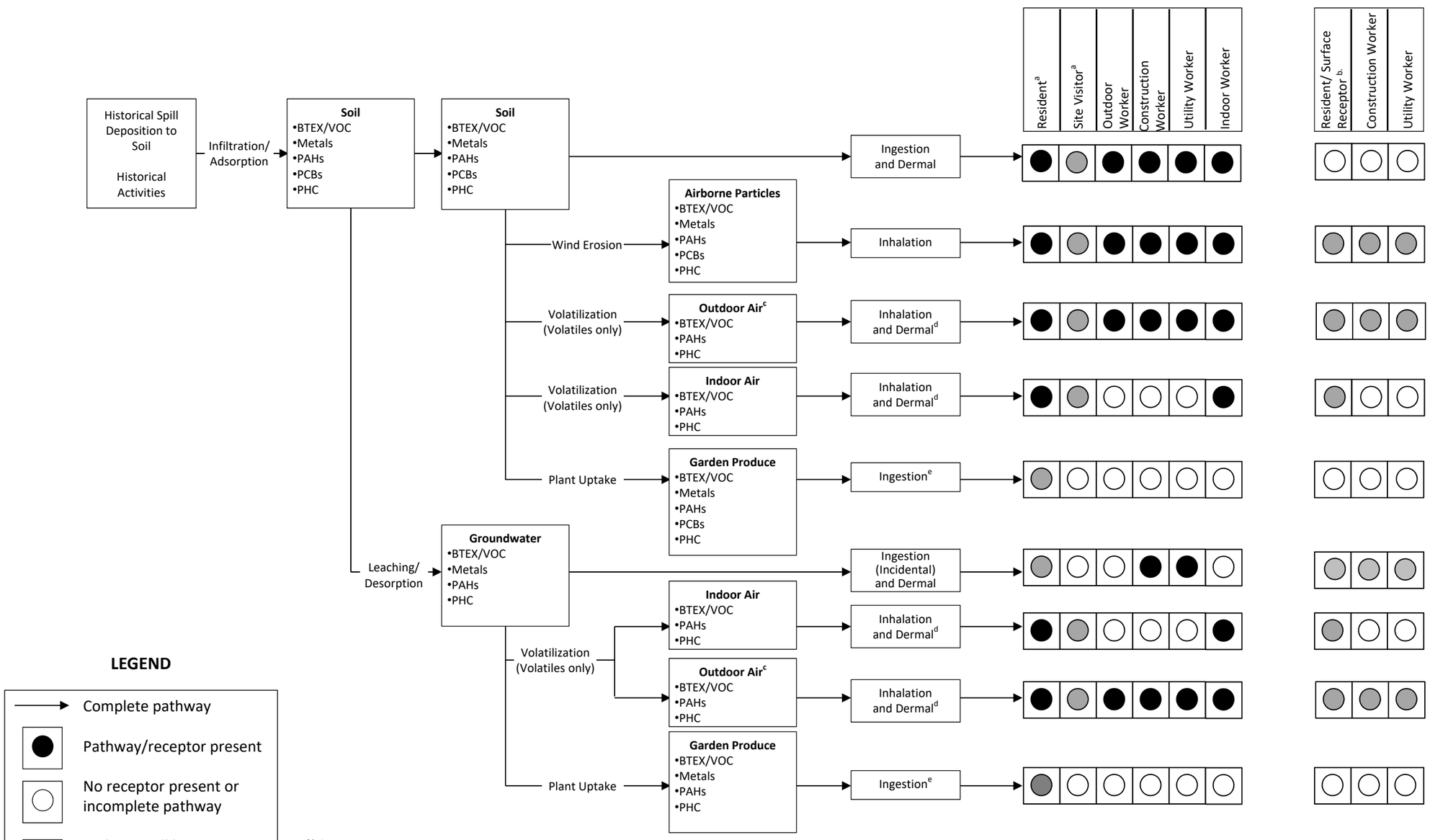
200 Beverley Street, Guelph, Ontario

Contaminant [a]	Contaminant Identifier	Maximum Measured Concentration [b]	Units	Minimum Detection Limit	Applicable SCS [c]	Potential for Exceedances of Applicable SCSs at Nearest Offsite Receptors?	Retained as a Contaminant for Risk Assessment? (Rationale)

COC = contaminant of concern

CP = chlorophenol

Attachment E
Human Health and Ecological Conceptual Site Models

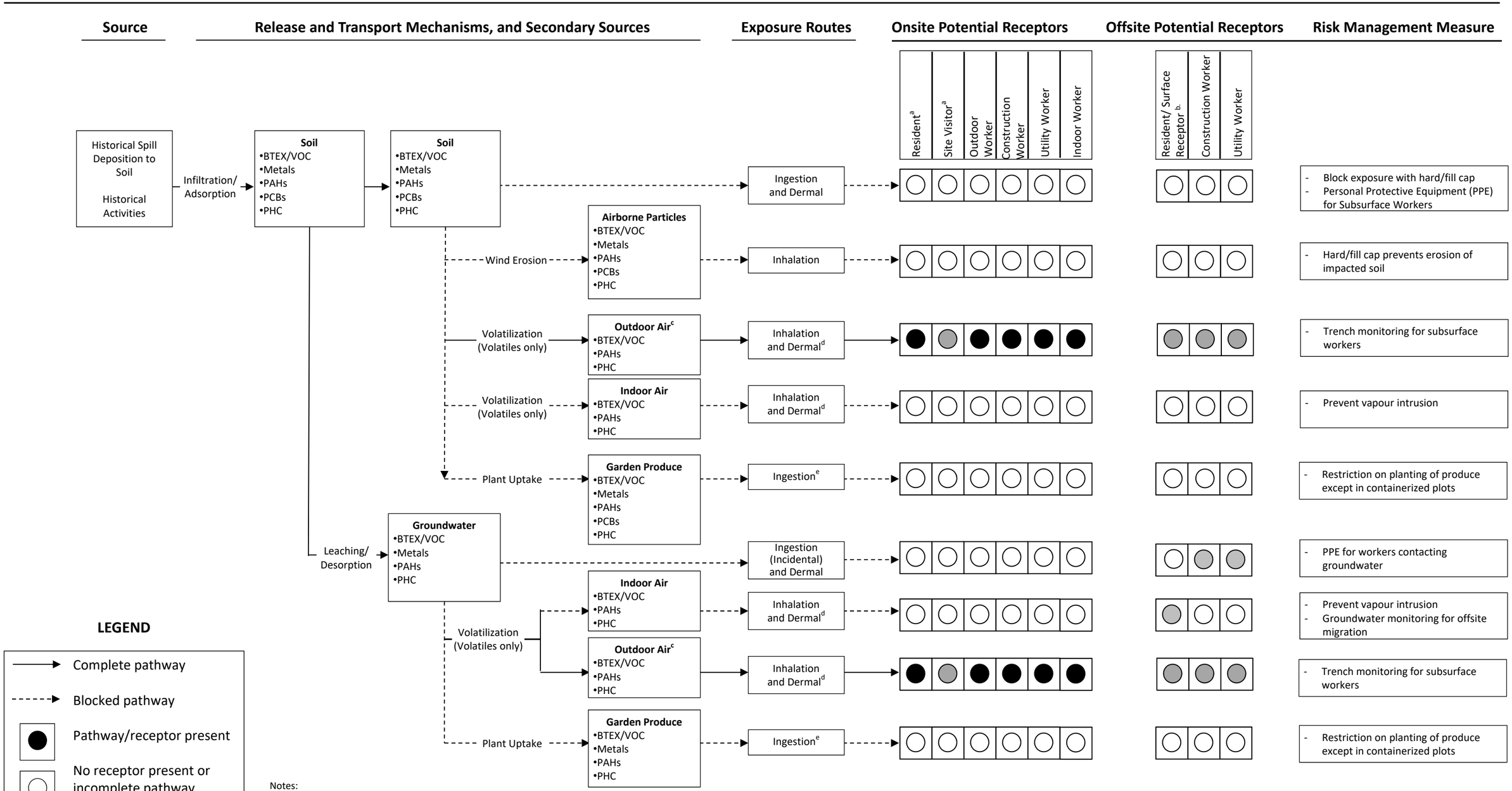


Notes:

a. Resident and Site Visitors from all age categories would be anticipated to frequent the site under a parkland, residential, commercial, or community redevelopment scenario.
b. Surface Receptor incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as indoor workers, residents, visitors, outdoor workers, or patrons of nearby properties that may be exposed to dust (soil particulates) or groundwater migrating offsite during the redevelopment of the property in the absence of RMMs.
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore, this pathway will not be considered quantitatively.

BTEX = benzene, toluene, ethylbenzene, and xylenes
COC = contaminant of concern
PAH = polycyclic aromatic hydrocarbon
PHC = petroleum hydrocarbon
VOC = volatile organic compound
PCB = polychlorinated biphenyls
RMM = risk management measure

Figure E-1. Human Health Conceptual Site Model
200 Beverley Street, Guelph, Ontario

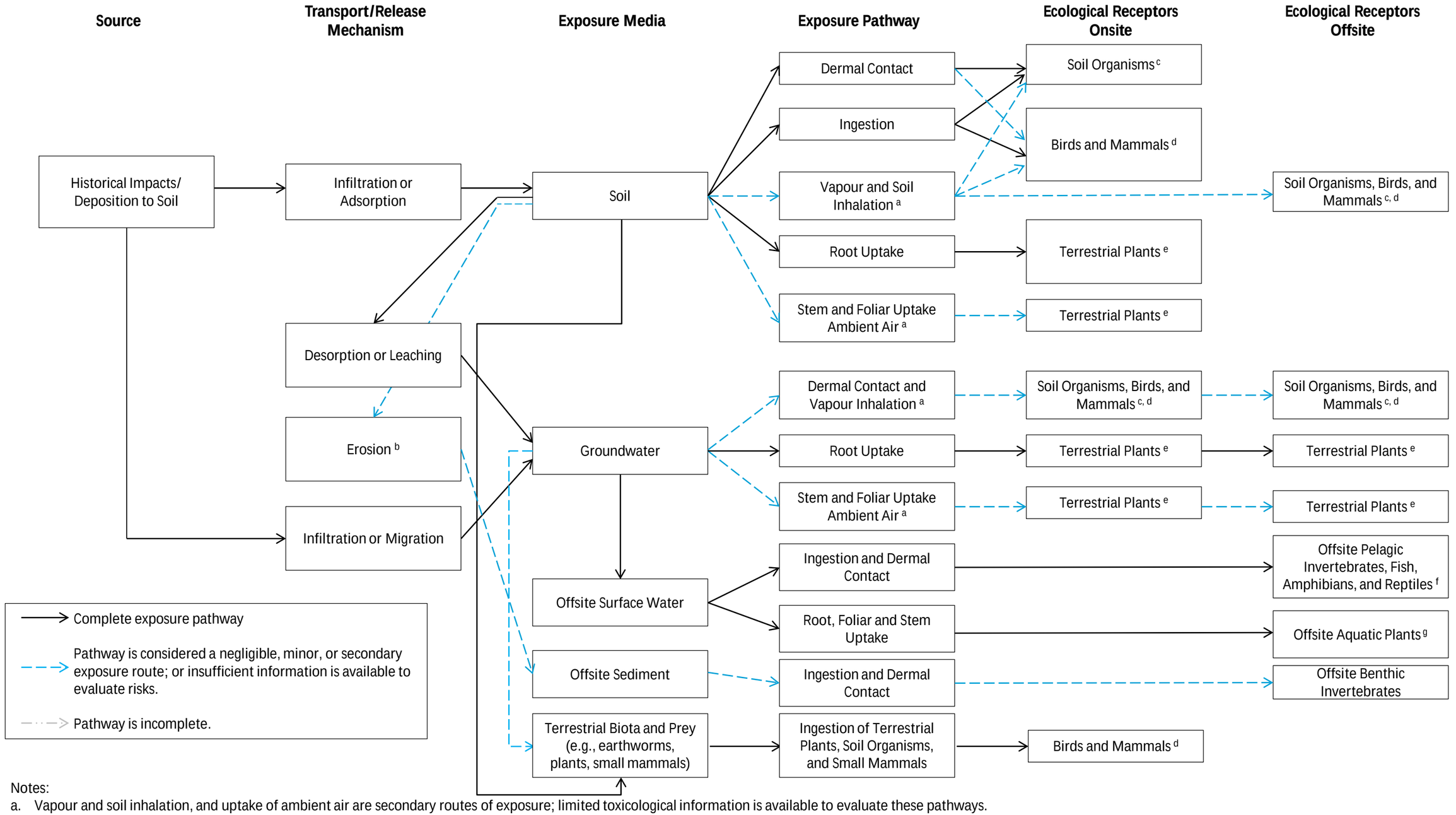


Notes:

a. Resident and Site Visitors from all age categories would be anticipated to frequent the site under a parkland, residential, commercial, or community redevelopment scenario.
b. Surface Receptor incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as indoor workers, visitors, outdoor workers, or patrons of nearby properties that may be exposed to dust (soil particulates) or groundwater migrating offsite during the redevelopment of the property in the absence of RMMs.
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore this pathway will not be considered quantitatively.

BTEX = benzene, toluene, ethylbenzene, and xylenes
COC = contaminant of concern
PAH = polycyclic aromatic hydrocarbon
PHC = petroleum hydrocarbon
VOC = volatile organic compound
PCB = polychlorinated biphenyls
RMM = risk management measure

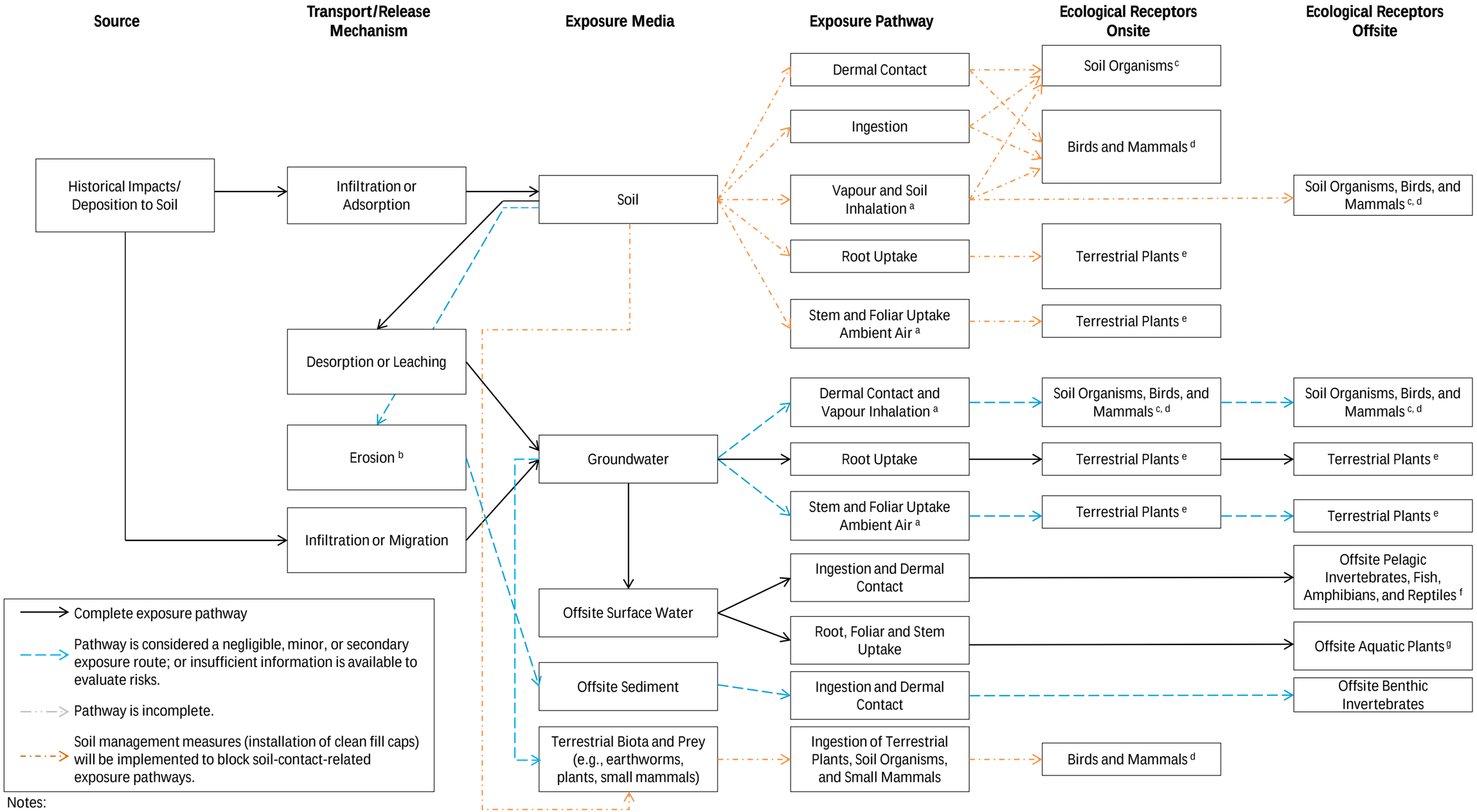
Figure E-2. Human Health Conceptual Site Model with Risk Management Measures
200 Beverley Street, Guelph, Ontario



Notes:

a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Pathway incomplete.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Emerald Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure E-3. Ecological Conceptual Site Model
200 Beverley Street, Guelph, Ontario



Notes:

a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Pathway incomplete.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Emerald Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure E-4. Ecological Conceptual Site Model with Risk Management Measures
200 Beverley Street, Guelph, Ontario

Attachment F
Toxicity Reference Values

Table F-1. Human Health Toxicity Reference Values

200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Acenaphthene	RfD	6.0E-02	mg/kg/day	Hepatotoxicity.	Mice	MECP, 2011	EPA IRIS, 1994	No
	RfD Sub-chronic	6.0E-01	mg/kg/day	Increased liver weight.	Mice	MECP, 2011	ATSDR, 1995	No
	SF	1.0E-03	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-04	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Acenaphthylene	RfD	6.0E-02	mg/kg/day	Hepatotoxicity (surrogate values from acenaphthene). [e]	Mice	MECP, 2011	EPA IRIS, 1994	No
	RfD Sub-chronic	6.0E-01	mg/kg/day	Increased liver weight (surrogate value from acenaphthene). [e]	Mice	MECP, 2011	ATSDR, 1995	No
	SF	1.0E-02	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-03	1/[mg/^{3}]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Anthracene	RfD	3.0E-01	mg/kg/day	No observed effects.	Mice	MECP, 2011	EPA IRIS, 1990	No
	RfD Sub-chronic	3.0E+00	mg/kg/day	No observed effects.	Mice	MECP, 2011	EPA IRIS, 1990 (modified) a	No
	RfC	5.0E-02	mg/m^3	Body weight reduction, hepatic, renal, and developmental effects (surrogate value from C9 - C18 Aromatic Fraction). [d,e]	Rats	MADEP, 2004	TPHCWG, 1997	Yes
Antimony (Sb)	RfD	6.0E-03	mg/kg/day	Decreased body weight and food intake.	Rats	MECP, 2013a	WHO DW, 2003; RIVM, 2009	No
	RfC	2.0E-04	mg/m^3	Antimony trioxide-Pulmonary toxicity, and chronic interstitial inflammation.	Rats	MECP, 2011	EPA IRIS, 1995	No
Arsenic (As)	RfD	3.0E-04	mg/kg/day	Hyperpigmentation, keratosis, and possible vascular complications.	Humans	MECP, 2017a	EPA IRIS, 1991; ATSDR, 2007	No
	RfC	NA	mg/m^3	None Selected.	-	MECP, 2017a	-	No
	SF	9.5E+00	1/[mg/kg/day]	Lung cancer, multiple internal organ cancers (liver, kidney, lung, and bladder), skin cancer.	Humans	MECP, 2017a	-	No
	URF	1.5E-01	1/[mg/m^3]	Lung cancer.	Humans	MECP, 2017a	-	No
Benz[a]anthracene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E-01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-02	1/[mg/m^3]	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene

Table F-1. Human Health Toxicity Reference Values

200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Benzene	RfD	5.0E-04	mg/kg/day	Decreased lymphocyte count.	Humans	ATSDR, 2007	-	Yes
	RfC	3.0E-02	mg/m^3	Decreased lymphocyte count.	Humans	MECP, 2011	EPA IRIS, 2003	No
	SF	8.3E-02	1/[mg/kg/day]	Malignant lymphomas (female mice); bone marrow hematopoietic hyperplasia (male mice)	Mice	HC, 2010	-	Yes
	URF	2.2E-03	$1/[mg/m^3]$	Leukemia.	Humans	MECP, 2011	EPA IRIS, 2000	No
Benzo[a]pyrene	RfD	3.0E-04	mg/kg/day	Neurobehavioural changes (developmental). [d]	Rats	EPA IRIS, 2017	-	Yes
	RfC	2.0E-06	mg/m^3	Decreased embryo/fetal survival (developmental). [d]	Rats	EPA IRIS, 2017	-	Yes
	SF	1.0E+00	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (1) employed.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes
	URF	6.0E-01	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (1) employed.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes
Benzo[b]fluoranthene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E-01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-02	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Benzo[g,h,i]perylene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E-02	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-03	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Benzo[k]fluoranthene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E-01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-02	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Cadmium	RfD	1.0E-04	mg/kg/day	Renal toxicity.	Humans	ATSDR, 2012	-	Yes
	RfC	1.0E-05	mg/m^3	Kidney toxicity.	Humans	ATSDR, 2012	-	Yes
	SF	NA	1/[mg/kg/day]	-	-	-	-	No
	URF	9.8E+00	$1/[mg/m^3]$	Lung carcinomas.	Rats	MECP, 2011	HC, 2010	No

Table F-1. Human Health Toxicity Reference Values

200 Beverley Street, Guelph, Ontario

Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Chrysene	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E-02	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-03	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Cobalt (Co)	RfD	1.0E-03	mg/kg/day	Polycythemia (proportion of blood volume that is occupied by red blood cells increased).	Humans	MECP, 2011	ATSDR, 2004	No
	RfD Sub-chronic	1.0E-02	mg/kg/day	Polycythemia (proportion of blood volume that is occupied by red blood cells increased).	Humans	MECP, 2011	ATSDR, 2004	No
	RfC	6.0E-06	mg/m^3	Decreased pulmonary function and respiratory tract irritation.	Humans	EPA PPRTV, 2008	-	Yes
	RfC Sub-chronic	2.0E-05	mg/m^3	Decreased pulmonary function and respiratory tract irritation.	Humans	EPA PPRTV, 2008	-	Yes
	URF	1.1E-07	$1/[mg/m^3]$	Lung adenoma or carcinoma.	Rats	EPA PPRTV, 2008	-	Yes
Copper (Cu)	RfD	1.0E-02	mg/kg/day	Gastrointestinal effects.	Humans	MECP, 2016e	ATSDR, 2004	No
	RfC	NA	mg/m^3	None Selected.	-	MECP, 2016e	-	No
Dibenz[a,h]anthracene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
	SF	1.0E+00	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (1) employed; see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-01	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (1) employed; see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Dichloroethane, 1,1-	RfD	2.0E-01	mg/kg/day	Renal toxicity.	Rats	EPA PPRTV, 2006	-	Yes
	RfD Sub-chronic	4.0E-01	mg/kg/day	Kidney damage (for example, increased serum creatinine and urea).	Cats	MECP, 2011	CalEPA DW, 2003	No
	RfC	1.7E-01	mg/m^3	Kidney damage (for example, increased serum creatinine and urea).	Cats	MECP, 2011	EPA HEAST, 1984	No
	SF	5.7E-03	1/[mg/kg/day]	Mammary gland adenocarcinomas.	Rats	CalEPA DW, 2003	-	Yes
	URF	1.6E-03	$1/[mg/m^3]$	Mammary gland adenocarcinomas.	Rats	CalEPA DW, 2003	-	Yes
Dichloroethylene, 1,1-	RfD	5.0E-02	mg/kg/day	Hepatic toxicity (fatty change).	Rats	MECP, 2016f	WHO CICAD, 2003; EPA IRIS, 2002	No
	RfC	2.0E-01	mg/m^3	Hepatic toxicity (fatty change).	Rats	MECP, 2016f	WHO CICAD, 2003; EPA IRIS, 2002	No
	RfC Sub-chronic	7.9E-02	mg/m^3	Hepatic effects (mottled livers).	Guinea Pigs	MECP, 2011	ATSDR, 1994	No
Dichloroethylene, cis-1,2- [f]	RfD	2.0E-03	mg/kg/day	Increased kidney and liver weights; decrease hematocrit.	Rats	MECP, 2016a	EPA IRIS, 2010	No
	RfD Sub-chronic	1.7E-02	mg/kg/day	Increased kidney and liver weights; decrease hematocrit.	Rats	MECP, 2016a	EPA PPRTV, 2011	No
	RfC	NA	mg/m^3	None Selected.	--	MECP, 2016a	-	No

Table F-1. Human Health Toxicity Reference Values
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Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Dichloroethylene, trans-1,2-	RfD	2.0E-02	mg/kg/day	Decrease in number of antibody forming cells.	Mice	MECP, 2016b	EPA IRIS, 2010	No
	RfD Sub-chronic	6.5E-02	mg/kg/day	Decrease in number of antibody forming cells.	Mice	MECP, 2016b	EPA IRIS, 2010 (modified) a	No
	RfC	6.0E-02	mg/m^3	Fatty degeneration of the liver lobules and Kupffer cells, and pulmonary hyperaemia, alveolar septal distension, and pneumonic infiltration.	Rats	MECP, 2016b	RIVM, 2001; MECP, 2011	No
	RfC Sub-chronic	7.9E-01	mg/m^3	Fatty degeneration of the liver.	Rats	MECP, 2011	ATSDR, 1996	No
Ethylbenzene	RfD	1.0E-01	mg/kg/day	Liver and kidney toxicity.	Rats	MECP, 2016d	EPA IRIS, 1987; RIVM, 2001; WHO DW, 2003; HC CSD, 2010	No
	RfD Sub-chronic	4.0E-01	mg/kg/day	Hepatotoxicity	Rats	MECP, 2016d	ATSDR, 2010	No
	RfC	1.9E+00	mg/m^3	Increased severity of nephropathy.	Rats	MECP, 2016d	TCEQ, 2010; CalEPA chREL, 2000	No
Fluoranthene	RfD	4.0E-02	mg/kg/day	Nephropathy, increased liver weights, hematological alterations, and clinical effects.	Mice	MECP, 2011	EPA IRIS, 1993	No
	RfD Sub-chronic	4.0E-01	mg/kg/day	Nephropathy, increased liver weights, hematological alterations, and clinical effects.	Mice	MECP, 2011	EPA IRIS, 1993 (modified) a	No
	SF	1.0E-02	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.01) employed; see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-03	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.01) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Fluorene	RfD	4.0E-02	mg/kg/day	Decreased red blood cell count, packed cell volume and hemoglobin.	Mice	MECP, 2011	EPA IRIS, 1990	No
	RfD Sub-chronic	4.0E-01	mg/kg/day	Decreased red blood cell count, packed cell volume and hemoglobin.	Mice	MECP, 2011	EPA IRIS, 1990 (modified) a	No
	RfC	5.0E-02	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2003	-	Yes
Indeno[1,2,3-cd]pyrene [c]	RfD	NA	mg/kg/day	None Selected.	-	-	-	No
	SF	1.0E-01	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-02	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.1) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Mercury (elemental)	RfD	1.6E-04	mg/kg/day	Increased kidney weight.	Rats	CalEPA DW, 1999	-	Yes
	RfD Sub-chronic	1.6E-03	mg/kg/day	Increased kidney weight.	Rats	CalEPA DW, 1999	-	Yes
	RfC	3.0E-04	mg/m^3	Impairment of neurobehavioral functions.	Humans	EPA IRIS, 1995	-	Yes
2-(1-)Methylnaphthalene	RfD	4.0E-03	mg/kg/day	Pulmonary alveolar proteinosis.	Mice	MECP, 2011	EPA IRIS, 2003	No
	RfC	5.0E-02	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2003	-	Yes
	SF	2.9E-02	1/[mg/kg/day]	Carcinogenic by mutagenic mode of action for lung adenomas and carcinomas. 1-Methylnaphthalene only.	Mice	EPA RSL, 2016	EPA PPRTV, 2008	Yes
Molybdenum	RfD	5.0E-03	mg/kg/day	Increased uric acid levels.	Humans	MECP, 2011	EPA IRIS, 1993	No
	RfC	1.2E-02	mg/m^3	Changes in body weight.	Mice, Rats	MECP, 2011	RIVM, 2001	No

Table F-1. Human Health Toxicity Reference Values

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Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Naphthalene	RfD	2.0E-02	mg/kg/day	Decreased mean terminal body weight.	Rats	MECP, 2011	EPA IRIS, 1998	No
	RfD Sub-chronic	2.0E-01	mg/kg/day	Decreased mean terminal body weight.	Rats	MECP, 2011	EPA IRIS, 1998 (modified) a	No
	RfC	3.7E-03	mg/m^3	Nasal effects: hyperplasia and metaplasia of respiratory and olfactory epithelium.	Mice	MECP, 2011	ATSDR, 2005	No
	URF	3.4E-02	$1/[mg/m^3]$	Carcinogenicity; respiratory epithelial adenoma and olfactory epithelial neuroblastoma of the nose.	Mice, Rats	EPA RSL, 2016	CalEPA ATH, 2009	Yes
n-Hexane	RfD	6.0E-02	mg/kg/day	Nervous system-neuropathy; Testicular atrophy.	Rats	EPA HEAST, 1997	-	Yes
	RfD Sub-chronic	6.0E-01	mg/kg/day	Nervous system-neuropathy; Testicular atrophy.	Rats	EPA HEAST, 1997	-	Yes
	RfC	7.0E-01	mg/m^3	Neurotoxic effects (functional impairment of the peripheral nervous system).	Rats	EPA IRIS, 2005	-	Yes
Nickel	RfD	2.8E-03	mg/kg/day	Reproductive and developmental effects (pre- and perinatal mortality). [d]	Rats	EFSA, 2015	-	No
	RfC	6.0E-05	mg/m^3	Lung fibrosis.	Rats	MECP, 2011	TERA, 1999	No
	URF	2.4E-01	$1/[mg/m^3]$	Lung and nasal cancers.	Humans	MECP, 2011	EPA IRIS, 1991; 2006	No
PHC F1 (C6-C10)								
Aliphatic (C6 - C8)	RfD	5.0E+00	mg/kg/day	Neurotoxicity.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1.8E+01	mg/m^3	Neurotoxicity.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aliphatic (C>8 - C10)	RfD	1.0E-01	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	1.0E+00	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1.0E+00	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>8 - C10)	RfD	4.0E-02	mg/kg/day	Decreased body weight.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	2.0E-01	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
PHC F2 (C10-C16)								
Aliphatic (C>10 - C12)	RfD	1.0E-01	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	1.0E+00	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1.0E+00	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aliphatic (C>12 - C16)	RfD	1.0E-01	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	1.0E+00	mg/kg/day	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	1.0E+00	mg/m^3	Hepatic and hematological changes.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>10 - C12)	RfD	4.0E-02	mg/kg/day	Decreased body weight.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	2.0E-01	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
Aromatic (C>12 - C16)	RfD	4.0E-02	mg/kg/day	Decreased body weight.	Mice, Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	2.0E-01	mg/m^3	Decreased body weight.	Rats	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
PHC F3 (C16-C34)								
Aliphatic (C>16 - C21) [b]	RfD	2.0E+00	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
Aliphatic (C>21 - C34) [b]	RfD	2.0E+00	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
Aromatic (C>16 - C21) [b]	RfD	3.0E-02	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	3.0E-01	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
Aromatic (C>21 - C34) [b]	RfD	3.0E-02	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	3.0E-01	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No

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Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
PHC F4 (C34-C50)/F4G-SG (GHH-Silica)								
Aliphatic (C>34) [b]	RfD	2.0E+01	mg/kg/day	Hepatic (foreign body reaction) granuloma.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
Aromatic (C>34) [b]	RfD	3.0E-02	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfD Sub-chronic	3.0E-01	mg/kg/day	Nephrotoxcity.	Mice	MECP, 2011	TPHCWG, 1997; CCME, 2000	No
	RfC	NA	mg/m^3	None Selected.	-	-	-	No
Phenanthrene	RfD	4.0E-02	mg/kg/day	Applicable to the non-carcinogenic C9 to C16 aromatic total petroleum hydrocarbon fraction (or its constituents) and is based on decreased body weight and increased liver and kidney weight.	Mice, Rats	RIVM, 2001	-	Yes
	RfC	5.0E-02	mg/m^3	CNS effects and increased liver and kidney weight.	Rats	MADEP, 2004	-	Yes
Polychlorinated Biphenyls	RfD	2.0E-05	mg/kg/day	Immunological effects.	Monkeys	MECP, 2011	ATSDR, 2000	No
	RfD Sub-chronic	3.0E-05	mg/kg/day	Neurobehavioral alterations.	Monkeys	MECP, 2011	ATSDR, 2000	No
	RfC	5.0E-04	mg/m^3	Hepatic effects and reduced body weight.	Rabbits, Rats	MECP, 2011	RIVM, 2001	No
	URF	1.0E-01	$1/[mg/m^3]$	Liver hepatocellular adenomas, carcinomas, cholangiomas, or cholangiocarcinomas.	Rats	MECP, 2011	EPA IRIS, 1997	No
Pyrene	RfD	3.0E-02	mg/kg/day	Kidney effects (renal tubular pathology, decreased kidney weights).	Mice	MECP, 2011	EPA IRIS, 1993	No
	RfD Sub-chronic	3.0E-01	mg/kg/day	Kidney effects (renal tubular pathology, decreased kidney weights).	Mice	MECP, 2011	EPA IRIS, 1993	No
	SF	1.0E-03	1/[mg/kg/day]	Alimentary tract tumours (forestomach, esophagus, tongue, and larynx). Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Mice	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
	URF	6.0E-04	$1/[mg/m^3]$	Upper respiratory and upper digestive tract (forestomach) tumours. Kalberlah et al. TEF (0.001) employed, see Benzo[a]pyrene.	Hamsters	EPA IRIS, 2017	Kalberlah et. al., 1995; EPA IRIS, 2017	Yes, see Benzo(a)pyrene
Tetrachloroethylene	RfD	6.0E-03	mg/kg/day	Neurotoxicity - occupational exposures.	Humans	MECP, 2014a	EPA IRIS, 2012	No
	RfD Sub-chronic	1.4E-01	mg/kg/day	Effects on body weight gain, and ratio of liver or kidney weight to body weight.	Rats	MECP, 2014a	HC, 2010 (modified) [a]	No
	RfC	4.0E-02	mg/m^3	Neurotoxicity - occupational exposures.	Humans	MECP, 2014a	EPA IRIS, 2012	No
	RfC Sub-chronic	1.4E+00	mg/m^3	Neurotoxicity.	Humans	MECP, 2011	ATSDR, 1997	Yes
	SF	2.1E-03	1/[mg/kg/day]	Hepatocellular adenomas or carcinomas.	Mice	MECP, 2014a	EPA IRIS, 2012	No
	URF	2.6E-04	$1/[mg/m^3]$	Hepatocellular adenomas or carcinomas.	Mice	MECP, 2014a	EPA IRIS, 2012	No
Thallium	RfD	1.4E-05	mg/kg/day	Alopecia.	Rats	MECP, 2011	CalEPA DW, 1999	No
	RfD Sub-chronic	1.4E-04	mg/kg/day	Alopecia.	Rats	MECP, 2011	CalEPA DW, 1999 (modified) [a]	No
Trichloroethane, 1,1,1-	RfD	2.0E+00	mg/kg/day	Reduced body weight.	Mice	MECP, 2011	EPA IRIS, 2007	No
	RfD Sub-chronic	7.0E+00	mg/kg/day	Reduced body weight.	Mice	MECP, 2011	EPA IRIS, 2007	No
	RfC	5.0E+00	mg/m^3	Liver histopatholgical changes.	Rats	EPA IRIS, 2007	-	Yes
	RfC Sub-chronic	5.0E+00	mg/m^3	Liver histopatholgical changes.	Rats	EPA IRIS, 2007	-	Yes

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Parameter	Toxicity Reference Value		Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]
Trichloroethylene	RfD	5.0E-04	mg/kg/day	Multiple: Developmental immunotoxicity, decreased thymus weights in mice, and heart malformations in rats. [d]	Mice, Rats	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	RfC	2.0E-03	mg/m^3	Multiple: Decreased thymus weights in mice and heart malformations in rats. [S]	Mice, Rats	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	SF	4.6E-02	1/[mg/kg/day]	Kidney, non-Hodgkin lymphoma, and liver cancers.	Humans, Mice	MECP, 2014b	EPA IRIS, 2011; ATSDR, 2013	No
	URF	4.1E-03	$1/[mg/m^3]$	Kidney, non-Hodgkin lymphoma, and liver cancers.	Humans, Mice	MECP, 2014b	EPA IRIS, 2011	No
Vanadium (V)	RfD	2.1E-03	mg/kg/day	Developmental effects in offspring. [d]	Rats	MECP, 2011	CalEPA DW, 2000	No
	RfD Sub-chronic	2.1E-03	mg/kg/day	Developmental effects in offspring. [d]	Rats	MECP, 2011	CalEPA DW, 2000	No
	RfC	1.0E-03	mg/m^3	Chronic upper respiratory tract symptoms.	Humans	MECP, 2011	WHO, 2000	No
Vinyl Chloride	RfD	3.0E-03	mg/kg/day	Liver cell polymorphism.	Rats	MECP, 2016c	ATSDR, 2006; EPA IRIS, 2000; MECP, 2011	No
	RfC	6.0E-02	mg/m^3	Liver cell polymorphism.	Rats	MECP, 2016c	TCEQ, 2009	No
	SF (continuous lifetime exposure from birth)	1.5E+00	1/[mg/kg/day]	Total of liver angiosarcoma, hepatocellular carcinoma, and neoplastic nodules.	Rats	MECP, 2016c	WHO DW, 2011	No
	SF (continuous lifetime exposure during adulthood)	7.2E-01	1/[mg/kg/day]	Total of liver angiosarcoma, hepatocellular carcinoma, and neoplastic nodules.	Rats	MECP, 2016c	EPA IRIS, 2000	No
	URF (continuous lifetime exposure from birth)	8.4E-03	$1/[mg/m^3]$	Liver angiosarcomas, angiomas, hepatomas, and neoplastic nodules.	Rats	MECP, 2016c	TCEQ, 2009	No
	URF (continuous lifetime exposure during adulthood)	4.4E-03	$1/[mg/m^3]$	Liver angiosarcomas, angiomas, hepatomas, and neoplastic nodules.	Rats	MECP, 2016c	EPA IRIS, 2000	No
Xylene Mixture	RfD	2.0E-01	mg/kg/day	Decreased body weight and increased mortality.	Rats	MECP, 2011	EPA IRIS, 2003	No
	RfD Sub-chronic	4.0E-01	mg/kg/day	Hyperactivity.	Mice	MECP, 2011	ATSDR, 2007	No
	RfC	7.0E-01	mg/m^3	CNS effects; and irritation of the eyes, nose, and throat.	Humans	MECP, 2011	CalEPA ChREL, 2005	No
	RfC Sub-chronic	2.6E+00	mg/m^3	Neurotoxicity.	Rats	MECP, 2011	ATSDR, 2007	No
Zinc	RfD	3.0E-01	mg/kg/day	Decreases in erythrocyte Cu, Zn-superoxide dismutase (ESOD) activity.	Humans	MECP, 2011	EPA IRIS, 2005	No
	RfC	1.4E-03	mg/m^3	Route-to-route extrapolation by MADEP.	-	MADEP, 2004	-	Yes

[a.] MECP derived toxicity values by modifying the proposed values in the cited source documents.

[b.] Chemical is not considered a concern for inhalation exposure and toxicity.

[c.] Noncancer TRV not available. Consistent with MECP (2011) Rationale Table.

[d.] Additional consideration for developmental effects required for this chemical and route of exposure.

[e.] Proxy or surrogate is chosen based on chemical's structural or functional similarity.

[f.] RfC for trans-1,2-dichloroethylene was used in the risk calculations as a surrogate in the absence of an MECP-selected TRV. RIVM (2009b) indicates that new genotoxicity studies conclude that "there is no clear evidence for differences in toxicity between the cis and the trans-isomer", therefore the use of the trans- isomer is an appropriate surrogate.

[g.] Toxicity Profiles to be provided in the risk assessment specific to the TRVs used in the RA following the secondary screening for human health.

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EPA HEAST, 1997. Health Effects Assessment Summary Tables, FY 1997 Update (http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=2877).

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Parameter	Toxicity Reference Value	Units	Effect/Basis	Study Population	Source	Originating Agency/Author	Candidate for Toxicity Profile [g]

EPA PPRTV. Provisional Peer Reviewed Toxicity Values for Superfund (http://hhpprtv.ornl.gov/quickview/pprtv_papers.php)

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MECP, 2013a. Toxicity Reference Value (TRV) Selection Rationale Document: Antimony. DRAFT. February.

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MECP, 2014b. Toxicity Reference Value (TRV) Selections for Trichloroethylene. Agency Review Completion: February 2013.

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MECP, 2016b. Toxicity Reference Value (TRV) Selection Summary Document: trans-1,2-Dichloroethylene. DRAFT. January.

MECP, 2016c. Toxicity Reference Value (TRV) Selections for Vinyl Chloride. April, 2016.

MECP, 2016d. Toxicity Reference Value (TRV) Selections for Ethylbenzene. March 2016.

MECP, 2016e. Toxicity Reference Value (TRV) Selections for Copper. April 2016.

MECP, 2016f. Toxicity Reference Value (TRV) Selections for 1,1-dichloroethylene. December 2016.

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TPHCWG, 1997. Development of Fraction-Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH) Vol.4.

WHO CICAD. http://www.who.int/ipcs/publications/cicad/en/. Reference date reflects the individual profiles which were prepared in different years.

WHO DW. Chemical hazards in drinking-water (http://www.who.int/water_sanitation_health/dwq/chemicals/en/). Reference date reflects the individual profiles which were prepared in different years.

ATSDR = Agency for Toxic Substances and Disease Register

CalEPA = California Environmental Protection Agency

CalEA ATH = California Environmental Protection Agency Air Toxic Hotspots Program

CalEPA ChREL = California Environmental Protection Agency Chronic Reference Exposure Levels (REL)

CalEPA DW = California Department of Environmental Protection - Public Health Goals

CCME = Canadian Council of Ministers of the Environment

CNS = Central Nervous System

EFSA = European Food Safety Authority

ESOD = Erythrocyte superoxide dismutase

EPA HEAST = United States Environmental Protection Agency Health Effects Assessment Summary Table

EPA IRIS = United States Environmental Protection Agency Integrated Risk Information System

EPA PPRTV = United States Environmental Protection Agency Provisional Peer Reviewed Toxicity Value

EPA RSL = United States Environmental Protection Agency Regional Screening Levels

F = fraction

HC = Health Canada

HC CSD = Health Canada Contaminated Sites Division

kg = kilogram(s)

m^3 = cubic metre(s)

MADEP = Massachusetts Department of Environmental Protection

mg/kg/d = milligram(s) per kilogram per day

mg/m^3 = milligram(s) per cubic metre

MECP = Ontario Ministry of Environment, Conservation and Parks

NA = not applicable

RA = Risk Assessment

RfC = reference concentration

RfD = reference dose

RIVM = Netherlands National Institute of Public Health and Environmental Protection

SF = slope factor

PHC = petroleum hydrocarbon

TCEQ = Texas Commission on Environmental Quality

TEF = toxicity equivalence factor

TERA = Toxicology Excellence for Risk Assessment

TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group

TRV = Toxicity Reference Value

URF = unit risk factor

WHO = World Health Organization

WHO CICAD = World Health Organization Concise International Chemical Assessment Document

WHO DW = World Health Organization Drinking Water

Attachment G
Legal Property Information

December 5, 2018

The Corporation of the City of Guelph
1 Carden Street
Guelph, ON N1H 3A1

Attention: Prasoon Adhikari, Environmental Engineer

Re: Submission of Record of Site Condition – 200 Beverly Street, Guelph (also known as 200 Beverley Street, Guelph)

We understand that this letter will be part of the submissions to the Ministry of Environment, Conservation and Parks with respect to filing a Record of Site Condition for the lands described below, and to the extent and for that limited purpose, this letter can be read as also being addressed to the Ministry of Environment, Conservation and Parks for the purposes of such filing. We confirm the following:

1. **Legal Description**: PT LOT 1, 2, & 3, RANGE 3, DIVISION F, CITY OF GUELPH (FORMERLY TOWNSHIP OF GUELPH); PT BEVERLY ST, PLAN 343 , CLOSED BY DEP2184; AS IN RO706184 now described as Part 1, Reference Plan 61R-7850

2. **Registered Ownership**: The Corporation of the City of Guelph

3. **Assessment Roll**: 23 08 010 008 031 00

We trust that these confirmations will satisfy the requirements of submitting the Records of Site Condition.

Thank you.

Katherine Hughes
Associate Solicitor
Legal, Realty and Court Services
Corporate Services

T **519-822-1260 x 2751**
F 519-822-0705
E katherine.hughes@guelph.ca

City Hall
1 Carden St
Guelph, ON
Canada
N1H 3A1

T 519-822-1260
TTY 519-826-9771

guelph.ca

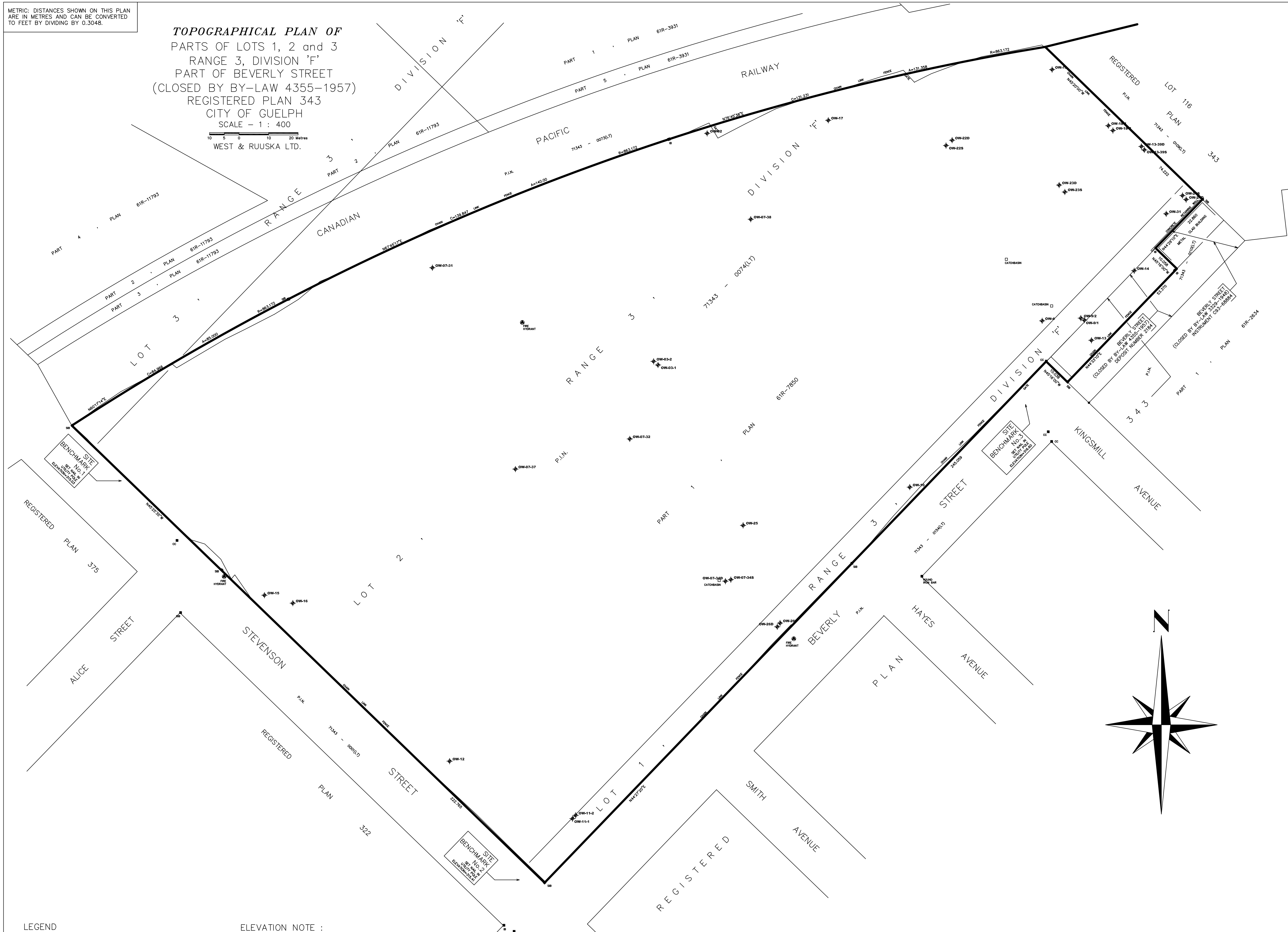
METRIC: DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

TOPOGRAPHICAL PLAN OF

PARTS OF LOTS 1, 2 and 3
RANGE 3, DIVISION 'F'
PART OF BEVERLY STREET
(CLOSED BY BY-LAW 4355-1957)
REGISTERED PLAN 343
CITY OF GUELPH

SCALE - 1 : 400

WEST & RUUSKA LTD.



LEGEND

■	DENOTES	FOUND MONUMENT
IB	"	IRON BAR
SIB	"	STANDARD IRON BAR
CC	"	CUT CROSS
P	"	TOP OF PIPE ELEVATION
G	"	GROUND ELEVATION AT PIPE
MW	"	MONITORING WELL
TP	"	TEST PIPE

ELEVATION NOTE :

ELEVATIONS SHOWN HEREON ARE GEODETIC and ARE DERIVED FROM CANSEL CAN-NET REAL TIME NETWORK OBSERVATION, UTM ZONE 17, NAD83 (CSRS) (2010).

WEST & RUUSKA LTD.
Land Surveyors
17 NELSON STREET, BRANTFORD, ONTARIO, N3T 2M6
Telephone (519)752-8641
DRAWN BY: Ted S. KUTYLA, CST, CET

C170202

Attachment H
Supporting Information

Table H-1. Species at Risk Occurrences within 1 km^2 of the RA Property

200 Beverly Street, Guelph, Ontario

Species (Common Name)	Species (*Latin Name*)	Preferred Habitat [a]	Ontario (S-Rank)	COSEWIC	MNRF Status/ SARO	Likelihood and Last Observation [b]
Plants						
Carey's Sedge	*Carex careyana*	Rich deciduous woods, wooded slopes and ravines.	S2	-	-	None, habitat not present. Last observed on June 8, 1905.
Invertebrates						
Giant Lacewing	*Polystoechotes punctatus*	Streamside vegetation, especially in woods.	SH	-	-	None, habitat not present. Last observed in August 1948.
Insects						
Painted Skimmer	*Libellula semifasciata*	Ponds and other still bodies of water, especially boggy ones with emergent plants, and often within forest.	S2	-	-	None, habitat not present. Last observed on May 26, 1913.
Reptiles						
Northern Map Turtle	*Graptemys geographica*	Areas of medium to large open water in lakes with emerging woody debris and abundant molluscs.	S3	SC	SC	None, habitat not present. Last observed in July 1924.
Eastern Milksnake	*Lampropeltis triangulum*	Open habitats such as rocky outcrops, fields and forest edge. The milksnake hibernates underground, in rotting logs or in the foundations of old buildings.	S3	SC	SC	None, while concrete foundations are present at the RA Property, other habitat requirements are not present. Last observed on September 28, 1978.
Eastern Ribbonsnake	*Thamnophis sauritus*	Wet meadows, marshes, seasonally flooded prairies, bogs, ponds, lake shorelines, swamps, and shallow slow streams; also, other wet or moist forest in some areas. Usually in or near vegetative cover in sun exposed sites along the edge of standing or flowing water.	S3	SC	SC	None, habitat not present. Last observed on April 25, 1990.

Notes:

[a] Information obtained from the following sources accessed on October 19, 2018:

- Ontario Ministry of Natural Resources and Forestry Website: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list
- Minnesota Wildflowers website: https://www.minnesotawildflowers.info/
- Ontario Nature website: https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas
- The International Union for Conservation of Nature and Natural Resources Red List Website: http://www.iucnredlist.org/
- Nature Spot: https://www.naturespot.org.uk/species/giant-lacewing

- University of Maryland Biodiversity Project catalogue website: https://www.marylandbiodiversity.com/

[b.] Likelihood of species being present on RA Property. Last observation obtained from the MNRF (2017) NHIC database.

Notes:
- = not applicable
B = breeding
COSEWIC = Committee on the Status of Endangered Wildlife in Canada
END = Endangered
EXP = Extirpated
km^2 = square kilometre(s)
m = metre(s)
MNRF = Ontario Ministry of Natural Resources and Forestry
NHIC = Natural Heritage Information Centre
RA = Risk Assessment
S-Rank = Subnational Rank
    S1 = Critically Imperiled (often 5 or fewer occurrences)
    S2 = Imperiled (often 20 or fewer occurrences)
    S3 = Vulnerable (restricted range with relatively few populations - often 80 or fewer)
    S4 = Uncommon but not rare; some cause for long-term concern due to declines or other factors
SARO = Species at Risk in Ontario
SH= Possibly extirpated (historically) but may be rediscovered.
SC = Special Concern
THR =Threatened

Innovation, Science and Economic Development Canada
Corporations Canada

Innovation, Sciences et Développement économique Canada
Corporations Canada

Certificate of Compliance

Canada Business Corporations Act
s. 263.1

Certificat de conformité

Loi canadienne sur les sociétés par actions
art. 263.1

CH2M Hill Canada Limited

Corporate name / Dénomination sociale

429102-6

Corporation number / Numéro de société

I HEREBY CERTIFY that the corporation named above:

- exists under the *Canada Business Corporations Act*;
- has filed the required annual returns; and
- has paid all prescribed fees required.

JE CERTIFIE, par la présente, que la société ci-dessus mentionnée :

- existe en vertu de la *Loi canadienne sur les sociétés par actions*;
- a déposé les rapports annuels exigés; et
- a acquitté les droits prescrits.

R Edwards

Raymond Edwards

Director / Directeur

2019-02-19

Issuance date (YYYY-MM-DD)
Date d'émission (AAAA-MM-JJ)

Canada

Risk Assessment Team Membership

Environmental Site Assessment

Ed Taves, M.Sc., C.Chem., QPESA, P.Geo. (Limited)

Ed Taves has over 31 years of professional experience in environmental consulting. He specializes in environmental due diligence assessments (Phase One and Two ESAs), site characterization, risk assessment, remedial option analysis, contaminant hydrogeology, facility decommissioning and brownfield redevelopment, and the preparation of Records of Site Condition (RSCs). Clients have included federal and provincial departments and ministries, municipal governments, and private industries, as well as members of the legal, financial, accounting, and land development communities. Projects have been completed for a wide variety of contaminants, including petroleum hydrocarbons, a variety of volatile organic compounds including chlorinated aliphatic hydrocarbons, metals, polychlorinated biphenyls, pesticides, nutrients, energetics, unexploded ordnance, chemical warfare agents, and radiologicals. Ed has fulfilled a number of roles, including project manager, task manager, senior technical consultant, and public and regulatory agency liaison.

Hydrogeology

Patricia Meyer, M.Sc, P.Geo.

Patricia (Patty) Meyer is a Senior Hydrogeologist with over 17 years of experience conducting water supply, contaminant transport, water budget, and watershed characterization assessments. Patty is an experienced groundwater flow modeller and has developed, calibrated or applied over 50 groundwater flow and contaminant transport models for sites located across North America, the United States and South America. She also is an experienced project manager and technical lead and has conducted groundwater vulnerability, environmental assessments, cumulative impact assessments, well head protection area delineation, and watershed-scale water budget studies across Ontario and beyond.

Jacqueline Brook, B.Sc., M.Sc.

Jacqueline Brook is an environmental scientist with a Master of Science from UW from the department of Earth Sciences. She is a groundwater specialist, with 7 years of experience as an environmental consultant completing project work involving water sampling, well testing, drilling, and the evaluation of soil hydraulic properties. She has extensive experience developing conceptual and numerical geological and groundwater models.

Human Health Risk Assessment

Katherine Appleby, B.E.S., E.P. (QPRA pending)

Katherine will be the QPRA for this RA. Her qualifications have been recently submitted to the MECP as part of another PSF submission (February 2019) for evaluation. Katherine has 13 years of experience in the field of RAs and ESAs. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening-level risk assessments (SLRAs), and comprehensive RAs. Katherine has experience performing, reviewing, and supervising the completion of both HHRAs and ERAs for land- and water-based sites. Her skills include:

- Developing RA conceptual site models (CSMs)
- Selecting ecological and human health receptors
- Exposure modelling

- Selecting toxicity reference values (TRVs)
- Calculating risk estimates
- Developing risk management measures (RMMs)
- Reporting
- Performing peer review
- Responding to client and regulator comments on RA reports

Katherine has authored, led, or contributed to the completion of over 50 focused, comprehensive, or screening-level RA reports using both provincial (Ministry and Environment Yukon) and federal (Health Canada and Canadian Council of Minister of the Environment [CCME]) frameworks. She is familiar with provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended) and the RSC filing process.

Krista Barfoot, Ph.D., C.Chem., QPRA – Senior Technical Resource

Dr. Krista Barfoot is an RA scientist with over 20 years of industry experience, including over 15 years of experience in risk assessment (RA) and vapour intrusion (VI) assessment. Beyond RA and VI work, Dr. Barfoot's technical expertise additionally extends to the management of excess soil, non-aqueous phase liquid (NAPL), risk mitigation measures, and stakeholder communication. She is the Ontario Environment Industry Association (ONEIA) Brownfield Committee Chair, an ONEIA Excess Soils Sub-Committee Member, and a Canadian Brownfields Network (CBN) Board Member. She is actively leading the development of the strategic approach for revitalizing several large, high-profile brownfield sites in Ontario.

Dr. Barfoot has examined aspects of both drinking water and groundwater contamination, industrial air contamination, and soil quality degradation, and has investigative experience in all three environmental mediums (water, air, and soil). Her graduate studies and work have spanned the fields of chemistry, toxicology, pedology, geology, agrology, and ecology, and recently extended into research related to emerging contaminants.

Brandi Wilson, B.Sc.

Brandi Wilson is an Environmental Scientist with 2 years of experience in the environmental consulting industry. Her areas of expertise include environmental assessments, including conducting HHRAs and Phase One ESAs; data entry and processing; writing technical memoranda; and performing field investigation activities, including sediment and groundwater sampling. She has prepared numerous technical reports, including PSFs, SLRAs, and comprehensive RAs. Her skills include developing exposure modelling, calculating risk estimates, reporting, and responding to client and regulator comments on RA reports. Brandi also has experience with stormwater management (SWM) pond sediment chemistry related disposal versus beneficial use evaluations.

Ecological Risk Assessment

Katherine Appleby, B.E.S., E.P. (QPRA pending)

Katherine will be the QPRA for this RA. Her qualifications have been recently submitted to the MECP as part of another PSF submission (February 2019) for evaluation. Katherine has 13 years of experience in the field of RAs and ESAs. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening-level risk assessments (SLRAs), and comprehensive RAs. Katherine has experience performing, reviewing, and supervising the completion of both HHRAs and ERAs for land- and water-based sites. Her skills include:

- Developing RA conceptual site models (CSMs)
- Selecting ecological and human health receptors

- Exposure modelling
- Selecting toxicity reference values (TRVs)
- Calculating risk estimates
- Developing risk management measures (RMMs)
- Reporting
- Performing peer review
- Responding to client and regulator comments on RA reports

Katherine has authored, led, or contributed to the completion of over 50 focused, comprehensive, or screening-level RA reports using both provincial (Ministry and Environment Yukon) and federal (Health Canada and Canadian Council of Minister of the Environment [CCME]) frameworks. She is familiar with provincial and federal environmental legislation, such as O. Reg. 153/04 (as amended) and the RSC filing process.

James Kroetsch, B.Sc., M.Sc., F.W.T., EP, QP_{RA} – Senior Technical Resource

James Kroetsch has 29 years of experience in aquatic and terrestrial biology, with expertise in:

- Multidisciplinary environmental risk and impact assessment projects
- Environmental effects monitoring programs
- Site remediation studies
- Natural area inventories
- Fisheries compensation agreements
- Environmental management plans
- Watershed and habitat restoration studies
- Public consultation activities

He has applied his ecological skills on the municipal, provincial, national, and international levels for projects in the following sectors:

- Mining
- Planning and development
- Transportation
- Water management
- Aggregate
- Pulp and paper
- Petroleum
- Hydroelectric
- Nuclear power generation

He has performed, managed, and provided senior technical review for numerous ERAs under the MECP's O. Reg. 153/04 (as amended) process, as well as those following Canadian Council of Ministers of the Environment (CCME) and U.S. Environmental Protection Agency (USEPA) RA guidelines. These RAs have required field data investigations, ecological inventories, and monitoring. James has evaluated the fate, transport, and end point risks; and has developed and implemented numerous risk reduction strategies associated with exposure to:

- Metals
- Radionuclides
- Chlorinated and nonchlorinated VOCs
- PHCs
- PAHs
- Polychlorinated biphenyls (PCBs)

- Pesticides

He has also assisted in developing and implementing numerous risk reduction strategies. He is a registered QPRA for completing RAs under O. Reg. 153/04.

Nicole Pilgrim, M.Sc., P.Biol., R.P.Bio.

Nicole is a biologist with 6 years of experience in environmental consulting, and a total of 9 years of experience in biology in the academic, governmental, and industrial sectors. She is an aquatics project manager for linear development projects, and has extensive experience leading and coordinating aquatics projects. Nicole has led aquatic assessments throughout western Canada, describing and documenting fish habitat and using various methods of fish sampling. Nicole helps clients meet their regulatory requirements by writing technical reports, conducting desktop assessments, writing and filing regulatory applications, and providing regulatory advice. Nicole also has experience writing environmental and socioeconmic reports for water quality and quantity, fish and fish habitat, and physical and meteorological environment to determine residual and cumulative effects.

She also assists with human health and ecological RAs (HHERAs) on contaminated sites. Prior to Jacobs, Nicole worked on projects as an environmental monitor to confirm environmental compliance during construction, and completed fish and fish habitat assessments and tissue collections after a pipeline spill. She also has a M.Sc. in biology and specialized in aquatic toxicology.

Engineering

Wayne Cooley, B.A.Sc., P.Eng.

Wayne Cooley is a senior engineer with over 30 years of design and management experience in environmental and municipal engineering and construction. His primary expertise is in waste management, with an emphasis on landfill permitting, design, development, operation, closure, monitoring, and reporting. Additional significant experience consists of:

- Environmental site investigation and remediation
- Impervious linings
- Groundwater and leachate collection
- Pumping systems
- Stormwater management
- Municipal works

Wayne has extensive experience with planning and design issues, including the public consultation and approvals processes. Throughout his career, he has been extensively involved in both environmental and municipal construction works, providing a broad range of related services, such as tender and contract administration, construction inspection, and warranty administration. Wayne has successfully managed or completed a wide range of projects for public and private clients, and has liaised effectively with regulatory agencies to secure approvals.

Appendix A2
MECP Comments on PSF and Phase Two CSM and Jacobs Response to Comments

Ministry of the Environment, Conservation and Parks

Technical Assessment and Standards Development
7th Floor
40 St. Clair Avenue West
Toronto ON M4V 1M2

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations techniques et de l'élaboration des normes
7e étage
40, avenue St. Clair Ouest
Toronto (Ontario) M4V 1M2

Ontario

Mary 6, 2019

City of Guelph
1 Carden Street
Guelph, Ontario N1H 3A1

Attention: Mr. Prasoon Adhikari

RE: **Ministry comments for the PSF for 200 Beverley Street, Guelph, Ontario, report prepared by CH2M Hill Canada Limited, dated February 2019 [PSF1748-19, IDS No. 6417-B9XQGZ].**

This letter will acknowledge receipt of the Pre Submission Form (PSF) submitted for the following Property under the Records of Site Condition Regulation (O. Reg. 153/04).

- **Pre-Submission Form for 200 Beverley Street, Guelph, Ontario, report prepared by CH2M Hill Canada Limited, dated February 2019**

The Ministry has reviewed the PSF submitted for the Property. Our reviewers offer comments, and questions in the attached Schedule A for the proponent's consideration in preparing a risk assessment for submission under the *Environmental Protection Act* (Act), Ontario Regulation 153/04 (Regulation), and associated guidance documents.

The outcome of this preliminary consultation is not binding on the risk assessment property owner or the Ministry, as the understanding of site conditions may develop and/or change during the course of the risk assessment. For this reason, the Ministry has the right to change its position. Ministry comments on the PSF do not in any way indicate acceptance of the final risk assessment approach or other conclusions of the risk assessment report and it does not indicate acceptance of the risk assessment report by the Director pursuant to s.168.5 of the Act.

If, at any time after submitting the PSF, the qualified person responsible for the preparation of the risk assessment changes or the property owner changes, the property owner shall give notice to the Director of the change in circumstance.

Four hard copies of the risk assessment, one marked original (along with a stand-alone electronic copy of the risk assessment [USB format]) are to be submitted to the Director of Client Services

and Permissions Branch for review under the Regulation and must include a copy of the PSF as well as a response in the risk assessment report outlining how the Ministry's concerns in Schedule A to this letter were addressed in the risk assessment.

Please note that a risk assessment under the Regulation does not deal with all potential approvals and issues associated with other Ministry legislation. Other regulatory and compliance tools are required to address other aspects of redevelopment of this property including:

- disposal of excess soil,
- potential for release of contaminants to the environment during remediation and construction activities,
- remedial activities which require Certificates of Approvals, and
- off-site impacts.

Off-site impacts, actual or likely, must be reported to the Ministry District Office forthwith. For your information the Act, Regulation, guidance documents and associated fact sheets have been posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment

Craig Kinch
Director, Environmental Protection Act s. 168.5

Attach:

SCHEDULE A
To Director's Notice dated May 6, 2019

Comments by Ministry of Environment, Conservation and Parks On Pre-Submission Form

200 Beverley Street, Guelph, Ontario
PSF1748-19
(IDS Ref No. 6417-B9XQGZ)

The following are Ministry comments on the following Pre-Submission Form (PSF):

- **Pre-Submission Form for 200 Beverley Street, Guelph, Ontario, report prepared by CH2M Hill Canada Limited, dated February 2019**

Ministry reviewers offer comments, observations and questions, as follow, for the proponent's consideration in preparing a risk assessment for submission under the Records of Site Condition Regulation, O. Reg. 153/04 (Regulation).

Comments provided by the Ministry on the content of this Pre-Submission Form are not in any way a Director's response to a risk assessment referred to in subsection 168.5 of the EPA.

It also should be noted that a risk assessment submitted to the Ministry under the Regulation must include all mandatory requirements for risk assessments as listed in Table 1 of Schedule C of the Regulation. These requirements must be met or the risk assessment will be deemed incomplete and may be returned without further review.

It should also be noted that a risk assessment submitted to the Ministry under the Regulation must include a copy of the PSF as well as a response outlining how the comments in this Ministry review have been considered in the risk assessment.

The Regulation, guidance documents and associated fact sheets have been prepared to assist proponents. They can be found posted to the following site:

https://www.ontario.ca/page/brownfields-redevelopment

Timeline for Review of Risk Assessment

The proposed Risk Assessment (RA) will be a RA other than those identified in O. Reg. 153/04, Schedule C, Part II. Therefore, the review timeline for the RA will be set at 16 weeks. Section 46 of the Regulation provides specified maximum timelines for review of a RA by the Ministry. The Ministry's timeline for review of the RA under Section 46 of the Regulation will commence on receipt by the Ministry of a risk assessment in accordance with Section 2 of Schedule C of the Regulation.

COMMENTS ON PRE-SUBMISSION FORM

The following comments pertain to the Pre-Submission Form (PSF) for 200 Beverley Street, Guelph, Ontario, report prepared by CH2M Hill Canada Limited, dated February 2019

General Comments

The site is the former International Malleable Iron Company foundry facility with an approximate area of 5.2 ha. The foundry closed in 1989, and the site has been generally unoccupied since. The site is currently vacant with no onsite operations occurring. All former onsite buildings have been removed, with concrete floor slabs still in place. The proponent proposes to redevelop the site for a combination of one or more of residential, parkland, commercial, and community land uses.

Several technical issues and/or inconsistencies have been identified as described below that must be addressed in the risk assessment submission.

Specific Review Comments

Planned Risk Assessment Approach

1. The QP is reminded that while the Approved Model may be used as a tool in the conduct of the Tier 3 RA, it will not satisfy all of the mandatory requirements of a Tier 3 RA and not all of the assumptions of the Approved Model will necessarily be appropriate in the context of a Tier 3 RA. In addition, exposure pathways not addressed by the Approved Model require additional consideration in a Tier 3 RA (and should be evaluated either quantitatively or qualitatively).

Site Information

2. Section 3.2 – Neighbouring/adjacent property use to the west was indicated as residential; however, it appears to be a mixture of commercial/light industrial/residential. The RA submission should describe actual site usage in all areas, noting that zoning designations often include exemptions or may allow other permissible uses.

3. Section 3.3, Additional Project Information - It is indicated here and in Attachment A2 that free product has been observed and measured at the site (e.g., APECs 2, 5, and 10), and that analytical results suggest the potential for free product (e.g., APEC 11). The RA will need to fully describe the nature and extent of free product at the site and how it will be addressed. Free product on a site should be removed to the extent practicable.

4. Section 3.6 Contaminant Inventory – The following comments are provided:
    a. Tables D-1 and D-2, Summary of COC Screening in Soil – It appears that OTR values were used for screening of some parameters with no SCS. The QP should

provide references for the OTR values used (e.g., Rationale document, Soil Urban Parks, etc.) as the Reviewer was not able to find some of the referenced OTR values (e.g., OTR value of 17,400 ug/g for magnesium). In addition, no OTR value is available for some parameters (e.g., zirconium); however, it was indicated that the max concentration was lower than the OTR value. It is suggested that OTR values for all parameters that were screened out be provided with appropriate reference. It appears that the QP has used the CCME value for screening of tin in the absence of an MECP value; however, the CCME value is not shown in the table (Table D-1). The CCME value should be included in the table or RA text and rationale should be provided on why using this value is appropriate for the site. Similarly, it is suggested that the PGMIS values used for screening of groundwater parameters be included in Table D-2.

b. In addition, some of the notes under Table D-1 appear to be unrelated to this table and should be removed (e.g., DND, EXP).
c. Similarly, references to OTR values should be clarified in Table 6-7b in Appendix A2. It is noted that some parameters occur in Table 6-7b and not in Table D-1 and vice versa (e.g., zirconium in Table 6-7b but not D-1, and bismuth in D-1 but not 6-7b). These tables should be reviewed and corrected as required.
d. A stronger rationale should be provided for screening out of parameters with no SCS or available OTR values, including review of other sources of potential background concentration data and consideration of whether the chemical in question may be associated with historical site activities. Notably, bismuth concentrations may be elevated and this metal is known to be associated with specialty alloys.

<u>Human Health Risk Assessment</u>

5. Section 5.0 – The following comments are provided:
    a. Based on the HHCSM figures (Figures E-1 and E-2), a utility worker receptor is considered to be present at the Site. For future submissions, this receptor should be included in the HHCSM tables in Section 5.0 of the PSF for consistency.
    b. It is unclear how groundwater ingestion will be addressed by the RA. Figure E-1 refers to this as incidental ingestion, but includes consideration of construction and utility workers, as well as residents. It is unclear how residents would experience incidental exposures to groundwater. Further, since potable groundwater usage applies, the RA should consider this pathway as well and recommend appropriate risk management measures as required.

6. Attachment B - It is understood that vapour intrusion was not evaluated as part of the Phase Two ESA. The results of the P2ESA indicated that volatile COCs are present in soil and groundwater at concentrations greater than Table 6 SCS. It is understood that details regarding the design and locations of the future buildings are not known at this time. However, an assessment of potential vapour intrusion into future buildings should be completed in the RA and required RMMs (if needed) should be provided in the RMP. The Reviewer expects that this is the QP's intent, but the wording in this section is

ambiguous.

Ecological Risk Assessment

7. Attachment B, Contaminant Pathways and Receptors – The text in this section omits discussion of potential aquatic ecological exposure pathways, although they are referenced in the PSF per se and the Ecological CSM. The QP is encouraged to make use of the Approved Model in the evaluation of this issue.

CSPB Comments on Phase Two CSM

CSPB is currently reviewing the phase two CSM for this file. It is recommended that the QPESA follow up directly with CSPB regarding the status of the phase two CSM review; the CSPB contact is Rose Ash; email: rosemary.ash@ontario.ca

Summary and Conclusions

Several technical issues and/or inconsistencies have been identified as described above that must be addressed in the risk assessment submission.

Risk Management Measures (RMMs)

General Comments

- Based upon on review of the information provided with the Phase Two CSM, it does not appear that sufficient groundwater sampling has been completed at the time of submission in a number of monitoring well locations, specifically for VOCs and PHCs. As presented, it appears that several wells were only sampled once for these parameters. Please ensure that the RA includes all available data, in tabular format such that an interpretation to any potential trends can be made. If additional information is not available and additional groundwater sampling is not planned, additional groundwater monitoring will need to be considered in order to evaluate whether or not the groundwater contamination plume is increasing, decreasing or stable as well as to determine whether or not the maximum concentrations in groundwater have been reasonably identified.

- As the City of Guelph relies on groundwater for the municipal drinking water supply, both the Risk Assessment and the Phase Two CSM need to consider the potential impacts of COCs identified on the Property above the drinking water component value on the municipal supply. This evaluation needs to take into consideration the City's source water protection plan and make reference to available source water protection mapping.

Specific Review Comments

- Based upon what has been provided, the use of RMMs is anticipated by the QP. If RMMs are in fact found to be necessary as a result of the Risk Assessment, a certificate of property use will be required to be issued. Furthermore, if RMMs are required as part of this risk assessment, details on these measures will need to be included in the risk assessment report, including a clear description of the RMMs and/or any property restrictions; performance objectives; duration; and any maintenance and monitoring requirements along with contingency measures (if applicable).

Environmental Bill of Rights Requirements

For any Property Owner or their Agent with an interest in submitting a Risk Assessment to the Ministry for acceptance under the Environmental Protection Act s. 168.5 we want to bring to your attention important amendments under the Environmental Bill of Rights Act.

Ontario Regulation 681/94, Classification of Proposals for Instruments, under the Environmental Bill of Rights (EBR) has been amended to classify certificates of property use (CPUs) as a class II instrument under the EBR if the certificate of property use relates to a risk assessment submitted to the Ministry on or after October 1, 2005. This amendment was made through O. Reg. 505/05. This classification requires a minimum level of public notification (by the Ministry) prior to issuance of the CPU, including a posting on the EBR, of certificate of property use proposals, and provides third party leave to appeal a decision on a certificate of property use.

All decisions regarding a CPU are subject to the Environmental Bill of Rights (EBR). One purpose of the summary of the Risk Management Plan which must be provided in the Risk Assessment Report under the heading "Risk Management Requirements" is to support these requirements. This summary will allow the Ministry to prepare a notice for the EBR in a timely fashion so as not to delay the processing of the submission. The EBR posting allows public input regarding the pending decision of the Director to issue the CPU under Section 168.6 of the EPA.

The summary provided by the Qualified Person under the heading "Risk Management Requirements" will be posted. The Ministry reserves the right to change the wording of the description, as required, to ensure that the public is correctly notified of the subject of the application. The description should be simple and concise (typically under 100 words) and should include the following information:

- State the risk management measures (indicating the principle equipment and any proposed building or land use restrictions) and on-going monitoring, maintenance and contingency plan requirements.

The Regulation has been filed and can be viewed at e-laws:
https://www.ontario.ca/laws

SUBMISSION OF RISK ASSESSMENT

Submission of Risk Assessment

Four hard copies of the risk assessment (including a stand-alone electronic copy of the risk assessment [USB format]) should be delivered to:

The Director
Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, ON, M4V 1P5
Telephone 416-314-8001

Of the four copies, at least one copy must contain the original signature of the QP_{RA} in the section on "mandatory certifications" as required by Section 5 of Schedule C of the Regulation. This original or master copy should be clearly labelled.

Change of Owner or QP_{RA}

Note that Section 3 (13) of Schedule C of the Regulation requires that the Director be notified in writing of a change of Property Owner, or change of QP_{RA}. It is requested that written notification of such a change be submitted to the Director at the above address and by email to the Risk Assessment Coordinator (address below). It is also requested that the notification include a copy of completed sections A, B, 1 and 10 of the Pre-Submission Form, completed and signed by all parties.

Risk Assessment

Many risk assessments fail because they do not satisfy basic requirements of the Regulation and/or because of misunderstandings about risk assessment processes under the Regulation. Before submitting a Risk Assessment to the Ministry, it is strongly recommended that the QP_{RA} review the mandatory requirements for risk assessments submitted under the Regulation, as outlined in **Sections 2, 4 and 5, and Table 1 of Schedule C of the Regulation**. As well, the QP_{RA} should refer to the Ministry's *Procedures for Use of Risk Assessment Under Part XV.1 of the Environmental Protection Act* for guidance in how to satisfy the requirements of the Regulation.

Use of Non-Standard Models

Please be advised that if the risk assessment submission uses a computer model as referred to in Schedule C, Section 9(4) and 9(5) of the Regulation, the Risk Assessment will be deemed a 'new science' risk assessment and the review timeline will be set at 22 weeks. Please note that the Qualified Person shall, upon request of the Director, include an electronic copy of the computer model in the risk assessment report in a manner that does not violate any person's copyright or other intellectual property rights.

Property Specific Standards

It is the responsibility of the QP_{RA} to ensure that the property specific standards (PSS) that are developed in the risk assessment (RA) will support filing of a Record of Site Condition (RSC) by the QP_{ESA}. This means that:

1) The correct table of site condition standards (SCS) must be used for selecting contaminants of concern (COC) in the risk assessment, and
2) PSS must be proposed for all COCs.
3) The QP_{RA} and QP_{ESA} must be able to make the requisite certifications in the RA/RSC.
4) Any parameters that do not have a PSS established in the RA must meet the applicable SCS.
5) If the QP_{ESA} finds that the RA does not support filing of the RSC (for example: the RA established PSS that are lower than concentrations found on-site; remediation has failed to reduce concentrations to below the PSS or applicable SCS), a new Pre-Submission Form (PFS) and RA must be submitted to the Ministry for review under the Regulation. RAs, once approved under the Regulation, cannot be 'reopened' or revised.

ESA Requirements and RSC Filing

Some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the risk assessment (RA). Note that acceptance of the qualified person (QP's) responses on these ESA-related matters will be for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs will not be conducted as part of any future RA review. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that may be amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. In addition, if the work on the phase one and two ESA exceeds 18 months prior to the submission date of the RSC, the phase one and two ESA reports will need to be updated prior to submitting RSCs for filing.

If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Rose Ash of Client Services and Permissions Branch;

email: rosemary.ash@ontario.ca

Questions

If the $QP_{(RA)}$ has questions regarding the application of the Regulation or the above comments, they should be forwarded by email to:

Ann-Marie Deonarine
Risk Assessment Review Coordinator
Technical Assessment and Standards Development Branch
ann-marie.deonarine@ontario.ca

APPENDIX A2

Response to PSF Comments in Schedule A for 200 Beverly Street, Guelph, Ontario

	May 8, 2019 MECP Comment	Jacobs Response	Document Location
1	The QP is reminded that while the Approved Model may be used as a tool in the conduct of the Tier 3 RA, it will not satisfy all of the mandatory requirements of a Tier 3 RA and not all of the assumptions of the Approved Model will necessarily be appropriate in the context of a Tier 3 RA. In addition, exposure pathways not addressed by the Approved Model require additional consideration in a Tier 3 RA (and should be evaluated either quantitatively or qualitatively).	Acknowledged.	--
2	Section 3.2 – Neighbouring/adjacent property use to the west was indicated as residential; however, it appears to be a mixture of commercial/light industrial/residential. The RA submission should describe actual site usage in all areas, noting that zoning designations often include exemptions or may allow other permissible uses.	Acknowledged. The description has been updated to include commercial and residential based on the observed site use in Section 3 of the RA text and in Appendix D3.	Section 3 Appendix D3
3	Section 3.3, Additional Project Information - It is indicated here and in Attachment A2 that free product has been observed and measured at the site (e.g., APECs 2, 5, and 10), and that analytical results suggest the potential for free product (e.g., APEC 11). The RA will need to fully describe the nature and extent of free product at the site and how it will be addressed. Free product on a site should be removed to the extent practicable.	Acknowledged. NAPL has been described in the CSM (Appendix D3) and in Sections 4, 5, and 6 of the RA. As the NAPL has been measured just at and below the overburden and bedrock contact in the eastern portion of the Site, removal options are limited. Soil impacts (PHCs) and NAPL have been observed within a monitoring well in an area previously remediated (soil excavation); it is likely that fluctuations of the water table have resulted in a smear zone, recontaminating the backfilled soil that was placed following the historical remediation. NAPL and groundwater monitoring at the property boundary is proposed to manage the NAPL onsite (Section 7).	Appendix D3 and Sections 4, 5 and 6
4	Section 3.6 Contaminant Inventory – The following comments are provided: a. Tables D-1 and D-2, Summary of COC Screening in Soil – It appears that OTR values were used for screening of some parameters with no SCS. The QP should provide references for the OTR values used (e.g., Rationale document, Soil Urban Parks, etc.) as the Reviewer was not able to find some of the referenced OTR values (e.g., OTR value of 17,400 ug/g for magnesium). In addition, no OTR value is available for some parameters (e.g., zirconium); however, it was indicated that the max concentration was lower than the OTR value. It is suggested that OTR values for all parameters that were screened out be provided with appropriate reference. It appears that the QP has used the CCME value for screening of tin in the absence of an MECP value; however, the CCME value is not shown in the table (Table D-1). The CCME value should be included in the table or RA text and rationale should be provided on why using this value is appropriate for the site. Similarly, it is suggested that the PGMIS values used for screening of groundwater parameters be included in Table D-2.	Acknowledged. Reference has been added to the Rationale Document (MECP, 2011) for the OTR values. OTR values from the Rationale Document are adjusted in accordance with the procedure the MECP employs in the calculation of the Table 1 Standards, as presented on the "Background Calculations" tab of the MGRA (2016). A footnote has been added to Table F1-1 (Table D-1 in the PSF). A reference to the CCME value for tin has been added, and the rationale updated to reflect this change. PGMIS values were applied to parameters as appropriate in Table F1-2 (Table D-2 of the PSF).	Appendix F1
	b. In addition, some of the notes under Table D-1 appear to be unrelated to this table and should be removed (e.g., DND, EXP).	Acknowledged. The notes in Table F1-1 (Table D-1 of the PSF) have been updated as applicable.	Appendix F1
	c. Similarly, references to OTR values should be clarified in Table 6-7b in Appendix A2. It is noted that some parameters occur in Table 6-7b and not in Table D-1 and vice versa (e.g., zirconium in Table 6-7b but not D-1, and bismuth in D-1 but not 6-7b). These tables should be reviewed and corrected as required.	Acknowledged. OTR and CCME references have been updated per comment 4a. Acknowledged. Table F1-1 (Table D-1 of the PSF) has been updated for consistency with Table 6-7b.	Appendix F1
	d. A stronger rationale should be provided for screening out of parameters with no SCS or available OTR values, including review of other sources of potential background concentration data and consideration of whether the chemical in question may be associated with historical site activities. Notably, bismuth concentrations may be elevated and this metal is known to be associated with specialty alloys.	Concentrations of parameters that do not have evidence of being associated with the Site or historical activities were not retained, specifically when the parameter or parameters were not targeted and only ran as a part of a full analytical scan by the analytical laboratory. Bismuth, specifically, was reviewed for another potential background concentration source and "the residential TRRP Tier 1 protective concentration level (PCL) (TCEQ,2017)" has a value of 37,000 ug/g which is much higher than the maximum reported concentration on Site of 150 ug/g. Refer to the rationale tables provided in Appendix D2 (soil and groundwater) and Appendix D3 (groundwater).	Appendix D2 Appendix D3
5	Section 5.0 – The following comments are provided: a. Based on the HHCSM figures (Figures E-1 and E-2), a utility worker receptor is considered to be present at the Site. For future submissions, this receptor should be included in the HHCSM tables in Section 5.0 of the PSF for consistency.	Acknowledged.	--

	May 8, 2019 MECP Comment	Jacobs Response	Document Location
	b. It is unclear how groundwater ingestion will be addressed by the RA. Figure E-1 refers to this as incidental ingestion, but includes consideration of construction and utility workers, as well as residents. It is unclear how residents would experience incidental exposures to groundwater. Further, since potable groundwater usage applies, the RA should consider this pathway as well and recommend appropriate risk management measures as required.	Acknowledged. The human health CSM figures have been updated to indicate ingestion of groundwater may occur by incidental ingestion for construction and utility workers, but also through ingestion of potable groundwater for residents.	Figures 4-1 and 4-2
6	Attachment B - It is understood that vapour intrusion was not evaluated as part of the Phase Two ESA. The results of the P2ESA indicated that volatile COCs are present in soil and groundwater at concentrations greater than Table 6 SCS. It is understood that details regarding the design and locations of the future buildings are not known at this time. However, an assessment of potential vapour intrusion into future buildings should be completed in the RA and required RMMs (if needed) should be provided in the RMP. The Reviewer expects that this is the QP's intent, but the wording in this section is ambiguous.	Acknowledged. Indoor air modelling for a generic residential and generic building scenario were completed as part of the RA. Modelling is presented in Appendix G2, and risk calculations and discussion are presented in Section 4.	Appendix G2 and Section 4
7	Attachment B, Contaminant Pathways and Receptors – The text in this section omits discussion of potential aquatic ecological exposure pathways, although they are referenced in the PSF per se and the Ecological CSM. The QP is encouraged to make use of the Approved Model in the evaluation of this issue.	Acknowledged. A qualitative assessment of the potential for offsite risks was completed for the potential offsite aquatic receptors employing the MECP MGRA Model to derive site-specific S-GW3 values based on the distance to the nearest downgradient water body. However, since the Site is a shallow soil property, use of the site-specific distance to the nearest waterbody does not result in a change to the GW3 values ("since one cannot assume that dilution occurs within the bedrock aquifer" [MECP, 2011]). Section 5.2.3 in the RA discusses the potential ecological aquatic receptors, while Section 5.5.3.2 includes a discussion on the potential pathway analysis.	Section 5.2.3 Section 5.5.3.2 Appendix F1, Tables F1-5a to F1-5e
8	Based upon on review of the information provided with the Phase Two CSM, it does not appear that sufficient groundwater sampling has been completed at the time of submission in a number of monitoring well locations, specifically for VOCs and PHCs. As presented, it appears that several wells were only sampled once for these parameters. Please ensure that the RA includes all available data, in tabular format such that an interpretation to any potential trends can be made. If additional information is not available and additional groundwater sampling is not planned, additional groundwater monitoring will need to be considered in order to evaluate whether or not the groundwater contamination plume is increasing, decreasing or stable as well as to determine whether or not the maximum concentrations in groundwater have been reasonably identified.	Acknowledged. A supplemental soil and groundwater investigation was completed between March and April of 2019; five existing wells were sampled and seven boreholes were advanced. Between February and March 2020, an additional soil and groundwater investigation was completed and 4 boreholes were advanced and 90 monitoring wells were sampled. In February 2020, 5 test pits were also advanced. The results of the additional soil and groundwater sampling are provided in Appendix D3. As a result, the screening tables (Table F1-1 and F1-2) were updated to reflect the additional soil and groundwater data. Appendix D3 provides the tabulated groundwater results in Table 6-8.	Section 3 Appendix D3, Table 6-8 Appendix F1, Tables F1-1 and F1-2
9	As the City of Guelph relies on groundwater for the municipal drinking water supply, both the Risk Assessment and the Phase Two CSM need to consider the potential impacts of COCs identified on the Property above the drinking water component value on the municipal supply. This evaluation needs to take into consideration the City's source water protection plan and make reference to available source water protection mapping.	Acknowledged. Reference to the source water protection mapping is provided in Appendix D3.	Appendix D3
10	Based upon what has been provided, the use of RMMs is anticipated by the QP. If RMMs are in fact found to be necessary as a result of the Risk Assessment, a certificate of property use will be required to be issued. Furthermore, if RMMs are required as part of this risk assessment, details on these measures will need to be included in the risk assessment report, including a clear description of the RMMs and/or any property restrictions; performance objectives; duration; and any maintenance and monitoring requirements along with contingency measures (if applicable).	Acknowledged.	--

Notes:

APEC = area of potential environmental concern
CCME = Canadian Council of Ministers of the Environment
City = City of Guelph
COC = contaminant of concern
CSM = conceptual site model
EcoCSM = ecological conceptual site model
ERA = Environmental Risk Assessment
ESA = Environmental Site Assessment
ha = hectare
HH = human health
km^2 = square kilometre
MGRA = Modified Generic Risk Assessment
MECP = Ontario Ministry of the Environment, Conservation and Parks
OTR = Ontario Typical Range
PGMIS = Provincial Groundwater Monitoring Information System
PHC = petroleum hydrocarbon
PSF = pre-submission form
P2 = Phase Two
QP = Qualified Person
RA = Risk Assessment
RSC = Record of Site Condition
RMM = risk management measure
RMP = risk management plan
SCS = site condition standard
VOC = volatile organic compound

Phase Two CSM Comments For:	PSF/RA Property Address: 200 Beverly St, Guelph PSF/RA File No.: PSF 1748-19 IDS No.: 6417-B9XQGZ Completed by: Client Services and Permissions Branch, Financial Assurance and Brownfields Services Unit Reviewer Name: Herb Maier, P.Geo.	October 10, 2019

These comments are based on the information provided in the phase two conceptual site model (CSM) in Attachment B of the Pre-Submission Form (PSF) dated February 2019.

General Comments:

1. According to the information presented in the phase two CSM there appear to a number of soil sampling locations within several areas of potential environmental concern (APECs) that have not been analyzed for the complete metals parameter group. In figures (plan view and cross-sections), sampling locations that have not been analyzed in accordance with the Regulation should be distinguished from sampling locations that have been analyzed in accordance with the Regulation. It is important to note that, although these sample results are useful, samples used for the assessment of APECs, delineation, confirmation sampling, etc. are to be collected and analyzed in accordance with the Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011. Additional sampling may be required to fill any resulting data gaps.

2. According to the description provided for APEC-11 there appear to have been historical impacts in this location (including free product), which do not appear to be shown in figures. Note that the locations and depths of any known historically impacted areas in this and in any other areas on the property and concentrations where contaminants previously exceeded the applicable site condition standard (SCS) need to be identified and shown in figures to demonstrate that areas where historical exceedances were present have been assessed in accordance with the regulatory requirements.

3. The title block in figures showing contaminant distribution contain a note that "J" indicates associated value is estimated"; however, no such samples were found in figures. Please note that data subject to qualifiers should be clearly highlighted in figures.

4. The reviewer was unable to locate Building 4H (Foundry Addition) on Figure 6-2 of phase one CSM. It is unclear whether this building is shown.

5. The phase two CSM needs to include a figure that shows potentially contaminating activity (PCA) locations and corresponding APECs. Where off-site PCAs exist that are not considered to contribute the APECs, then this figure should also distinguish between off-site PCAs that result in APECs from PCAs that do not (e.g., PCAs contributing to APECs could be highlighted red and PCAs that do not in green).

6. The phase two CSM acknowledges that the CSM has not been "finalized" and that further work is needed to confirm the applicable SCS (i.e., further work to determine representativeness of elevated pH in one sample location), assess APECs and delineate contaminants. Further submissions should ensure any data gaps identified by the QP and Ministry are appropriately addressed.

7. According to the phase two CSM, arsenic exceeded the applicable SCS in ground water in MW17-112S; however, this exceedance is not shown on figures. It is unclear if this is a typo and the if the qualified person (QP) is referring to MW18-112S.

8. It appears that the screened interval depths for MW18-135S and MW18-135D on Figure 6-15 (and possibly other figures) may be reversed.

Specific Comments of the Phase Two CSM:

9. Clause 33.1(2)(b) of the Regulation – The general objectives of the phase two environmental site assessment (ESA) are to be achieved by conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the phase two sampling and analysis plan and for any such contaminants identified during subsequent phase two activities and analyses of environmental conditions at the phase two property. The following issue was identified:

    - Based on the information presented in the phase two CSM, it is unclear if all APECs associated with the identified PCAs and/or potential sources of contamination have been investigated. For example:

        a) There do not appear to be any soil sampling locations for chlorophenols (CPs) in the central historical excavation area of APEC-1. There also do not appear to be any ground water sampling locations for CPs and acid/base/neutral compounds (ABNs) in the eastern portion of APEC-1. The description provided for APEC-1 refers to moulding sand and dust collector waste storage in the north west corner of the building and drained into the truck bay; however, these specific locations do not appear to be located and identified in figures in the phase two CSM.

        b) There does not appear to be adequate distribution of sampling of metals, petroleum hydrocarbons (PHCs) and volatile organic compounds (VOCs) in soil in APEC-3.

        c) There appears to be only one sample location for CPs in soil in APEC-4.

        d) There do not appear to be any soil sample locations for polycyclic aromatic hydrocarbons (PAHs) and VOCs and no ground water sample locations within the galvanizing room associated with APEC-5.

        e) There do not appear to be any soil and ground water sampling locations within the oil houses associated with APEC-7 and associated tanks are not shown and identified.

        f) The former underground storage tank (UST) associated with APEC-8 is not shown and identified.

        g) There do not appear to be any soil or ground water sampling locations within the oil house associated with APEC-9.

        h) It is unclear if there are any sampling locations in the location(s) where machine shop cuttings were stored on the ground north of the machine shop building associated with APEC-10 given that this area is not located and identified in figures in the phase two CSM.

i) It appears that the QP is relying on a single soil and ground water sampling location at the norther boundary of APEC-12. In addition, there appears to be additional coal storage east and outside of APEC-12.

j) There do not appear to be any soil sampling locations for PAHs and only one soil sample location for metals within the northern length of APEC-13.

k) There do not appear to be any ground water sampling locations for the identified contaminants of potential concern (COPCs) within the former building footprint associated with APEC-14.

l) There appears to be only a single soil sample location and no ground water sampling locations for the identified COPCs within the sand mixing/storage building associated with APEC-15 and only one soil sample location for CPs in APEC-15.

m) There do not appear to be any sampling locations for the identified COPCs in the central portion of APEC-16 where the transformer area appears to be located.

n) There do not appear to be any sample locations for PAHs within the coal storage building footprint or coal pile west of the coal storage building associated with APEC-18.

o) There do not appear to be any soil sampling locations for PHCs, PAHs and VOCs within the garage building footprint associated with APEC-20.

p) There do not appear to be any soil sampling locations for PAHs within the coal storage building footprint associated with APEC-21.

q) There do not appear to be any soil sampling locations for PHCs, VOCs and PAHs or ground water sampling locations within the paint shop building footprint associated with APEC-23.

r) There appear to be gaps in the assessment of PHCs, PAHs and VOCs in soil in the western, west-central and east-central portions and PHCs and PAHs in ground water in the west-central portion of the former drum storage area associated with APEC-25.

s) There do not appear to be any soil or ground water sampling locations for the identified COPCs within the electrical shop associated with APEC-27.

t) The description for APEC-29 associated with fill material of unknown quality also refers to oiling of exterior yard areas for dust control. Oiling of yard areas should be identified as a separate APEC(s) and yard areas where oil was applied should be clearly shown and identified in figures to demonstrate that these area(s) where oil was applied have been adequately assessed.

Note that identifying and locating where any PCA and/or potential sources of contamination have occurred and showing tanks in such areas is required in the phase one CSM and on figures showing the property before actions taken to reduce the

concentration of contaminants in the phase two ESA. The phase two CSM must demonstrate that samples have been collected and analyzed from areas where maximum concentrations are expected and that the distribution of samples within each APEC is representative of the full extent of each APEC.

10. Subsection 7(1) and 16 of Schedule E – The QP shall ensure that all areas on, in or under the phase two property where a contaminant is present at a concentration greater than the applicable SCS for the contaminant shall be delineated laterally and vertically for each contaminant present in soil, ground water or sediment, on, in or under the phase two property. In addition, section 16 specifies additional characterization requirements for when analysis shows that the contaminant is present at a concentration greater than the applicable SCS. The following issues were identified:

    - There appears to be a gap in the lateral delineation of benzene, toluene, ethylbenzene, xylenes (BTEX) in soil in BH07-66.
    - There do not appear to be any deeper ground water sampling locations to vertically delineate benzene in ground water in MW17-102D nor do there appear to be up/cross-gradient samples at laterally delineate at similar depth.
    - Trichloroethylene (TCE) is reported as exceeding the applicable SCS in MW18-113D; however, it is unclear if TCE has been vertically delineated in this area. It is further noted here that there do not appear to be any shallower ground water sampling for VOCs in this area.
    - There appears to be a general gap in the delineation of VOCs in the northwestern portion of the property.
    - BTEX in soil exceeded the applicable SCS in BH07-66 at the overburden-bedrock interface; however, no ground water sampling appears to have been conducted at this location.
    - There do not appear to be any ground water sampling locations for PHCs in the vicinity of MW18-117S and BH07-60 in the northwestern portion of the property where PHCs exceeded the applicable SCS in soil.
    - It is acknowledged that further lateral and vertical delineation of VOCs in soil will be undertaken.

    The QP will be required to delineate the lateral and vertical extent of these contaminants in soil and in ground water by conducting further phase two investigation activities.

11. Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing from the phase two CSM:

- A narrative description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including:

    a. Hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable SCSs, lateral and vertical hydraulic gradients. The magnitude of the downward and upward hydraulic gradients should be provided.

    b. Any respect in which section 41 or 43.1 of the Regulation applies to the property. This section of the phase two CSM should include an evaluation of presence/absence of areas of natural significance.

- Where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, identification of:

    i. The distribution, in each of the areas where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, of each contaminant present in the area at a concentration greater than the applicable SCS, for each medium in which the contaminant is present, together with figures showing the distribution. A narrative description of lateral and vertical distribution of BTEX in ground water in MW17-102D appears to be missing from the phase two CSM.

- The title of Figure 6-4 of the phase two CSM refers to "inorganics". Please note that all contaminants should be identified using the Method Groups as identified in the "Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011, which are also listed in footnote number 3 of the approved APEC table form.

- The phase two CSM should provide confirmation that maximum concentration of cis-1,2-dichloroethene (cis-1,2-DCE) in ground water under the property have been located and identified.

- Based on figures in the phase two CSM there appear to be a number of ground water sampling locations that exceeded the applicable SCS and subsequently met the applicable and are highlighted as meeting the applicable SCS; however, no further explanation for each is provided. It is unclear what the rationale is for why these ground water sample locations are considered to meet the applicable SCS. For example:

    i. Antimony is identified on Figure 6-12 as having initially exceeded the applicable SCS in ground water in MW118-114D and then subsequently meeting the applicable SCS, but is highlighted as meeting the applicable SCS. Similarly, lead is reported as having exceeded the applicable SCS in ground water in OW07-33 and subsequently meeting the applicable SCS in two subsequent sampling events, but highlighted as meeting the applicable SCS. Similar issues were identified for zinc in ground water in OW12 and OW26S and arsenic in ground water in MW17-101D. However, no explanations are provided in the CSM.

ii. Benzene is identified on Figure 6-14 as having exceeded the applicable SCS in ground water in MW18-112G and subsequently meeting the applicable SCS and is highlighted as meeting the applicable SCS; however, no explanation is provided.

iii. PHC F2 is identified on Figure 6-15 as having exceeded the applicable SCS in ground water in OW18-II and subsequently meeting the applicable SCS and is highlighted as meeting the applicable SCS; however, no explanation is provided.

iv. Polychlorinated biphenyls (PCBs) are identified as having previously exceeded the applicable SCS in ground water in OW26S in 2010 and subsequently meeting the applicable SCS in 2011 and 2017 at this location.

If an initial sampling result that is greater than the applicable SCS is considered to be non-representative, a rationale for why should be provided and where there has been only a single subsequent sampling event, at least one additional round of ground water sampling should be conducted to confirm. If the initial exceedance is representative of site conditions (e.g., true/real exceedance), then delineation would be required.

- The lateral and/or vertical distribution of contaminants in cross-sections on Figures 6-3c, 6-5a, 6-5b, 6-6a, 6-6c, 6-6d, 6-7a, 6-7b, 6-8a, 6-10a, 6-10b, 6-12a, 6-14c, 6-14d and 6-17a did not follow the requirements of clause 7(4)(c), Schedule E, which states the following:

  "the delineation is conducted by assuming the lateral and vertical extent of the area in which a contaminant is present at a concentration greater than the applicable SCS for that contaminant extends laterally or vertically, as the case may be, from a sampling location at which the contaminant is present at a concentration greater than the applicable SCS for the contaminant to the next sampling location at which the concentration of the contaminant is equal to or below the applicable SCS for the contaminant".

- The screened interval of monitoring wells should clearly identified on cross-sections showing the lateral and vertical distribution of contaminants.

12. Subsection 47(15) of Schedule E – Figures, maps, site plans and cross-sections are required to contain a scale, north arrow and a title block that includes a descriptive title, the address of the phase two property, if any, the name of the QP's firm, company or partnership, if any; and the date the figure, map, site plan or cross-section was created. The following issues were identified:

    - The figures are marked "Draft", indicate that "Locations are approximate" and the title block is missing the date the figure was created.

APPENDIX A2

Response to Phase Two Conceptual Site Model Comments for 200 Beverley Street, Guelph, Ontario

October 10, 2019 MECP Comment	Jacobs Response
General Comments	
1. According to the information presented in the phase two CSM there appear to a number of soil sampling locations within several areas of potential environmental concern (APECs) that have not been analyzed for the complete metals parameter group. In figures (plan view and cross- sections), sampling locations that have not been analyzed in accordance with the Regulation should be distinguished from sampling locations that have been analyzed in accordance with the Regulation. It is important to note that, although these sample results are useful, samples used for the assessment of APECs, delineation, confirmation sampling, etc. are to be collected and analyzed in accordance with the Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011. Additional sampling may be required to fill any resulting data gaps.	Metals analysis from historical samples were used to supplement the more recent Phase Two ESA investigations. Metals analysis were done in accordance with the regulations at the time which result in arsenic, boron, and uranium typically missing from metals analyses from samples collected in the 1990s (54 samples at 43 locations), and boron and uranium typically missing from metals analyses from 2007 (77 samples from 36 locations). These soil sampling locations (79 locations) make up roughly 50 percent of the total 158 soil sampling locations for metals. All APECs which include Metals as COPCs have been characterized with at least one soil sample from the recent sampling events which have been collected and analyzed in accordance with O. Reg. 153/04. The sampling locations in each APEC are shown in the disposition table provided as Table 6-4 of the CSM. This is a total of 91 samples from 55 locations. Historical Metals therefore only supplement data for characterization and provide more dense coverage with 79 additional sample locations. As with the nature of fill in industrial locations, the horizontal and vertical extent of contaminants present is essentially across the full site, to the full depth of soils present (ie. to bedrock, which is on average 2.5 mbgs at the Site) and therefore historical samples are rarely used for delineation. The only area where clean historical soils are used for delineation is a limited area across the northwestern boundary of the property, where limited industrial activity has occurred. We believe the historical data is still valid and useful for the following reasons: - no industrial activity has happened since the time of sampling and metals remain fairly stable in soil; - many maximum concentrations (9 of 11 locations) are from historical locations, and are included to have a conservative dataset; resampling to find the maximums in current programs would be impractical - sampling analysis was done by an accredited lab in accordance with the regulations at the time; - the parameters that are missing, aside from arsenic in the 1990s samples, have not been determined to be COPCs based on the APEC descriptions, nor as COCs from the results of the remaining 91 samples. Boron and uranium are detected at a maximum of half or less of their respective SCS. Where arsenic occurs in concentrations above the SCS (3 of 165 samples), the extent has been delineated with samples analyzed for metals including arsenic.
2. According to the description provided for APEC-11 there appear to have been historical impacts in this location (including free product), which do not appear to be shown in figures. Note that the locations and depths of any known historically impacted areas in this and in any other areas on the property and concentrations where contaminants previously exceeded the applicable site condition standard (SCS) need to be identified and shown in figures to demonstrate that areas where historical exceedances were present have been assessed in accordance with the regulatory requirements.	As this excavation occurred in 1999, confirmatory sampling (i.e. samples collected for TPH, lead and zinc only) and documentation of the soil removal was not conducted as per the current regulatory requirements. Therefore, Jacobs did not intend to use or report this data in similar ways to any current remediation as there were data reliability issues for those historical exceedances. Instead, Jacobs used the historical data for screening purposes to develop the Phase Two ESA sampling programs, and the area and APEC has been characterized and delineated with subsequent sampling meeting the current regulatory requirements. We discuss the use and reliability of all historical data in Section 3.3.1 of the RA as well as within the Phase Two ESA (in draft) and generally state that the VOC and TPH parameters prior to 2004 are considered unreliable due to changes in analytical methods and have been replaced with more appropriate analyses. Additionally, we have not relied on historical data from reports that did not include laboratory certificates of analysis. COCs that were targeted during the 1999 excavation (TPH, Lead and Zinc) remain as COCs on the Site. Most of the excavated area is still included in the impacted areas defined by the horizontal and vertical delineation as shown on the CSM figures (metals and PHCs in both soil and groundwater), with the exception of a small area to the north where current sampling has characterized the PHCs in soil and groundwater to be below the SCS.
3. The title block in figures showing contaminant distribution contain a note that "J" indicates associated value is estimated"; however, no such samples were found in figures. Please note that data subject to qualifiers should be clearly highlighted in figures.	The J qualifier was missing on applicable data from previous figures and has been updated where applicable.
4. The reviewer was unable to locate Building 4H (Foundry Addition) on Figure 6-2 of phase one CSM. It is unclear whether this building is shown.	Building 4H on the inset table on Figure 6-2 was an error which was corrected in the Phase One ESA and mistakenly carried through to the CSM. The figure has been updated with the corrected table. One building was missing labels (6A) and was also added in the revised Figure 6-2.
5. The phase two CSM needs to include a figure that shows potentially contaminating activity (PCA) locations and corresponding APECs. Where off-site PCAs exist that are not considered to contribute the APECs, then this figure should also distinguish between off-site PCAs that result in APECs from PCAs that do not (e.g., PCAs contributing to APECs could be highlighted red and PCAs that do not in green).	Figures 4-1a and 4-1b have been included to show off-site and onsite PCAs and corresponding APECs.
6. The phase two CSM acknowledges that the CSM has not been "finalized" and that further work is needed to confirm the applicable SCS (i.e., further work to determine representativeness of elevated pH in one sample location), assess APECs and delineate contaminants. Further submissions should ensure any data gaps identified by the QP and Ministry are appropriately addressed.	Acknowledged. The subsequent submission of the CSM has all data gaps addressed.

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7. According to the phase two CSM, arsenic exceeded the applicable SCS in ground water in MW17- 112S; however, this exceedance is not shown on figures. It is unclear if this is a typo and the if the qualified person (QP) is referring to MW18-112S.	Arsenic exceeded the applicable SCS in MW18-112S. This was a typo and text has been corrected.
8. It appears that the screened interval depths for MW18-135S and MW18-135D on Figure 6-15 (and possibly other figures) may be reversed.	The screen depth information was reversed in the project database in error and has been corrected. The figures have been regenerated using the updated database information.
Specific Comments of the Phase Two CSM:	
9. Clause 33.1(2)(b) of the Regulation – The general objectives of the phase two environmental site assessment (ESA) are to be achieved by conducting one or more rounds of field sampling for all contaminants associated with any APEC identified in the phase two sampling and analysis plan and for any such contaminants identified during subsequent phase two activities and analyses of environmental conditions at the phase two property. The following issue was identified:	
• Based on the information presented in the phase two CSM, it is unclear if all APECs associated with the identified PCAs and/or potential sources of contamination have been investigated. For example:	
a) There do not appear to be any soil sampling locations for chlorophenols (CPs) in the central historical excavation area of APEC-1. There also do not appear to be any ground water sampling locations for CPs and acid/base/neutral compounds (ABNs) in the eastern portion of APEC-1. The description provided for APEC-1 refers to moulding sand and dust collector waste storage in the north west corner of the building and drained into the truck bay; however, these specific locations do not appear to be located and identified in figures in the phase two CSM.	The QPs basis for the frequency and placement of sampling for CPs was based on a site-wide approach in addition to the assessment of individual APECs. As the potential for ABNs and CPs on site would be associated with spent foundry sand, the APECs 1, 4, 15 and 29 (Foundry, Sand Storage and Mixing, and fill quality over the Site where excess sand may have been placed) were assessed together. Samples were generally collected in the first investigation phase (2017) to determine if additional sampling was required. For all the soil (23 samples from 13 locations) and groundwater (11 samples from 9 locations) samples collected, no detectable concentrations of CPs were found, and all ABNs were non-detect or below the SCS in soil and non-detect in groundwater. Additionally, historical analysis of CPs in GW (not used in the Phase Two ESA as there was no CofA and data was over 10 years old) also did not have detectable concentrations of CPs present. Specific responses to MECP concerns are as follows: • Re: Historical Excavation – This was the location of a capacitor room and was remediated for PCBs. Although enclosed in the foundry, elevated concentrations (or highest concentrations) of chlorophenols were not expected to be present in this area. • Re: Eastern Portion of APEC-1 lacking GW samples groundwater samples were not collected from MW17-106S as no concentrations were detected in the soil samples form this location. • Re: north west corner/truck bay - MW17-107S (SL and GW collected) is located within the western portion of APEC-1 and within 15 m of the truck bay area.
b) There does not appear to be adequate distribution of sampling of metals, petroleum hydrocarbons (PHCs) and volatile organic compounds (VOCs) in soil in APEC-3.	An additional borehole location (BH20-212) was advanced on the west side of the APEC to add adequate distribution to the existing four investigation locations that were sampled for metals, PHCs and VOCs.
c) There appears to be only one sample location for CPs in soil in APEC-4.	As discussed in the response to comment 9a, and the uncertainty to as whether the sand storage was for clean or spent material, one sample was analyzed for CPs and ABNs to determine presence/absence and the result of this (and all samples on site) indicate non detectable concentrations of CPs in soil (and groundwater). We believe that the current sampling and locations provide adequate coverage characterizing the APEC.
d) There do not appear to be any soil sample locations for polycyclic aromatic hydrocarbons (PAHs) and VOCs and no ground water sample locations within the galvanizing room associated with APEC-5.	Two soil samples and one groundwater sample from one location (MW17-108S) were collected within APEC-5 and analyzed for all the COPCs identified for the APEC (Metals, PHCs, PAHs and VOCs). The location was placed central and downgradient (less than 3 m) from the approximate location of the galvanizing building (based off an FIP, has a margin of error), in a location where typical management/disposal of waste would have occurred (i.e. "out the back door"). Soil results from this location showed no detectable concentrations of VOCs and PAHs and exceeded the SCS for PHCs and metals. Concentrations in soil of zinc, specifically, are shown to increase with depth in this area, up to the bedrock surface (maximum of 67,200 at MW17-108S) – likely the result of release(s) of molten zinc (liquid) to the ground. Likely due to zinc being largely insoluble by nature, these impacts in soil do not result in groundwater concentrations above the SCS. Subsequent samples (TP18-309, TP18-310 and BH18-207) were collected within the APEC for these parameter groups exceeding (PHCs and metals) within 5-10 m of the original location, and results showed concentrations less than MW18-108S. BH18-207 was located within the area that was likely the former building footprint and concentrations of zinc were reported up to 37,500 ug/g at 0.76-0.89 mbgs; an additional metal sample was collected at the bedrock contact to ensure the maximum zinc concentrations were captured. Samples of VOCs and PAHs were included for additional characterization, and a new maximum concentration of trichloroethylene (TCE) was found at the surface which reduced to concentrations which met the SCS before the depth of the water table. MW18-108S remained as the location of the maximum zinc in soil.
e) There do not appear to be any soil and ground water sampling locations within the oil houses associated with APEC-7 and associated tanks are	There are 7 soil and 3 groundwater sample locations within APEC-7. Table 6-4 summarizes the soil and groundwater analyses associated with APEC-7.

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	not shown and identified.	BH07-56 and MW-103S/D are located very close to or within the footprint of the oil house which cover BTEX and PHCs in soil and groundwater. It is noted that building locations are estimated based on what was shown on FIPs and/or historical report figures, and locations were placed in areas that would capture potential impacts (i.e. downgradient monitoring well placement). The Site Plan and Historical Buildings Figure (Figure 2-2 in the Phase Two ESA and Figure 6-2 of the Phase One Summary in the RA) has been added to the CSM (Figure 2-2) which shows the location of the ASTs as well as known buildings, UST and other site features.
f)	The former underground storage tank (UST) associated with APEC-8 is not shown and identified.	The Site Plan and Historical Buildings Figure (Figure 2-2 in the Phase Two ESA and Figure 6-2 of the Phase One Summary in the RA) has been added to the CSM (Figure 2-2) which shows the location of the ASTs as well as known buildings, UST and other site features.
g)	There do not appear to be any soil or ground water sampling locations within the oil house associated with APEC-9.	There are 3 soil and 3 groundwater sample locations associated with APEC-9. Table 6-4 summarizes the soil and groundwater analyses associated with this APEC. BH07-54 and MW17-105 series wells are located close (3-4 metres) to or within the footprint of the oil house; the building location is approximated as they are based on the available FIPs.
h)	It is unclear if there are any sampling locations in the location(s) where machine shop cuttings were stored on the ground north of the machine shop building associated with APEC-10 given that this area is not located and identified in figures in the phase two CSM.	The area north of the machine shop was included in the 1999 excavation/remediation. Text has been added to the APEC description to clarify that the soils in this area have been removed and backfilled.
i)	It appears that the QP is relying on a single soil and ground water sampling location at the northern boundary of APEC-12. In addition, there appears to be additional coal storage east and outside of APEC-12.	The areas of coal storage as determined from the Phase One ESA all fall within APEC-12. The APEC description has been worded more clearly; previously text was confusing as it was referencing changes to the extent of the area based on the FIPs reviewed. An additional borehole (BH20-213) was advanced in the central area of the APEC for additional characterization in soil for PAHs and metals. No exceedances were found, and therefore no further groundwater locations were added.
j)	There do not appear to be any soil sampling locations for PAHs and only one soil sample location for metals within the northern length of APEC-13.	Two additional test pits (TP20-322 and TP20-323) were excavated in the northern length of the former rail line for characterization of PAHs and metals in soil.
k)	There do not appear to be any ground water sampling locations for the identified contaminants of potential concern (COPCs) within the former building footprint associated with APEC-14.	OW10 is located south and downgradient (8m) of the possible auto storage, maintenance and repair building, and within the identified APEC boundaries. Based on the age of the building and remaining concrete foundation observed in the field, the monitoring well is located in an appropriate location to capture potential impacts. We believe that the current sampling and locations provide adequate coverage for the APEC.
l)	There appears to be only a single soil sample location and no ground water sampling locations for the identified COPCs within the sand mixing/storage building associated with APEC-15 and only one soil sample location for CPs in APEC-15.	As discussed in the response to comment 9a, one sample was analyzed for CPs and ABNs in the central area of APEC-15, and along with the other foundry sand related samples/APECs to determine the presence/absence of these constituents at the entire Site. The result of this (and all samples on site) indicate no detectable concentrations or trace concentrations below the SCS of CPs/ABNs in soil (and no detectable concentrations in groundwater). OW07-37, located within the APEC had groundwater samples collected for the identified COPCs. Soil and groundwater results by APEC are summarized in Table 6-4.
m)	There do not appear to be any sampling locations for the identified COPCs in the central portion of APEC-16 where the transformer area appears to be located.	OW07-32 is located 2 metres downgradient from what appears to be the transformer pad and is located within the APEC boundaries. Sampling locations are taken from outside the pad, where material could have been spilled directly to the soil/ground; the concrete pad tends to act as a cap. We believe that the current sampling and locations provide adequate coverage for the APEC.
n)	There do not appear to be any sample locations for PAHs within the coal storage building footprint or coal pile west of the coal storage building associated with APEC-18.	PAHs were analyzed in one soil location (MW17-100S) and two groundwater locations (MW17-110S and OW07-38S) for the coal storage APEC. An additional borehole (BH20-214) was advanced for further characterization of PAHs in the APEC.
o)	There do not appear to be any soil sampling locations for PHCs, PAHs and VOCs within the garage building footprint associated with APEC-20.	It is noted that the garage footprint was very small (less than 10 x 10 metres). Various historical reports placed the building north (P&R) or south (DCS) of the historical sampling locations, and recent field investigations could not confirm its exact location. Historical investigations were based on visual observations of impacts and activities at the time, and therefore are believed to have captured the areas with the highest likelihood of contamination. Some historical data was not used in the Phase Two dataset (soil samples with no CofA, or old VOC/TPH data) and the recent sampling program included locations to reevaluate /supplement this data (ie TP17-300, resampling of OW15/16). We believe that the current sampling and locations provide adequate coverage for the APEC.
p)	There do not appear to be any soil sampling locations for PAHs within the coal storage building footprint associated with APEC-21.	The former coal storage area footprint is very small (6 x 10 m) and makes up the southern portion of the former garage (APEC-20). Accuracy is based on FIPs alone as the previous investigations were likely conducted when coal was no longer used as a fuel source; TP17-300 and TP18-318 are approximately 17 m apart, on either side of what we've identified as the coal storage area, and likely capture any potential impacts. We believe that the current sampling and locations provide adequate coverage for the APEC.
q)	There do not appear to be any soil sampling locations for PHCs, VOCs and PAHs or ground water sampling locations within the paint shop	There is one location (MW17-110S) for soil and two locations (MW17-110S and OW07-38S) for groundwater to the south of the building footprint, within the APEC boundaries. An additional borehole (BH20-214) was advanced within the building footprint for further characterization of VOCs, PHCs, PAHs and metals in the APEC.

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building footprint associated with APEC-23.	
r) There appear to be gaps in the assessment of PHCs, PAHs and VOCs in soil in the western, west-central and east-central portions and PHCs and PAHs in ground water in the west-central portion of the former drum storage area associated with APEC-25.	For soil, OW07-31 includes samples with PHCs and VOCs for the western side, TP17-302 includes PHCs, PAHs and VOCs for the west-central area. Historical data is available in the east-central area for location "12" for VOCs and TPH and "12SE10" for TPH, however the data dates back to 1991 and therefore was not considered reliable for the Phase Two ESA. An additional testpit (TP20-322) was added in the central area of the former drum storage area and soil samples analyzed for VOCs, PHCs, PAHs and metals. For groundwater, MW18-115S was added for sampling of VOCs, PAHs and PHCs to provide the additional coverage in the west-central portion to supplement the data from OW07-31, OW02, and OW17.
s) There do not appear to be any soil or ground water sampling locations for the identified COPCs within the electrical shop associated with APEC-27.	The footprint of the former electrical shop is very small (approx. 5 x 10 m). As the building/addition was built after 1960, the concrete slab likely provided a barrier for soil and groundwater contamination directly within/beneath the building footprint. Sampling locations were placed for downgradient coverage of the COPCs in soil and groundwater. An additional testpit (TP20-324) was added within the former electrical shop footprint for greater coverage of the COPCs. No impacts other than zinc were found (which is representative of the entire site) and therefore the existing groundwater locations were still considered adequate coverage.
t) The description for APEC-29 associated with fill material of unknown quality also refers to oiling of exterior yard areas for dust control. Oiling of yard areas should be identified as a separate APEC(s) and yard areas where oil was applied should be clearly shown and identified in figures to demonstrate that these area(s) where oil was applied have been adequately assessed.	Jacobs believes the fill material of unknown quality is more reasonably applied to all areas of the site, including the oiled yard areas as it is not known to which areas of the site the activities occurred. The unknown fill description applies to all historical filling activities that may have occurred, such as dumping foundry sands, or other operational waste and therefore a large number of COPCs have been considered. COPCs for oiled areas (ie PHCs) are therefore included and the dataset provides good PHC coverage in the yard areas.
Note that identifying and locating where any PCA and/or potential sources of contamination have occurred and showing tanks in such areas is required in the phase one CSM and on figures showing the property before actions taken to reduce the concentration of contaminants in the phase two ESA. The phase two CSM must demonstrate that samples have been collected and analyzed from areas where maximum concentrations are expected and that the distribution of samples within each APEC is representative of the full extent of each APEC.	
10. Subsection 7(1) and 16 of Schedule E – The QP shall ensure that all areas on, in or under the phase two property where a contaminant is present at a concentration greater than the applicable SCS for the contaminant shall be delineated laterally and vertically for each contaminant present in soil, ground water or sediment, on, in or under the phase two property. In addition, section 16 specifies additional characterization requirements for when analysis shows that the contaminant is present at a concentration greater than the applicable SCS. The following issues were identified:	
• There appears to be a gap in the lateral delineation of benzene, toluene, ethylbenzene, xylenes (BTEX) in soil in BH07-66.	Exceedances of BTEX at BH07-66 are marginal, with non-detect results from samples immediately below (TP18-317), and a significant amount of BTEX sampling has been completed across the Site. Samples used for lateral delineation are approximately 30 m away and we consider them to be adequate coverage.
• There do not appear to be any deeper ground water sampling locations to vertically delineate benzene in ground water in MW17-102D nor do there appear to be up/cross- gradient samples at laterally delineate at similar depth.	The exceedance at MW17-102D was considered anomalous as it is not present in the soil or shallow groundwater in this area of the Site (ie. OW07-34S/D, OW26S, MW107S, MW18-121S). Deeper groundwater sampling locations to vertically delineate the marginal exceedances of benzene include MW18-107D, MW18-121D and MW18-123S where benzene concentrations were not detected. Additional notes have been added to the CSM to describe this uncharacteristic concentration.
• Trichloroethylene (TCE) is reported as exceeding the applicable SCS in MW18-113D; however, it is unclear if TCE has been vertically delineated in this area. It is further noted here that there do not appear to be any shallower ground water sampling for VOCs in this area.	MW18-113 is located in an APEC assessing off-site GW impacts, and no known historical site activities occurred in this area. A full monitoring well network was sampled for VOCs in the latest sampling event (February 2020). MW18-113D and MW18-113S met the SCS with non-detect concentrations. Appropriate notes have been included in the CSM to indicate that due to two subsequent samples meeting the SCS, this location in no longer considered to exceed the SCS.
• There appears to be a general gap in the delineation of VOCs in the northwestern portion of the property.	The northwestern corner of the property was the employee parking lot and no APECs associated with VOCs were identified in this area. Existing VOC impacts are related to the regional groundwater quality. Existing shallow groundwater wells (MW18-112S, MW18-113S, MW18-114S, MW18-115S, MW18-117S and MW18-124S) on the northwest portion of the property were sampled for VOCs to confirm the characterization of the shallow groundwater. All shallow monitoring wells met the SCS.
• BTEX in soil exceeded the applicable SCS in BH07-66 at the overburden-bedrock	The historical soil sample collected from BH07-66 spanned the entire depth of soil (ie 0.05 to 1.22) so it is unclear if impacts were truly extended to bedrock. The soil exceedances here are fairly marginal and additional samples from 2017 at the rock interface immediately adjacent to BH07-66 (TP18-317) were nondetect for BTEX.

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interface; however, no ground water sampling appears to have been conducted at this location.	The PIDs readings from the original BH were low (less than 10 ppm) and no gross impacts or staining is noted on the original BH log. Therefore, the potential for BTEX impacts in groundwater to be associated with these minor soil impacts is low.
• There do not appear to be any ground water sampling locations for PHCs in the vicinity of MW18-117S and BH07-60 in the northwestern portion of the property where PHCs exceeded the applicable SCS in soil.	MW18-117S, the shallow well in the centre of the PHC soil impacted area was sampled for PHCs in GW in February 2020 and all results were non-detect, meeting the SCS.
• It is acknowledged that further lateral and vertical delineation of VOCs in soil will be undertaken.	Acknowledged. Lateral and vertical delineation of VOCs in soil was completed and updated. TCE exceedances in soil at MW17-102D were no longer considered to exceed the SCS as soil results from a subsequent sampling event met the SCS and remained below the SCS when averaged with the previous results. A new VOC maximum (TCE) was found in the surface soil at BH18-207 and was adequately delineated with two deeper samples and locations sampled for VOCs in the immediate vicinity.
The QP will be required to delineate the lateral and vertical extent of these contaminants in soil and in ground water by conducting further phase two investigation activities.	
11. Section 43 and Table 1, Report Section 6, Sub-Heading (x) of Schedule E – The phase two CSM submitted with the RSC is required to demonstrate the current condition of the phase two property or, where remedial actions have been undertaken, the condition of the phase two property before the remedial actions were undertaken. The following information is missing from the phase two CSM:	
• A narrative description of, and, as appropriate, figures illustrating the physical setting of the phase two property and any areas under it including:	
a. Hydrogeological characteristics, including aquifers, aquitards and, in each hydrostratigraphic unit where one or more contaminants are present at concentrations above the applicable SCSs, lateral and vertical hydraulic gradients. The magnitude of the downward and upward hydraulic gradients should be provided.	This information has been added to the CSM text.
b. Any respect in which section 41 or 43.1 of the Regulation applies to the property. This section of the phase two CSM should include an evaluation of presence/absence of areas of natural significance.	This information has been added to the CSM text.
• Where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, identification of:	
i. The distribution, in each of the areas where a contaminant is present on, in or under the phase two property at a concentration greater than the applicable SCS, of each contaminant present in the area at a concentration greater than the applicable SCS, for each medium in which the contaminant is present, together with figures showing the distribution. A narrative description of lateral and vertical distribution of BTEX in ground water in MW17-102D appears to be missing from the phase two CSM.	As per a previous comment, the exceedance at MW17-102D was considered anomalous as it is not present in the soil or shallow groundwater in this area of the Site (ie. OW07-34S/D, OW26S, MW107S, MW18-121S). Deeper groundwater sampling locations to vertically delineate the marginal exceedances of benzene include MW18-107D, MW18-121D and MW18-123S where benzene was not detected. Additional text has been added to the CSM to describe this uncharacteristic BTEX concentration in groundwater at MW17-102D.
• The title of Figure 6-4 of the phase two CSM refers to "inorganics". Please note that all contaminants should be identified using the Method Groups as identified in the "Protocol for Analytical Methods in the Assessment of Properties under Part XV.1 of the Environmental Protection Act", March 9, 2004, amended as of July 1, 2011, which are also listed in footnote number 3 of the approved APEC table form.	Figure titles for Inorganics have been updated to reflect where Metals, Hydride-forming Metals, and Other Regulated Parameters are shown.

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• The phase two CSM should provide confirmation that maximum concentration of cis-1,2- dichloroethene (cis-1,2-DCE) in ground water under the property have been located and identified.	There is confidence that concentration of 1,2-DCE onsite in OW24D is the maximum concentration given its proximity to the known offsite source of chloroethenes and the consistently lower concentrations found across the remainder of the Site. Text explicitly stating this information has been added to VOC Groundwater discussion in the CSM.
• Based on figures in the phase two CSM there appear to be a number of ground water sampling locations that exceeded the applicable SCS and subsequently met the applicable and are highlighted as meeting the applicable SCS; however, no further explanation for each is provided. It is unclear what the rationale is for why these ground water sample locations are considered to meet the applicable SCS. For example:	The explanation of these groundwater exceedances which were considered non-representative based on subsequent groundwater sampling data meeting the SCS were not provided in the Phase Two CSM text, but rather in the Phase Two Summary (Attachment A2, Table 6-10b of the PSF). Table 6-10c has been added to form part of the Phase Two CSM and outlines the rationale for the exclusion of non-representative detected data with a MECP SCS.
i. Antimony is identified on Figure 6-12 as having initially exceeded the applicable SCS in ground water in MW118-114D and then subsequently meeting the applicable SCS, but is highlighted as meeting the applicable SCS. Similarly, lead is reported as having exceeded the applicable SCS in ground water in OW07-33 and subsequently meeting the applicable SCS in two subsequent sampling events, but highlighted as meeting the applicable SCS. Similar issues were identified for zinc in ground water in OW12 and OW26S and arsenic in ground water in MW17-101D. However, no explanations are provided in the CSM.	The rationale for the exclusion of specific antimony, lead, zinc, and arsenic groundwater results as exceedances based on at least two subsequent sampling events meeting the SCS was provided in Attachment A2, Table 6-10b of the PSF. These rationales are now included in Table 6-10c of the CSM.
ii. Benzene is identified on Figure 6-14 as having exceeded the applicable SCS in ground water in MW18-112G and subsequently meeting the applicable SCS and is highlighted as meeting the applicable SCS; however, no explanation is provided.	The rationale for the exclusion of specific benzene groundwater results as exceedances based on at least two subsequent sampling events meeting the SCS was provided in Attachment A2, Table 6-10b of the PSF. This rationale is now included in Table 6-10c of the CSM.
iii. PHC F2 is identified on Figure 6-15 as having exceeded the applicable SCS in ground water in OW18-II and subsequently meeting the applicable SCS and is highlighted as meeting the applicable SCS; however, no explanation is provided.	The rationale for the exclusion of specific PHC F2 groundwater results as exceedances based on at least two subsequent sampling events meeting the SCS is provided in Attachment A2, Table 6-10b of the PSF. This rationale is now included in Table 6-10c of the CSM.
iv. Polychlorinated biphenyls (PCBs) are identified as having previously exceeded the applicable SCS in ground water in OW26S in 2010 and subsequently meeting the applicable SCS in 2011 and 2017 at this location.	The rationale for the exclusion of specific PCB groundwater results as exceedances based on at least two subsequent sampling events meeting the SCS is provided in Attachment A2, Table 6-10b of the PSF. This rationale is now included in Table 6-10c of the CSM.
If an initial sampling result that is greater than the applicable SCS is considered to be non-representative, a rationale for why should be provided and where there has been only a single subsequent sampling event, at least one additional round of ground water sampling should be conducted to confirm. If the initial exceedance is representative of site conditions (e.g., true/real exceedance), then delineation would be required.	Comment noted. The requested information was initially provided in the PSF but was provided in the Phase Two ESA Summary Appendix (A2) and not specifically detailed in the Phase Two CSM. A table outlining the rationale for the exclusion of non-representative detected data with a MECP SCS has been added to form part of the Phase Two CSM (Table 6-10c).
• The lateral and/or vertical distribution of contaminants in cross-sections on Figures 6-3c, 6-5a, 6-5b, 6-6a, 6-6c, 6-6d, 6-7a, 6-7b, 6-8a, 6-10a, 6-10b, 6-12a, 6-14c, 6-14d and 6-17a did not follow the requirements of clause 7(4)(c), Schedule E, which states the following: "the delineation is conducted by assuming the lateral and vertical extent of the area in which a contaminant is present at a concentration greater than the applicable SCS for that contaminant extends laterally or vertically, as the case may be, from a sampling location at which the contaminant is present at a concentration greater than the applicable SCS for the contaminant to the next sampling location at which the concentration of the contaminant is equal to or below the applicable SCS for the contaminant".	Improvements have been made to the lateral and/or vertical distribution of contaminants in the updated CSM figures: Figure 6-3c, metals in soil: contaminant extent is continued to the surface, and BH07-55 is projected from the plan view. Figure 6-5a, BTEX in soil: the surface elevation of BH07-66 is corrected, and TP18-318 is projected from the plan view. Figure 6-5b, BTEX in soil: TP17-306 is projected from the plan view, and contaminant extents are extended to the bedrock surface. Figure 6-6a, PHCs in soil: contaminant extents are extended laterally to match the plan view and vertically from surface to bedrock; TP13-04, BH18-205 and BH18-207 are projected on from the plan view. Figure 6-6c, PHCs in soil: MW18-119 is projected on from the plan view. Figure 6-6d, PHCs in soil: TP17-306 is projected on from the plan view. Figure 6-7b, PAHs in soil: An additional five locations projected from the plan view for lateral delineation. Figure 6-8a, VOCs in soil: previous cross-section of A-A' is replaced with H-H' (now Figure 6-8b) which includes a new maximum for TCE at BH18-207. Figure 6-10a, PCBs in soil: BH07-41 and TP18-316 are projected on from the plan view for lateral delineation.

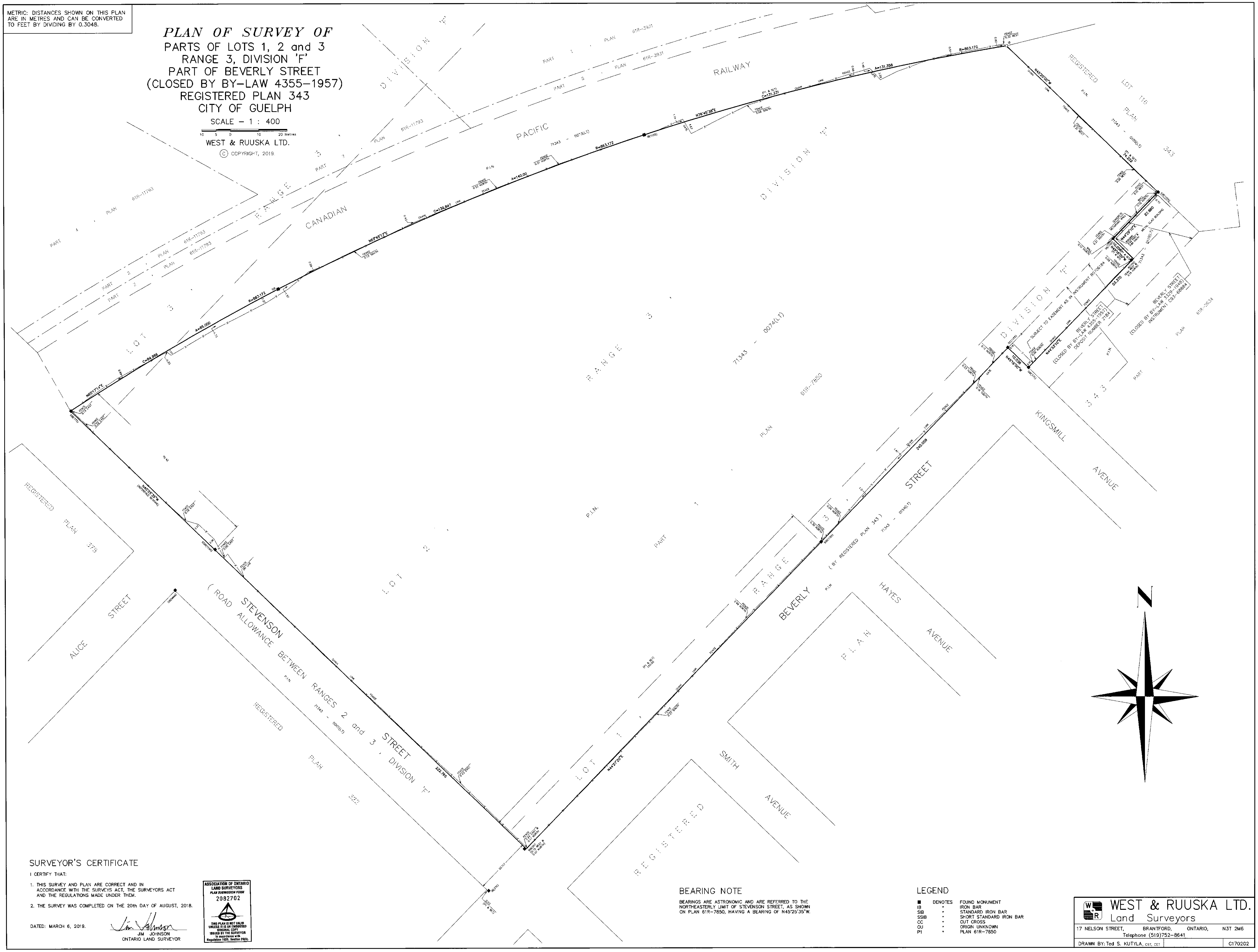
October 10, 2019 MECP Comment	Jacobs Response
	Figure 6-10b, PCBs in soil: contaminant extents are extended up to the former capacitor excavation limits Figure 6-12a, Metals in groundwater: previous exceedances at OW07-37 have been removed as two subsequent samples met the SCS, and contaminant extents are updated. Figure 6-14c, BTEX in groundwater: MW17-102D is projected on from the plan view to account for the contaminant area between two clean groundwater samples. Figure 6-14d, BTEX in groundwater: MW18-128D and MW18-133D are projected on from the plan view for vertical delineation. Figure 6-17a, VOCs in groundwater: MW18-119S/D are projected from the plan view and the contaminant extents are extended to show the regional TCE related groundwater impacts at depth (as well as in Figure 6-17e).
• The screened interval of monitoring wells should clearly identified oncross-sections showing the lateral and vertical distribution of contaminants.	The screened interval in metres are shown listed in the callouts and are also represented by the length of the green or red coloured bars for each monitoring well location on the cross-section. This information has been added to the figure notes for clarification.
12. Subsection 47(15) of Schedule E – Figures, maps, site plans and cross-sections are required to contain a scale, north arrow and a title block that includes a descriptive title, the address of the phase two property, if any, the name of the QP's firm, company or partnership, if any; and the date the figure, map, site plan or cross-section was created. The following issueswere identified:	
• The figures are marked "Draft", indicate that "Locations are approximate" and the title block is missing the date the figure was created.	The draft watermarks have been removed from the figures. The note regarding "locations are approximate" has been revised to indicate that "historical locations are approximate". Current locations or existing historical monitoring wells have been surveyed as part of the Phase Two ESA. The date the figure is provided at the bottom left corner of the figure but has also been added to the title block in the updated CSM.

METRIC: DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

PLAN OF SURVEY OF
PARTS OF LOTS 1, 2 and 3 RANGE 3, DIVISION 'F' PART OF BEVERLY STREET (CLOSED BY BY-LAW 4355-1957) REGISTERED PLAN 343 CITY OF GUELPH

SCALE – 1 : 400

WEST & RUUSKA LTD.



SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 20th DAY OF AUGUST, 2018.

DATED: MARCH 6, 2019.

JIM JOHNSON
ONTARIO LAND SURVEYOR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2082702
THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29(3).

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHEASTERLY LIMIT OF STEVENSON STREET, AS SHOWN ON PLAN 61R-7850, HAVING A BEARING OF N45°25'35"W.

LEGEND

■	DENOTES	FOUND MONUMENT
IB	"	IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
OU	"	ORIGIN UNKNOWN
P1	"	PLAN 61R-7850

WEST & RUUSKA LTD.
Land Surveyors
17 NELSON STREET, BRANTFORD, ONTARIO, N3T 2M6
Telephone (519)752-8641
DRAWN BY: Ted S. KUTYLA, CST, CET | C170202

Appendix A3
MECP Comments on RA and Jacobs Response to Comments – October 2020

Ministry of the Environment, Conservation and Parks

Technical Assessment and Standards Development Branch
40 St. Clair Avenue West
7th Floor
Toronto ON M4V 1M2
Phone: 416.327.5519
Fax: 416.327.2936

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction des évaluations techniques et de l'élaboration des normes
40, avenue St. Clair Ouest
7e étage
Toronto, ON M4V 1M2
Tél: 416 .327.5519
Téléc: 416. 327.2936

Ontario

October 16, 2020

The Corporation of the City of Guelph
1 Carden St
Guelph, Ontario, N1H 3A1

Re: Notice of a Circumstance requiring additional information for 200 Beverley Street, Guelph, Ontario (Property)
Risk assessment number 6417-B9XQGZ
TASDB file number RA1748-19a

This is to acknowledge your submission of a risk assessment report on 2020/06/22 regarding the Property to the Ministry of the Environment, Conservation and Parks (Ministry). By way of this letter I am providing you written notice, prior to making a decision under section 168.5 of the *Environmental Protection Act* (the Act), that the Director is aware of the following circumstance:

The content of the risk assessment report does not comply with a requirement specified in section 4 or 5 of Schedule C of Ontario Regulation 153/04.

Due to the above-noted circumstance, this is to request that you:

- revise and resubmit the risk assessment to the Director in accordance with the directions specified below in Schedule A

By way of this letter the Director is providing you notice that a new time to respond to a risk assessment will commence on the date that the Qualified Person submits the revised risk assessment in accordance with this notice.

At any time the owner may withdraw the risk assessment by giving written notice to the Director.

For your information the Act, Regulation, guidance documents and associated fact sheet have been posted on the world wide web at:

https://www.ontario.ca/page/brownfields-redevelopment

Craig Kinch

Director, Environmental Protection Act s. 168.5

c: Katherine Appleby, Jacobs Engineering Group Inc.
Ann-Marie Deonarine, Technical Assessment and Standards Development Branch

attach

SCHEDULE A
To Director's Notice
Comments by the Ministry of the Environment, Conservation and Parks On Risk Assessment
for
200 Beverley Street, Guelph, Ontario
RA1748-19a
IDS Ref. No. 6417-B9XQGZ

The following are Ministry comments on the following Risk Assessment (RA):

- **Risk Assessment Report for 200 Beverley Street, Guelph, Ontario report prepared by Jacobs Engineering Group Inc., dated June 2020**

Comments On Risk Assessment

General Comments

The Site is the former International Malleable Iron Company (IMICO) foundry facility with an approximate area of 5.2 hectares. The Site was first developed in 1913 when it was acquired by IMICO and closed in 1989. Demolition of the buildings and removal of various wastes from the Site (including some excavated soil and PCB materials and a large aboveground AST) occurred in 1998/1999. The Site is currently vacant with no on-site operations occurring. The future redevelopment plans at this time are unknown, but may include one or more of residential, parkland, and commercial use.

Several issues have been identified in the site characterization, HHRA and ERA that need to be addressed before the risk assessment can be considered to meet the requirements of O. Reg. 153/04.

Note that some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the RA. Note that acceptance of the qualified person (QP's) responses on these ESA-related matters is for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs has not been conducted. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that is amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Rose Ash of Client Services and Permissions Branch; email: rosemary.ash@ontario.ca

Specific Review Comments

PSF Comments

1. No response was required.

2. The response addresses the comment.

3. The response partially addresses the comment.
    a. Based on information provided in Sections 1.8.4 and 1.9.4, it appears that the extent of LNAPL in soil/groundwater has not been fully delineated as LNAPL has been found in BH07-41 (assumed during drilling) but no monitoring well is present in this area. Given the presence of LNAPL in soil and groundwater at and below the overburden and bedrock contact and shallow groundwater at the Site, it should be confirmed that free phase product has been adequately characterized and removed to the extent practicable.
    b. Free phase product should also be depicted/included in a plan view figure, cross-sectional figure and the HH and ERA CSMs (e.g. Figure 4-1, 4-2, 5-1 and 5-2).
    c. Section 3 of the RA report should include information related to NAPL chemical and physical characteristics, NAPL mobility, stability and recoverability, dissolved phase (groundwater) and vapour phase (soil vapour) concentrations, and acute-risk concerns (e.g. explosive conditions).

4. The following comments are provided:
    a. The response addresses the comment.
    b. The response partially addresses the comment. The Reviewer was unable to locate where the rationale for the suitability of using the CCME value for tin was provided in the RA.
    c. The response addresses the comment.
    d. The response partially addresses the comment. The reference provided for bismuth represents a risk-based concentration level (and addresses human health only). It is not an estimate of naturally occurring background levels. If bismuth may be present at the site at concentrations exceeding naturally occurring background levels, then it would be considered a contaminant that should be appropriately delineated, and addressed in the RA (where the TCEQ PCL could then be applied as a qualitative screening level in the HHRA). Unless good information on expected naturally occurring background levels of bismuth can be provided, this COC should not be screened out.

5. The following comments are provided:
    a. No response was required.
    b. The response addresses the comment. See additional comments regarding HHCSMs below.

6. The response addresses the comment.

7. The response addresses the comment.

Risk Assessment Comments (October 2020)

Section 3.0 - Property Information, Site Plan and Geological Interpretation

1. Section 3.3.5 – Further rationale and justification for the screening of some chemicals is required. The QP is reminded that chemicals that may be associated with APECs at the site but do not have associated SCS should be considered COCs if they are present at concentrations exceeding naturally occurring background levels. Specific comments include the following:
    a. There appear to be discrepancies between the screening tables in Appendix F and the information provided in Table 6-7b in Appendix D (Rationale for the Removal of Soil COCs). For example, iron is indicated as not exceeding the modified OTR value in Appendix F, but nine samples are noted as exceeding this value in Table 6-7b. The Reviewer assumes this is because the data with higher concentrations was removed from consideration; however, it is unclear why iron would not be a COC at a site that was historically operated as an iron foundry. As iron would be associated with an APEC at the site and has been measured at concentrations exceeding naturally occurring background levels, it would be considered a contaminant and should be assessed as a COC in the RA.
    b. Additional consideration should also be given to other parameters (e.g., phosphorus, magnesium, strontium) with observed concentrations exceeding the OTR with respect to potential association with APECs at the site (i.e., a rationale should be provided as to why they would not be expected to be associated with past site activities).

Section 4.0 - Human Health Risk Assessment

2. Sections 4.1.2.1 and 4.1.2.2 – Soil and groundwater component values used for the secondary screening should be provided in Tables 4-1 and 4-2.

3. Sections 4.1.2.1 and 4.1.2.2 – The process of selection of COCs in soil and groundwater for the trench air inhalation pathway for construction and utility worker receptors should be discussed in these sections.

4. Section 4.2.2 (Figure 4-1) – Groundwater ingestion (potable water) should be shown as a complete pathway for the indoor worker receptor in Figure 4-1 based on discussions provided in Section 4.2 and Table 4-13. Similarly, incidental groundwater ingestion should be shown as a complete pathway for the off-site construction/utility worker receptors in Figure 4-1 based on discussion provided in Section 4.2 and Table 4-13.

5. Section 4.3 – Subchronic TRVs were provided in Table 4-26 for some chemicals; however, it is not clear if the subchronic TRVs were used for estimation of risks for any of the receptors. Further, for some parameters more than one TRV was provided in Table 4-26 (e.g., SF and URF for vinyl chloride) and it is not clear if different TRVs were used for the estimation of risks for some receptors in the RA (e.g., composite receptor vs adult/toddler receptor). Clarification should be provided in Section 4.3.

6. Section 4.4.3.2 – It is unclear why the potential for risks to offsite receptors via the migration of soil gas is considered low. Supporting information should be provided and discussed here for potential offsite migration of volatile impacts in groundwater as well as lateral migration of soil gas from onsite soil to the nearby offsite buildings.

7. Section 4.4.5 – The text in this section can be interpreted to imply that Section 43.1 of the Regulation also applies due to the presence of water bodies within 30 metres of the site, which was likely not the intent. The Reviewer notes that it is indicated in Section 5.1.1 that there is no surface water or aquatic habitat within 30 metres of the RA property. The text should be clarified accordingly.

8. Section 4.4.6 – Further information should be provided on the basis for assessing some COCs in groundwater as potentially mobile, and others not.

Section 5.0 - Ecological Risk Assessment

9. Section 5.2.2 –It is unclear that potential habitat for all reptiles and amphibians would not be present at the site given the vacant nature of the property and the extent to which portions of the site have become re-naturalized. The Reviewer acknowledges that exposure and toxicity information is less available for reptiles and amphibians, but if the receptors in these categories may occur at the property, then they should be assessed qualitatively to the extent possible (i.e., in Section 5.5.3), and any limitations in the approach discussed in the uncertainty assessment (as was done for off-site receptors in this category).

10. Section 5.3.1 – It is indicated in this section that groundwater effects on birds and mammals were not assessed. Considering the shallow groundwater depth at the Site, potential indirect exposure to groundwater for mammals and birds via terrestrial plants may be possible. Clarification is required.

11. Section 5.5.2.2 – The following comments are provided:
    a. The presence, or potential presence, of NAPL is inconsistent with the determination that the HQ for PHC F3 and F4 would be less than one (i.e., the assumption that F3 and F4 are insufficiently soluble to result in concentrations that would be sufficiently elevated to pose a concern is obviated by the presence of NAPL). Further consideration of this issue is required.
    b. The Reviewer agrees that rooting zones may be shallower than 1.5 metres for many

types of vegetation, but this would not necessarily be true for some types of vegetation, notably mature trees. Further consideration of this issue is required relative to potential risks and RMMs that may apply to mature trees.

c. Thin fill cap has been recommended in the RMP for the existing mature trees that will remain onsite following site redevelopment. A discussion of the locations of these trees with respect to the areas with shallow groundwater should be provided.

12. Section 5.5.5 – The text in this section can be interpreted to imply that Section 43.1 of the Regulation also applies due to the presence of water bodies within 30 metres of the site, which was likely not the intent. The Reviewer notes that it is indicated in Section 5.1.1 that there is no surface water or aquatic habitat within 30 metres of the RA property. The text should be clarified accordingly.

Section 6.0 – Conclusions and Recommendations

13. Section 6.3 – It is unclear from the discussion provided whether potentially recoverable NAPL may be present at the property. It is the Ministry's expectation that NAPL will be recovered to the extent practicable. Additional discussion is warranted for completeness.

14. Section 6.4 and Table 6-3 – It is unclear if the fill cap concentrations take into consideration all the applicable component values and relevant exposure pathways (e.g. S-Nose, inhalation from a trench scenario, etc). This should be clarified.

Other Comments

15. Appendix D – A rationale for and description of any hydrogeological and geological interpretations which differ from assumptions on which the Soil, Ground Water and Sediment Standards are based is required to be included with the ESA summary.

Phase Two Conceptual Site Model Comments

All comments have been adequately addressed.

Summary and Conclusions

Several issues have been identified in the review of the risk assessment that will need to be clarified before the risk assessment can be accepted under O. Reg. 153/04.

Comments On Risk Management

1. For areas where NAPL has been observed, consideration needs to be given to including a provision in the RMP for prohibiting the construction of buildings with basements or other occupied below grade structures in these areas for as long as the NAPL remains present in these areas. Please contact the District Office to discuss prior to resubmission.

2. Should slab-on-grade buildings be constructed in the areas where residual NAPL remains, additional design considerations/details are required to be provided in Appendix I.2 as it relates to the presence of NAPL and the conceptual vapour mitigation systems as proposed.

3. Imported "Unimpacted Soil" as defined in Section 7.2.2 of the Risk Assessment and related sections in Appendix I includes a reference to O. Regulation 406/19 and the Rules for Soil Management and Excess Soil Quality Standards. These references need to be removed as a Risk Assessment under O. Regulation 153/04 (as amended) is being undertaken and the issued CPU will take precedence. As such, any imported "Unimpacted Soil" must meet the applicable generic site conditions standards for this property as identified in the Risk Assessment (i.e. Table 6 SCS). This reduces confusion and uncertainty. Please contact the District Office directly to discuss prior to resubmission.

4. Section 7.2.3.1: The HSP requirements need to include consideration of the potential risks associated with dust, soil/groundwater vapour and the presence of NAPL.

5. Section 7.2.3.2 needs to include the following:
    - management measures and an action plan (including appropriate disposal options) for NAPL if encountered. If NAPL is encountered, notification to the Director in writing within 24 hours of the NAPL being encountered.

6. If buildings with basements are not prohibited, as recommended in 1.0 above, Section 7.2.3.3 will need to be updated to include provisions for the presence of NAPL.

7. Section 7.4.1 needs to be updated to include timelines for notification requirements to the Director. Typical timelines are included below for reference and will be modified and incorporated into the CPU as warranted.
    - *In the event that the indoor air and or sub-slab vapour monitoring program identifies one or more of the Target Analytes at concentrations above the Target Indoor Air/ Sub-Slab Vapour Target Concentrations in **Table 1XXX**, respectively, and where the concentrations of the observed Target Analytes are determined by the qualified Licensed Professional Engineer to be a result of soil vapour intrusion, the Owner shall implement the contingency measures detailed in Section XXX of the RA and as follows:*

        i. Written notice shall be submitted to the Director by the Owner within 14 calendar days of the Owner's receipt of the laboratory analysis. This written

notice shall include the indoor air and or sub-slab vapour sampling results (as necessary), the laboratory certificates of analysis and the anticipated timeline for the implementation of the confirmatory sampling program along with any additional work as may be deemed necessary by a qualified Licensed Professional Engineer. Confirmatory sampling shall occur within 14 calendar days from the date of the Owner's receipt of the laboratory analysis and be completed by a qualified Licensed Professional Engineer.

ii. *In the event that the confirmatory indoor air and or sub-slab sampling verifies the exceedances of one or more of the Target Analytes concentrations above the Target Indoor Air Concentration/Target Sub-slab vapour Concentrations in* ***Table 1XXX****, the Owner shall:*

(a) *Submit written notice to the Director within 14 calendar days of the Owner's receipt of the laboratory analysis. This written notice shall include the confirmatory indoor air and or sub-slab vapour sampling results, the laboratory certificates of analysis and the details of, and the anticipated timeline to implement contingency measures consistent with Section XXXX of the RA along with the implementation of further evaluation/assessment of the vapour mitigation system as may be deemed necessary by a qualified Licensed Professional Engineer. The implementation of contingency measures, along with the implementation of a confirmatory indoor air sampling program shall occur within 14 calendar days of the Owner's submission of the written notice of the exceedance to the Director;*

(b) *Within 30 calendar days of the implementation of the contingency plan, the Owner shall submit to the Director an update report prepared by a qualified Licensed Professional Engineer documenting the implementation of contingency measures, results of the implementation of the confirmatory indoor air sampling program along with the details and timelines for the implementation of performance indoor air and or sub-slab vapour monitoring program. The update report shall include, but not be limited to:*

i. *Laboratory results and laboratory certificates of analysis;*
ii. *Field logs, leak testing (as necessary) and documentation of QA/QC;*
iii. *Discussion and interpretation of the results in comparison to the respective Target Indoor Air Concentrations as listed in* ***Table 1XXX****; and,*
iv. *Conclusions and recommendations with respect to the performance of the vapour mitigation system along with the need for additional work and/or continued monitoring as may be deemed warranted.*

8. Section 7.4.3.1 – The groundwater monitoring program needs to include groundwater monitoring wells OW24S/D and OW13-39S/D to monitoring COCs coming onto the property and ensure that they do not exceed the PSS. Further, although the MECP is actively pursuing the identification of the off-site source of the contamination in this area of the property, no Provincial Officers Order has been issued to date. Please update this section accordingly.

9. Section 7.4.3.1 – The groundwater monitoring well network should be updated o include the measurement of NAPL in at least one or two key wells within the areas identified as having residual NAPL. Further, should an increased thickness be observed, passive removal (i.e. use of absorbent pad/socks) or active removal should be triggered along with notification to the Director.

10. Appendix L, Figure I-9 – There was no discussion provided in regards to this figure. Please update this section accordingly.

RESUBMISSION

The risk assessment should be revised and resubmitted to the following address:

The Director
Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, ON, M4V 1P5

Telephone 416-314-8001

Four hard copies of the risk assessment should be submitted (one marked original), including a stand-alone, electronic copy of the risk assessment report (in USB format). However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

To assist MECP in its review of the resubmission, changes to the risk assessment from the version that is the subject of the above review should be outlined in a revision table or errata sheet attached to the resubmission. Use of a redline method in the body of the revised risk assessment also is recommended, if possible and where practicable.

It also is recommended that the QP_{RA} provide responses to the MECP review comments as an attachment to the submission or as an appendix in the revised risk assessment. This will provide an opportunity for the QP_{RA} to explain to MECP reviewers how the MECP review comments have been addressed in the risk assessment. The QP_{RA} should note that submission of a response to the MECP review comments without a revised risk assessment or addendum is not considered to be a

resubmission of the risk assessment under the Regulation and it may not be reviewed.

The Property Owner and QP_{RA} should note that upon receipt and review of the resubmission, the Director may issue a decision under Section 168.5 (1) EPA to accept or not to accept the risk assessment. If the decision is not to accept the risk assessment, then subsequent resubmissions or provision of additional information cannot be accepted by the Ministry for review. Advancement of a risk assessment of the subject property will require submission of a new Pre Submission Form followed by a new risk assessment of the site in accordance with Schedule C of the Regulation.

It is recommended that before resubmission of the risk assessment, the QP_{RA} review the mandatory requirements for risk assessments submitted under the Regulation, as outlined in Section 4 and Table 1 of Schedule C of the Regulation. As well, the Ministry's *Procedures for Use of Risk Assessment Under Part XV.1 of the Environmental Protection Act* should be used for guidance in how to satisfy the requirements of the Regulation. **It is important that the QP_{RA} also confer with the QP_{ESA} to determine whether the PSS provided will support filing of a record of site condition.**

Some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the risk assessment (RA). Note that acceptance of the qualified person (QP's) responses on these ESA-related matters is for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs has not been conducted. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that is amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. In addition, if the work on the phase one and two ESA exceeds 18 months prior to the submission date of the RSC, the phase one and two ESA reports will need to be updated prior to submitting RSCs for filing.

If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Rose Ash of Client Services and Permissions Branch; email: rosemary.ash@ontario.ca

If the QP_{RA} has questions regarding the application of the Regulation or the above comments, they should be forwarded by email to:

Ann-Marie Deonarine
Risk Assessment Review Coordinator
Technical Assessment and Standards Development Branch
ann-marie.deonarine@ontario.ca

APPENDIX A3

Response to RA Comments in Schedule A for 200 Beverley Street, Guelph, Ontario

	October 16, 2020 MECP Comment	Jacobs Response	Document Location
PSF Comments			
1	No response was required.	No response required.	--
2	The response addresses the comment.	No response required.	--
3	The response partially addresses the comment.		
	a. Based on information provided in Sections 1.8.4 and 1.9.4, it appears that the extent of LNAPL in soil/groundwater has not been fully delineated as LNAPL has been found in BH07-41 (assumed during drilling) but no monitoring well is present in this area. Given the presence of LNAPL in soil and groundwater at and below the overburden and bedrock contact and shallow groundwater at the Site, it should be confirmed that free phase product has been adequately characterized and removed to the extent practicable.	LNAPL was not found in BH07-41. BH07-41 was erroneously used, and the correct location is BH07-46. Section 1.8.4 has been corrected to indicate that analytical data at BH07-46 suggests the potential for free product with concentrations above the MECP Free Phase Threshold values, and that LNAPL has NOT been currently found in wells in the area of this location. BH07-46 was advanced (by others, in 2007) within the historical excavation area in the north eastern portion of the site and LNAPL was not reported/encountered during drilling. It is noted that where the statement is made "LNAPL has been found in wells in the area of… " that this does not indicate LNAPL was found during drilling at the soil locations indicated, but instead is used to acknowledge the LNAPL observed in nearby well locations. The historically remediated area, that is, the soils excavated to bedrock in 1998 for contaminants including Total Petroleum Hydrocarbons in the northeast corner of the Site, is likely the origin of the remaining LNAPL at the Site. The recent Phase One and Two ESA activities did not uncover an alternate source. The LNAPL has consistently been measured in the eastern portion of the Site in OW23S since 2004, and more recently in newly installed wells MW17-108S and MW18-135S. The groundwater level (and NAPL levels) are within or at the bedrock contact, and the bedrock is highly fractured with evidence of NAPL within the fractures, which therefore makes any NAPL extraction process not feasible, slow, inefficient, and costly.	Appendix D3
	b. Free phase product should also be depicted/included in a plan view figure, cross-sectional figure and the HH and ERA CSMs (e.g. Figure 4-1, 4-2, 5-1 and 5-2).	Locations where free phase product was observed and/or measured is included on both plan view and cross-sectional groundwater figures for PHCs in the CSM (Figures 6-15, 6-15a, 6-15b). A note will be added on the HH/ERA CSM figures to address the presence of free phase product.	Figures 4-1, 4-2, 5-1, and 5-2
	c. Section 3 of the RA report should include information related to NAPL chemical and physical characteristics, NAPL mobility, stability and recoverability, dissolved phase (groundwater) and vapour phase (soil vapour) concentrations, and acute-risk concerns (e.g. explosive conditions).	A subsection has been added to discuss the NAPL and related information.	Section 3.2.1
4	The following comments are provided:		
	a. The response addresses the comment.	No response required.	--
	b. The response partially addresses the comment. The Reviewer was unable to locate where the rationale for the suitability of using the CCME value for tin was provided in the RA.	The following information for tin has been added to footnote "e" of Table F1-1: "The CCME screening values are protective of both human and ecological health and were derived in a manner similar to that of the MECP generic standards. Therefore, the CCME values are considered appropriate to use in the absence of MECP screening values for the selection of COCs."	Appendix F, Table F1-1
	c. The response addresses the comment.	No response required.	--
	d. The response partially addresses the comment. The reference provided for bismuth represents a risk-based concentration level (and addresses human health only). It is not an estimate of naturally occurring background levels. If bismuth may be present at the site at concentrations exceeding naturally occurring background levels, then it would be considered a contaminant that should be appropriately delineated, and addressed in the RA (where the TCEQ PCL could then be applied as a qualitative screening level in the HHRA). Unless good information on expected naturally occurring background levels of bismuth can be provided, this COC should not be screened out.	As stated in Table 6-7b of Appendix D2, bismuth was sampled in 2013 only, included as part of a requested full metals scan from the laboratory, but not as a targeted COC. Bismuth is a parameter that does not have specific evidence of being associated with the Site and was not targeted as a COC. It was suggested by the MECP that bismuth concentrations might be elevated and is known to be associated with speciality alloys, however there are a number of various parameters that can be associated with alloys and there is no specific evidence of any being produced on Site.	No changes made

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		Of the 12 samples from 10 locations analyzed, only 5 samples (3 locations) had detected concentrations that ranged from 6.4 to 150 ug/g. The location of the highest concentration had a duplicate sample concentration of 36 ug/g, indicating highly variable or anomalous conditions. There is no readily available data on expected naturally occurring background concentrations of bismuth for the area. Toxicity of bismuth is reported to be very low, and has been used to substitute lead in some industries to partially resolve the environmental issues related to heavy metals. The TCEQ PCL was provided as an additional line of evidence on why the QP is of the opinion the concentrations are trivial in nature. The presence and concentrations of this chemical on the Site are not considered to limit the Site use. The QPESA is of the opinion, that based on the above information, screening out bismuth as a COC is the appropriate conclusion.	
5	The following comments are provided:		
	a. No response was required.	No response required.	--
	b. The response addresses the comment. See additional comments regarding HHCSMs below.	No response required.	--
6	The response addresses the comment.	No response required.	--
7	The response addresses the comment.	No response required.	--
Risk Assessment			
1	Section 3.3.5 – Further rationale and justification for the screening of some chemicals is required. The QP is reminded that chemicals that may be associated with APECs at the site but do not have associated SCS should be considered COCs if they are present at concentrations exceeding naturally occurring background levels. Specific comments include the following:	The chemicals that have been called out by the reviewer have not been identified as being associated with the APECs at the Site based on the Phase One ESA conducted, or a review of the entire analytical data set. Messaging from previous RSC files and guidance documentation from the MECP have stressed that the QP is to use their judgement and COCs for the Site are determined at their discretion.	No changes made
	a. There appear to be discrepancies between the screening tables in Appendix F and the information provided in Table 6-7b in Appendix D (Rationale for the Removal of Soil COCs). For example, iron is indicated as not exceeding the modified OTR value in Appendix F, but nine samples are noted as exceeding this value in Table 6-7b. The Reviewer assumes this is because the data with higher concentrations was removed from consideration; however, it is unclear why iron would not be a COC at a site that was historically operated as an iron foundry. As iron would be associated with an APEC at the site and has been measured at concentrations exceeding naturally occurring background levels, it would be considered a contaminant and should be assessed as a COC in the RA.	Based on the QPESA's review of the data, the nine samples of 43 analyzed with concentrations above the modified OTR does not necessarily suggest Site activities are the cause. The locations of these samples are spread out over the Site, not in congregated areas, and occur at various depths. Areas of high iron often correlate with areas of low magnesium, suggesting more of a nutrient balance or naturally occurring variability. Groundwater conditions do not suggest a release or hot spot occurs on site; as similarly only 7 samples from 3 locations (of a total of 58 samples) report concentrations above the PGMIS (see Table 6-10b, Appendix D2), and do not correlate to the locations with highest concentrations in soil. These higher concentrations in groundwater were also found in the deeper well of some well nests (OW03-II and OW09-II) suggesting the concentrations are not due to a surficial release. Based on this information, along with that presented in Table 6-7b of Appendix D2, the QPESA is of the opinion, that screening out the iron as COCs is appropriate.	No changes made
	b. Additional consideration should also be given to other parameters (e.g., phosphorus, magnesium, strontium) with observed concentrations exceeding the OTR with respect to potential association with APECs at the site (i.e., a rationale should be provided as to why they would not be expected to be associated with past site activities).	Other parameters which have observed concentrations exceeding the OTR were not considered associated with APECs at the Site based on available information of the Site's history (Phase One ESA) and the review of the analytical data set and mapping out locations where these exceedances occurred. In many cases exceedances of magnesium and strontium occurred in areas where the lowest iron levels were reported and vice versa. As well, exceedances were not found in common areas, but instead were sporadic across the Site. These observations suggest more of a nutrient balance or naturally occurring variability. Specifically, the following was observed: - Phosphorus concentrations above the OTR occurred in one location (a sample and duplicate) of 43 samples only; which is likely an anomaly as all other concentrations reported were half or less of the OTR. - The highest concentrations of magnesium were reported from the backfill samples of the historical excavation in the northeastern portion of the Site. As stated in Table 6-7b, magnesium is abundant in the bedrock formations of the area and due to the shallow bedrock depth at the Site, it is expected the soils would contain a higher content.	No changes made

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		- Strontium concentrations above the OTR were found at 7 samples from 6 locations (from a total of 43 samples collected) with concentrations between 100 and 190 ug/g above the 87.5 ug/g value. Two of these were from backfill samples, again suggesting a natural variability in the soils of the area. Across Canada, the average strontium concentration in soil is reported as 207 ug/g (Health Canada, 2019; *Guidelines for Canadian Drinking Water – Guideline Technical Document – Strontium* [https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-strontium.html]). Strontium is also associated with limestone (which is the bedrock in the region of the Site). Based on the low proportion of samples reported at concentrations greater than the OTR, that all the concentrations reported at the Site are lower than the Canadian soil average, and that strontium is not specifically known to be associated with past site activities; strontium is not considered a COC and the concentrations present onsite do not limit the use of the property. Additionally, the QPESA is of the opinion that the assessment of contamination at the Site would be better represented by the distribution of other metals found as a result of historical activities, and that any risk that may be present from the unassessed parameters would be mitigated with the selected RMMs. Based on this information, along with that presented in Table 6-7b of Appendix D2, the QPESA is of the opinion, that screening out the parameters as COCs is appropriate.	
2	Sections 4.1.2.1 and 4.1.2.2 – Soil and groundwater component values used for the secondary screening should be provided in Tables 4-1 and 4-2.	The screening levels used are included in the appendix. Tables 4-1 and 4-2 are intended to be summary tables. A footnote has been added to Tables 4-1 and 4-2 to indicate that the full screening tables (including comparison of concentrations to component values) can be found in Appendix F.	Table 4-1 Table 4-2
3	Sections 4.1.2.1 and 4.1.2.2 – The process of selection of COCs in soil and groundwater for the trench air inhalation pathway for construction and utility worker receptors should be discussed in these sections.	The process for the selection of COCs for the trench air inhalation pathway is the same as the process described in these sections for indoor and outdoor air. Trench air is included under the umbrella of "outdoor air". Text clarifying that the screening process for outdoor air includes trench air has been added to Sections 4.1.2.1 and 4.1.2.2.	Section 4.1.2.1 Section 4.1.2.2
4	Section 4.2.2 (Figure 4-1) – Groundwater ingestion (potable water) should be shown as a complete pathway for the indoor worker receptor in Figure 4-1 based on discussions provided in Section 4.2 and Table 4-13. Similarly, incidental groundwater ingestion should be shown as a complete pathway for the off-site construction/utility worker receptors in Figure 4-1 based on discussion provided in Section 4.2 and Table 4-13.	Agreed. Figure 4-1 (HH CSM) was checked against Table 4-13; the following revisions were made: • Groundwater – Ingestion and Dermal Contact – Indoor Worker changed to Qualitative; Offsite Construction Worker changed to Qualitative • Groundwater – Inhalation and Dermal – Offsite Construction Worker and Utility Worker changed to Incomplete The figure edits do not impact the results or conclusions of the RA, as the receptor-pathway combinations were assessed per Table 4-13. Also, in response to PSF Comment 3b (above), the presence of NAPL at the Site has been noted on Figures 4-1 and 4-2.	Figure 4-1 Figure 4-2
5	Section 4.3 – Subchronic TRVs were provided in Table 4-26 for some chemicals; however, it is not clear if the subchronic TRVs were used for estimation of risks for any of the receptors. Further, for some parameters more than one TRV was provided in Table 4-26 (e.g., SF and URF for vinyl chloride) and it is not clear if different TRVs were used for the estimation of risks for some receptors in the RA (e.g., composite receptor vs adult/toddler receptor). Clarification should be provided in Section 4.3.	Text has been added to Section 4.3.2 to clarify where sub-chronic TRVs and the SFs/URFs for vinyl chloride were applied to for the evaluation of risks.	Section 4.3.2
6	Section 4.4.3.2 – It is unclear why the potential for risks to offsite receptors via the migration of soil gas is considered low. Supporting information should be provided and discussed here for potential offsite migration of volatile impacts in groundwater as well as lateral migration of soil gas from onsite soil to the nearby offsite buildings.	Additional discussion has been added to Section 4.4.3.2. It has been acknowledged that there is potential for offsite risk due to vapour from the migration of groundwater. RMMs are proposed to mitigate risks to receptors in offsite buildings from groundwater migration by proposing trigger concentrations in shallow wells at the perimeter of the RA Property at concentrations that consider the indoor air pathway. The QPRA has also discussed this comment with the Guelph District Engineer; the currently proposed RMMs (that is, groundwater monitoring to address the potential for offsite inhalation risks via groundwater migration) are considered sufficient.	Section 4.4.3.2
7	Section 4.4.5 – The text in this section can be interpreted to imply that Section 43.1 of the Regulation also applies due to the presence of water bodies within 30 metres of the site, which was likely not the intent. The Reviewer notes that it is indicated in Section 5.1.1 that there is no surface water or aquatic habitat within 30 metres of the RA property. The text should be clarified accordingly.	The text in Section 4.4.5 has been clarified with respect to the applicability of the other conditions mentioned under Sections 41 and 43.1 of O. Reg. 153/04.	Section 4.4.5

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8	Section 4.4.6 – Further information should be provided on the basis for assessing some COCs in groundwater as potentially mobile, and others not.	A footnote and reference has been added to Section 4.4.6 to clarify the general process for evaluating the mobility of COCs in groundwater.	Section 4.4.6
9	Section 5.2.2 –It is unclear that potential habitat for all reptiles and amphibians would not be present at the site given the vacant nature of the property and the extent to which portions of the site have become re-naturalized. The Reviewer acknowledges that exposure and toxicity information is less available for reptiles and amphibians, but if the receptors in these categories may occur at the property, then they should be assessed qualitatively to the extent possible (i.e., in Section 5.5.3), and any limitations in the approach discussed in the uncertainty assessment (as was done for off-site receptors in this category).	Section 5.2.2. has been revised to acknowledge the potential for reptiles to be onsite. Due to the Site conditions and lack of nearby water bodies/surface water, amphibians are not anticipated to be present onsite. Section 5.5.3.2 was added to qualitatively assess the potential risks to reptiles onsite based on the quantitative assessment of other onsite ecological receptors. It is assumed that the RMMs implemented for other ecological receptors will afford protection to reptiles, if present. The existing text included an uncertainty with regards to onsite reptiles, which was updated to be consistent with the revised qualitative assessment for onsite reptiles (Section 5.5.7).	Section 5.2.2 Section 5.5.3.2 Section 5.5.7
10	Section 5.3.1 – It is indicated in this section that groundwater effects on birds and mammals were not assessed. Considering the shallow groundwater depth at the Site, potential indirect exposure to groundwater for mammals and birds via terrestrial plants may be possible. Clarification is required.	The RA has been revised to qualitatively assess the indirect effects from groundwater on birds and mammals via diet (vegetation) in the context of the results to terrestrial plants.	Section 5.3.1 Section 5.5.3.3
11	Section 5.5.2.2 – The following comments are provided:	--	--
	a. The presence, or potential presence, of NAPL is inconsistent with the determination that the HQ for PHC F3 and F4 would be less than one (i.e., the assumption that F3 and F4 are insufficiently soluble to result in concentrations that would be sufficiently elevated to pose a concern is obviated by the presence of NAPL). Further consideration of this issue is required.	Acknowledged. The HQs for PHC F3 and F4 has been revised to be "assumed" greater than one due to the presence of petroleum-related NAPL at the RA Property. Section 5.5.2.2 and Tables 5-7a and 5-9 have been revised to reflect this assumption with respect to terrestrial plants. This change did not impact the results or conclusions of the assessment for these receptors. Per Section 3.2.1 NAPL mobility offsite is not expected; therefore, no changes were made with respect to the conclusions for potential risks to offsite aquatic receptors (Table 5-12). A table reference typo was corrected in the footnotes of Table 5-12.	Section 5.5.2.2 Table 5-7a Table 5-9 Table 5-12
	b. The Reviewer agrees that rooting zones may be shallower than 1.5 metres for many types of vegetation, but this would not necessarily be true for some types of vegetation, notably mature trees. Further consideration of this issue is required relative to potential risks and RMMs that may apply to mature trees.	The City has indicated that based on current plans for the Site, none of the mature trees at the Site, which are not planted species but have resulted from the vacancy of the Site, will remain following development. Therefore, Detail 2 as depicted in Figure I-3 will not be applicable as part of the future development and has been removed. For new trees, now Figure I-3, text has been added to further direct that the future Landscape Architect (LA) select species less prone to deep root systems and more tolerant of urban environments with respect to soil quality and groundwater uptake. As per the notes on Figure I-3, the LA can specify a deeper barrier thickness as required. The average depth to groundwater across the Site in the shallow wells is 2.07 mbgs. Depth to groundwater less than 1.5 mbgs has been noted on multiple occasions (greater than 20%) at only two shallow well locations across the RA Property (OW02 and OW22S) between 2010 and 2020 of the 56 shallow wells installed at the Site. These two wells are located in the northeastern portion of the Site. See additional discussion regarding distribution of contaminants and risk to terrestrial vegetation in Section 5.5.2.2 of the RA. It has been concluded that there are low potential risks to mature trees as a result of potential contaminated groundwater uptake (specifically PAHs, PHCs and zinc) and that the limited risk can be further managed through appropriate species selection and this requirement has been added as a Land Use Restriction (Section 7.2.3.4). Additional risk due to soil can be managed through use of a deeper fill cap as recommended by an LA for proposed tree planting areas.	Section 5.5.2.2 Appendix I, Figure I-3 Section 7.2.3.4 Table 7-4
	c. Thin fill cap has been recommended in the RMP for the existing mature trees that will remain onsite following site redevelopment. A discussion of the locations of these trees with respect to the areas with shallow groundwater should be provided.	As indicated, it is not anticipated that any of the existing trees will remain following development. See discussion above with respect to shallow groundwater. It is expected that the existing trees that have naturally established at the RA Property during its history of vacancy can remain in place in the interim and risk to these trees until development proceeds is low. The existing trees appear to be healthy and well established.	Detail 2 has been removed from Figure I-3
12	Section 5.5.5 – The text in this section can be interpreted to imply that Section 43.1 of the Regulation also applies due to the presence of water bodies within 30 metres of the site, which was likely not the intent. The Reviewer notes that it is indicated in Section 5.1.1 that there is no surface water or aquatic habitat within 30 metres of the RA property. The text should be clarified accordingly.	The text in Section 5.5.5 has been clarified with respect to the applicability of the other conditions mentioned under Sections 41 and 43.1 of O. Reg. 153/04.	Section 5.5.5

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13	Section 6.3 – It is unclear from the discussion provided whether potentially recoverable NAPL may be present at the property. It is the Ministry's expectation that NAPL will be recovered to the extent practicable. Additional discussion is warranted for completeness.	As discussed in the response to PSF Comment 3a, the LNAPL is present within the highly fractured bedrock contact zone, and recovery is considered not feasible as the process would be difficult, costly and inefficient. Additional discussion has been provided in Section 6.3 to expand on this discussion.	Section 6.3
14	Section 6.4 and Table 6-3 – It is unclear if the fill cap concentrations take into consideration all the applicable component values and relevant exposure pathways (e.g. S-Nose, inhalation from a trench scenario, etc). This should be clarified.	A check of the fill cap concentrations compared to the S-Nose and trench RBCs was completed, see additional text below. Statements regarding whether the fill cap concentrations are protective of these pathways have been added to the text. **S-Nose** The development of the S-nose component value is derived from a scenario where a gardener receptor smells a handful of soil while gardening. As extensive gardening activities are not expected at the RA Property (that is, gardening of home-grown produce is prohibited except in above ground containers/containerized plots and other gardening activities would be limited to ornamental gardens in landscaped areas), the application of the S-Nose component value in the selection of Fill Cap Target Concentrations (FCTCs) is considered overly conservative for the anticipated redevelopment scenario. A qualitative assessment of the soil odour pathway has been added to Section 4.4.3.9, which assesses and identifies the potential for (aesthetic) risks from this pathway, and identifies the need for RMMs to mitigate the potential odour issues. To be protective of potential odour concerns, text has been added to Section 7 noting that soil to be used as part of the cap needs to be meet the FCTCs as well as pass visual and olfactory inspection (that is, no sheen, staining, odour, or mixed debris). The text in Section 6.4 has been revised to reflect this information. **Trench Inhalation** The FCTCs (Table 6-3) were compared to the Trench RBCs (Table 4-46) to determine if the FCTCs were protective of the trench inhalation pathway. Where the trench air pathway risk was driven by groundwater, the RBCs were calculated only for groundwater in Table 4-46; therefore, the revised RA has calculated the soil RBCs for both 2-(1-)Methylnaphthalene and PHC F2 (which are soil COCs with trench air risks driven by groundwater concentrations). The soil RBCs associated with these COCs have been added to the footnotes of Table 4-46 and 7-2f, and were subsequently checked against the FCTCs in Table 6-3. The derived soil RBCs for the trench air pathway are higher than the associated FCTCs for each chemicals (refer to the comparison in Table A3-1 in Appendix A3). Therefore, Jacobs can confirm that the FCTCs are protective of the trench air pathway. The text in Section 6.4 has been revised to reflect this information.	Section 4.4.3.9 Table 4-46 (footnote) Section 6.4 Section 7.2.2 Section 7.2.3.2 Table 7-2f (footnote) Appendix A3, Table A3-1
15	Appendix D – A rationale for and description of any hydrogeological and geological interpretations which differ from assumptions on which the Soil, Ground Water and Sediment Standards are based is required to be included with the ESA summary.	A rationale and description of the interpretations has been added to the Phase Two ESA Summary in Appendix D2.	Appendix D2
Risk Management			
1	For areas where NAPL has been observed, consideration needs to be given to including a provision in the RMP for prohibiting the construction of buildings with basements or other occupied below grade structures in these areas for as long as the NAPL remains present in these areas. Please contact the District Office to discuss prior to resubmission.	Additional requirements have been added to restrict below grade occupied spaces within a specific area of the Site (potential NAPL), unless it is demonstrated that NAPL has been removed through focused pre-development remedial activity. An addition to the requirements in the SGMP has also been made requiring soils considered for reuse beneath the fill or hard cap, must meet the free-phase thresholds (FPT) for PHC F2, F3 and F4, as per Table 6-2a.	New Figure 7-2 Section 7.2.3.5
2	Should slab-on-grade buildings be constructed in the areas where residual NAPL remains, additional design considerations/details are required to be provided in Appendix I.2 as it relates to the presence of NAPL and the conceptual vapour mitigation systems as proposed.	Jacobs has reviewed the proposed vapour mitigation for slab-on-grade buildings presented in Appendix I and has determined that the proposed mitigation is considered appropriate for within the area shown in new Figure 7-2. The components of the identified NAPL are primarily PHC F3 and F4 with a lesser component of PHC F2 and therefore has limited volatility. The proposed slab-on-grade conceptual design will include monitoring and must allow for the conversion of the passive system to an active system. The contingency will be adequate to address any increased risks due to vapours results from the presence of NAPL below a future building. Statements have been added regarding material compatibility in Appendix I.	No change Section I.2.1 Section I.2.2.2
3	Imported "Unimpacted Soil" as defined in Section 7.2.2 of the Risk Assessment and related sections in Appendix I includes a reference to O. Regulation 406/19 and the Rules for Soil Management and Excess Soil Quality Standards. These references need to be removed as a Risk Assessment under O. Regulation 153/04 (as amended) is being undertaken and the issued CPU will take precedence. As such, any imported "Unimpacted Soil" must meet the applicable generic site conditions	Noted, these references have been removed from Section 7 and Appendix I.	Section 7 Appendix I

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	standards for this property as identified in the Risk Assessment (i.e. Table 6 SCS). This reduces confusion and uncertainty. Please contact the District Office directly to discuss prior to resubmission.		
4	Section 7.2.3.1: The HSP requirements need to include consideration of the potential risks associated with dust, soil/groundwater vapour and the presence of NAPL.	Section 7.2.3.1 has been revised to account for the pathways mentioned.	Section 7.2.3.1
5	Section 7.2.3.2 needs to include the following: • Management measures and an action plan (including appropriate disposal options) for NAPL if encountered. If NAPL is encountered, notification to the Director in writing within 24 hours of the NAPL being encountered.	These provisions have been added to Section 7.2.3.2 and 7.2.3.3	Section 7.2.3.2 and 7.2.3.3
6	If buildings with basements are not prohibited, as recommended in 1.0 above, Section 7.2.3.3 will need to be updated to include provisions for the presence of NAPL.	See response to Comment 1 above. Buildings with basements are prohibited until it can be shown that NAPL has been removed. Section 7.2.3.3 has been updated to account for the management of NAPL should it be encountered during construction excavation anywhere on the RA Property.	Section 7.2.3.3
7	Section 7.4.1 needs to be updated to include timelines for notification requirements to the Director. Typical timelines are included below for reference and will be modified and incorporated into the CPU as warranted. • *In the event that the indoor air and or sub-slab vapour monitoring program identifies one or more of the Target Analytes at concentrations above the Target Indoor Air/ Sub-Slab Vapour Target Concentrations in **Table 1XXX**, respectively, and where the concentrations of the observed Target Analytes are determined by the qualified Licensed Professional Engineer to be a result of soil vapour intrusion, the Owner shall implement the contingency measures detailed in Section XXX of the RA and as follows:* i. *Written notice shall be submitted to the Director by the Owner within 14 calendar days of the Owner's receipt of the laboratory analysis. This written notice shall include the indoor air and or sub-slab vapour sampling results (as necessary), the laboratory certificates of analysis and the anticipated timeline for the implementation of the confirmatory sampling program along with any additional work as may be deemed necessary by a qualified Licensed Professional Engineer. Confirmatory sampling shall occur within 14 calendar days from the date of the Owner's receipt of the laboratory analysis and be completed by a qualified Licensed Professional Engineer.* ii. *In the event that the confirmatory indoor air and or sub-slab sampling verifies the exceedances of one or more of the Target Analytes concentrations above the Target Indoor Air Concentration/Target Sub-slab vapour Concentrations in Table 1XXX, the Owner shall:* a. *Submit written notice to the Director within 14 calendar days of the Owner's receipt of the laboratory analysis. This written notice shall include the confirmatory indoor air and or sub-slab vapour sampling results, the laboratory certificates of analysis and the details of, and the anticipated timeline to implement contingency measures consistent with Section XXXX of the RA along with the implementation of further evaluation/assessment of the vapour mitigation system as may be deemed necessary by a qualified Licensed Professional Engineer. The implementation of contingency measures, along with the implementation of a confirmatory indoor air sampling program shall occur within 14 calendar days of the Owner's submission of the written notice of the exceedance to the Director;* b. *Within 30 calendar days of the implementation of the contingency plan, the Owner shall submit to the Director an update report prepared by a qualified Licensed Professional Engineer documenting the implementation of contingency measures, results of the implementation of the confirmatory indoor air sampling program along with the details and timelines for the implementation of performance indoor air and or sub-slab vapour monitoring program. The update report shall include, but not be limited to:* i. *Laboratory results and laboratory certificates of analysis;* ii. *Field logs, leak testing (as necessary) and documentation of QA/QC;* iii. *Discussion and interpretation of the results in comparison to the respective Target Indoor Air Concentrations as listed in Table 1XXX; and,* iv. *Conclusions and recommendations with respect to the performance of the vapour mitigation system along with the need for additional work and/or continued monitoring as may be deemed warranted.*	Timelines have been added to Section 7.4.1. consistent with current CPU requirements.	Section 7.4.1.1
8	Section 7.4.3.1 – The groundwater monitoring program needs to include groundwater monitoring wells OW24S/D and OW13-39S/D to monitoring COCs coming onto the property and ensure that they do not exceed the PSS. Further, although the MECP is actively pursuing the identification of the off-site source of the contamination in this area of the property, no Provincial Officers Order has been issued to date. Please update this section accordingly.	Monitoring wells OW24S/D and OW13-39S/D have been added to the groundwater monitoring program for comparison of results to the PSS only. The Financial Assurance text (Section 7.5.2) and table (Table 7-12) have been updated to account for the costs of sampling from four additional monitoring wells.	Section 7.4.3.1 Section 7.5.2 Table 7-9 Figure 7-2

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			Table 7-12
9	Section 7.4.3.1 – The groundwater monitoring well network should be updated o include the measurement of NAPL in at least one or two key wells within the areas identified as having residual NAPL. Further, should an increased thickness be observed, passive removal (i.e. use of absorbent pad/socks) or active removal should be triggered along with notification to the Director.	This provision has been added to the groundwater monitoring program. Wells OW23S, MW17-108S, and MW18-135S have been added to the groundwater monitoring program.	Section 7.4.3.1 Table 7-9 Figure 7-2
10	Appendix L, Figure I-9 – There was no discussion provided in regards to this figure. Please update this section accordingly.	The references in the Appendix I have been updated. This Figure was no longer required as no designs for unoccupied structures were proposed as part of this RA.	Appendix I

Notes:

APEC = area of potential environmental concern
CCME = Canadian Council of Ministers of the Environment
City = City of Guelph
COC = contaminant of concern
CSM = conceptual site model
ERA = Environmental Risk Assessment
ESA = Environmental Site Assessment
HH = human health
HSP = health and safety plan
HQ = hazard quotient
LNAPL = light non-aqueous phase liquid
MECP = Ontario Ministry of the Environment, Conservation and Parks
NAPL = non-aqueous phase liquid
OTR = Ontario Typical Range
PGMIS = Provincial Groundwater Monitoring Information System
PHC = petroleum hydrocarbon
PSF = pre-submission form
P2 = Phase Two
QP = Qualified Person
RA = Risk Assessment
RSC = Record of Site Condition
RMM = risk management measure
RMP = risk management plan
SCS = site condition standard
SF = slope factor
TRV = toxicity reference value
URF = unit risk factor
VOC = volatile organic compound

Table A3-1. Fill Cap Target Concentrations vs. Trench RBCs Check (Based on Table 6-3)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

							Check	
COC	HH Residential RBC [a] (µg/g)	Ecological RBC [b] (µg/g)	Table 6 SCS [c] (µg/g)	Observed Maximum [d] (µg/g)	Fill Cap Target Concentration [e] (µg/g)	Fill Cap Target Concentration Driver	Soil Trench RBCs (Refer to Table 4-46)	Is Fill Cap Target Concentration Less than Trench RBC?
2-(1-)Methylnaphthalene	72	29	0.99	4.93	4.93	Observed Max	1100	Yes
Acenaphthene	15	29	7.9	94	15	Human Health	NA	NA
Acenaphthylene	2.1	29	0.15	2	2	Observed Max	1300	Yes
Anthracene	1000	2.5	0.67	160	2.5	Ecological	25000	Yes
Antimony	113	20	7.5	18.6	18.6	Observed Max	NA	NA
Arsenic	18	20	18	23	18	Human Health/Table 6 SCS	NA	NA
Benzene	0.21	25	0.21	0.26	0.21	Human Health/Table 6 SCS	22	Yes
Benzo(a)anthracene	57	0.5	0.5	200	0.5	Ecological/Table 6 SCS	450000000	Yes
Benzo(a)pyrene	0.57	20	0.3	130	0.57	Human Health	NA	NA
Benzo(b)fluoranthene	5.7	1.1	0.78	190	1.1	Ecological	NA	NA
Benzo(g,h,i)perylene	57	6.6	6.6	70	6.6	Ecological/Table 6 SCS	NA	NA
Benzo(k)fluoranthene	5.7	1.1	0.78	66	1.1	Ecological	NA	NA
Cadmium	2.2	1.9	1.2	83.4	1.9	Ecological	NA	NA
Chrysene	57	7	7	180	7	Ecological/Table 6 SCS	NA	NA
Cobalt	22	40	22	393	22	Human Health/Table 6 SCS	NA	NA
Copper	200	140	140	2460	140	Ecological/Table 6 SCS	NA	NA
Dibenzo(a,h)anthracene	0.57	1.1	0.1	26	0.57	Human Health	NA	NA
Electrical Conductivity	2.6	0.7	0.7	2.19	0.7	Ecological/Table 6 SCS	NA	NA
Ethylbenzene	4	55	1.1	4.1	4	Human Health	5000	Yes
Fluoranthene	57	0.69	0.69	660	0.69	Ecological/Table 6 SCS	NA	NA
Fluorene	290	62	62	150	62	Ecological/Table 6 SCS	8200	Yes
Indeno(1,2,3-Cd)Pyrene	5.7	0.38	0.38	80	0.38	Ecological/Table 6 SCS	NA	NA
Lead	120	120	120	10100	120	Human Health/Table 6 SCS	NA	NA
Mercury	0.27	10	0.27	0.319	0.27	Human Health/Table 6 SCS	3.3	Yes
Molybdenum	110	6.9	6.9	35	6.9	Ecological/Table 6 SCS	NA	NA
Naphthalene	0.6	0.6	0.6	220	0.6	Human Health/Table 6 SCS	59	Yes
Nickel	330	100	100	117	100	Ecological/Table 6 SCS	NA	NA
PCB, Total	0.35	1.1	0.35	1.65	0.35	Human Health	NA	NA
PHC F2	98	150	98	3600	98	Human Health/Table 6 SCS	8300	Yes
PHC F3	5785	300	300	23000	300	Ecological/Table 6 SCS	NA	NA
PHC F4	6096	2800	2800	7300	2800	Ecological/Table 6 SCS	NA	NA
Phenanthrene	719	6.2	6.2	900	6.2	Ecological/Table 6 SCS	32000	Yes
Pyrene	539	78	78	470	78	Ecological/Table 6 SCS	NA	NA
Thallium	1	1.4	1	6	1	Human Health/Table 6 SCS	NA	NA
Trichloroethylene	0.061	8.1	0.061	35.4	0.061	Human Health/Table 6 SCS	2.3	Yes
Vanadium	86	86	86	100	86	Human Health/Table 6 SCS	NA	NA
Xylenes, Total	3.1	95	3.1	3.9	3.1	Human Health/Table 6 SCS	6900	Yes
Zinc	5635	340	340	67200	340	Ecological/Table 6 SCS	NA	NA

[a.] Obtained from Table 4-43 of this RA report.

[b.] Obtained from Table 5-13 of this RA report.

[c.] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Non-Potable Ground Water Condition (coarse-textured soils) (MECP, 2011).

[d.] Maximum concentration observed onsite, as shown in Table 4-1.

[e.] Cap Target Concentration is the minimum of the Human Health RBC, Ecological RBC, and observed maximum concentration. If the Cap Target Concentration is less than Table 6 SCS, the Table 6 SCS is selected as the Cap Target Concentration. Direct Contact and Inhalation of vapours originating from soil in the absence of RMMs have been considered in the derivation of the Cap Target Concentrations.

* Units for Electrical Conductivity are mS/cm

Notes:

µg/g = microgram per gram
COC = contaminant of concern
F = fraction
HH = human health
MECP = Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
RA = risk assessment
RBC = risk-based back-calculation concentration
RMM = risk management measure
SCS = site condition standard
NA = not applicable

Appendix A4
MECP Comments on RA and Jacobs Response to Comments – March 2021

Ministry of the Environment, Conservation and Parks
Standards Development Branch
7th Floor
40 St Clair Ave W
Toronto ON M4V 1M2
Fax: (416) 327-2936
Tel: (416) 212-7377

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction de l'élaboration des normes
7e étage
40 av St Clair O
Toronto ON M4V 1M2
Télécopieur: (416) 327-2936
Tél:(416) 212-7377

March 18, 2021

The Corporation of the City of Guelph
1 Carden St
Guelph, Ontario, N1H 3A1

Attention: Prasoon Adhikari

Re: Notice of a Circumstance requiring additional information for 200 Beverley Street, Guelph, Ontario (Property)
Risk assessment number 6417-B9XQGZ
TASDB file number RA1748-19b

This is to acknowledge your submission of a risk assessment report on 2021/11/18 regarding the Property to the Ministry of the Environment, Conservation and Parks (Ministry). By way of this letter I am providing you written notice, prior to making a decision under section 168.5 of the *Environmental Protection Act* (the Act), that the Director is aware of the following circumstance:

The content of the risk assessment report does not comply with a requirement specified in section 4 or 5 of Schedule C of Ontario Regulation 153/04.

Due to the above-noted circumstance, this is to request that you:

- revise and resubmit the risk assessment to the Director in accordance with the directions specified below in Schedule A

By way of this letter the Director is providing you notice that a new time to respond to a risk assessment will commence on the date that the Qualified Person submits the revised risk assessment in accordance with this notice.

At any time the owner may withdraw the risk assessment by giving written notice to the Director.

For your information the Act, Regulation, guidance documents and associated fact sheet have been posted on the world wide web at:

https://www.ontario.ca/page/brownfields-redevelopment

Craig Kinch

Director, Environmental Protection Act s. 168.5

c: Katherine Appleby, Jacobs Engineering Group Inc.
Ann-Marie Deonarine, Technical Assessment and Standards Development Branch
Melanie Wong, Technical Assessment and Standards Development Branch
Jennifer Volpato, MECP

attach

SCHEDULE A
To Director's Notice
Comments by the Ministry of the Environment, Conservation and Parks On Risk Assessment
for
200 Beverley Street, Guelph, Ontario
RA1748-19b
IDS Ref. No. 6417-B9XQGZ

The following are Ministry comments on the following Risk Assessment (RA):

- **Revised Risk Assessment Report for 200 Beverley Street, Guelph, Ontario report prepared by Jacobs Engineering Group Inc., dated November, 2020.**

Comments On Risk Assessment

General Comments

The Site is the former International Malleable Iron Company (IMICO) foundry facility with an approximate area of 5.2 hectares. The Site was first developed in 1913 when it was acquired by IMICO and closed in 1989. Demolition of the buildings and removal of various wastes from the Site (including some excavated soil and PCB materials and a large aboveground AST) occurred in 1998/1999. The Site is currently vacant with no on-site operations occurring. The future redevelopment plans at this time are unknown, but may include one or more of residential, parkland, and commercial use.

Several issues have been identified in the site characterization, HHRA and ERA that need to be addressed before the risk assessment can be considered to meet the requirements of O. Reg. 153/04.

Risk levels and property specific standards that are developed in the RA apply only to the subject property. Any assessment of risk or development of property specific standards in the RA that may be intended to apply to off-site properties are beyond the scope of a RA under the Regulation and accordingly are not part of the Ministry's review.

Note that some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the RA. Note that acceptance of the qualified person (QP's) responses on these ESA-related matters is for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs has not been conducted. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and

two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that is amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Rose Ash of Client Services and Permissions Branch; email: rosemary.ash@ontario.ca

Specific Review Comments

PSF Comments

1. No response was required.

2. The comment was previously addressed.

3. The following responses are provided:
   a. The response is noted.
   b. The response addresses the comment.
   c. Further discussion should be provided on the attempts made to recover free product in this area and to discuss whether active recovery is feasible.

4. The following comments are provided:
   a. The comment was previously addressed.
   b. The response partially addresses the comment. The CCME guideline for tin is actually one of the interim guidelines from 1991 and these do not necessarily offer a similar level of protection to MECP standards or more recent CCME guidelines. The CCME 1991 values actually include both assessment criteria and remediation objectives (with 300 ug/g representing the remediation objective). The assessment criteria for tin is 5 ug/g and this is meant to be representative of either background levels or the analytical detection limit at the time. As such, the assessment criteria would be more comparable to the OTR98 values being applied in this evaluation. The Reviewer is also aware of other investigations where tin concentrations ranging up to approximately 10 ug/g were reasonably evaluated as representing background conditions. As such, the conclusion that the observed tin concentrations at the site could reasonably be considered as being representative of background conditions would appear to be acceptable. The discussion should be updated to reflect such a comparison to background conditions as opposed to comparison to the interim remediation objective.
   c. The comment was previously addressed.
   d. The response does not address the comment. Detected chemical parameters would not be considered to be contaminants at the site if they are present at concentrations consistent with naturally occurring background levels and would not be associated with APECs at the site. A site with a long history of foundry operations with iron

and steel production can reasonably be expected to have a variety of metal contaminants present. Where metals are then detected at concentrations exceeding expected naturally occurring background levels, the reasonable conclusion would then be that the metals are associated with the past site operations. The Reviewer agrees that there is not a great deal of available information on background concentrations of bismuth in soils; however, where such data is available, very low bismuth concentrations (e.g., <1 ug/g) appear to be typical (e.g., North American transect data from USGS: https://pubs.usgs.gov/of/2005/1253/), and this is consistent with other sites in Ontario the Reviewer is familiar with where bismuth has been analyzed. Bismuth should be carried forward as a contaminant for consideration in the RA, where comparison to the TCEQ value referenced previously would be appropriate, and/or other qualitative or semi-quantitative approaches as required. The QP-ESA should also consider whether the existing bismuth dataset is sufficient for delineation purposes.

5. The comment was previously addressed.

6. The comment was previously addressed.

7. The comment was previously addressed.

Risk Assessment

Section 3.0 - Property Information, Site Plan and Geological Interpretation

1. Section 3.3.5 – As indicated in a previous comment, detected chemical parameters would not be considered to be contaminants at the site if they are present at concentrations consistent with naturally occurring background levels and would not be associated with APECs at the site. A site with a long history of foundry operations with iron and steel production can reasonably be expected to have a variety of metal contaminants present. Where metals are then detected at concentrations exceeding expected naturally occurring background levels, the reasonable conclusion would then be that the metals are associated with the past site operations. The Reviewer also notes that metals in general were flagged as potential contaminants at the site by the Phase One ESA.
    a. The response does not address the comment. Iron was clearly used as part of foundry operations at the site and therefore it is very unclear what the basis is for the QP's assertion that it would not be associated with APECs at the site. The Reviewer is also unclear as to what the QP is referring to when speaking of 'nutrient balance' issues and this would require additional context if being used as a line of evidence. Iron should be carried forward as a contaminant for consideration in the RA, where qualitative or semi-quantitative approaches can readily be applied as required. The QP-ESA should also consider whether the existing iron dataset is sufficient for delineation purposes.

b. The response partially addresses the comment. The specific responses relating to phosphorus and strontium are acceptable. For magnesium, and similarly for calcium, these may both also be components used in foundry processes. The fact that these are also present in bedrock formations in the area is not entirely convincing as shallow limestone and dolostone formations are very common in Ontario and would be representative of many of the sites used to establish the OTR98 concentrations. Further rationale should be provided or these should also be carried forward for evaluation in the RA.

Section 4.0 - Human Health Risk Assessment

2. The response addresses the comment.

3. The response addresses the comment.

4. The response addresses the comment.

5. The response addresses the comment.

6. The response partially addresses the comment. The QP is also required to consider and discuss lateral migration of soil gas (i.e., gas migration through the vadose zone) (e.g. 10 m (for biodegradable chemicals) and 30 m (for recalcitrant chemicals)).

7. The response addresses the comment.

8. The response addresses the comment.

Section 5.0 - Ecological Risk Assessment

9. The response addresses the comment.

10. The response addresses the comment.

11. The following comments are provided:
    a. The response addresses the comment; however, the QP is also referred to PSF comment 3.
    b. The response addresses the comment.
    c. The response partially addresses the comment. It is not clear whether or not a fill cap thickness of 150 mm is still recommended as an interim RMM for the existing mature trees until site redevelopment. Table I-1 and its footnote in Appendix I and footnote in Figure I-3 refers to 150mm fill cap for existing trees (Detail 2). Clarification is required.

12. The response addresses the comment.

Section 6.0 – Conclusions and Recommendations

13. Section 6.3 – See PSF Comment 3.

14. The response addresses the comment as pertains to Section 6. However, it is unclear whether the FCTCs take into account ecological pathways (e.g. S-GW3, etc.). This will also need to be addressed, as the proposed RMMs must also be protective of all receptors and pathways. For example, it is noted that the anthracene FCTC is greater than the Table 2 S-GW3 component value.

Other Comments

15. The response partially addresses the comment. A discussion should be provided regarding the applicability of using the Generic Standards considering differences between site-specific and MECP default hydrogeological/geological values (e.g., size of contaminated area, etc.) used in the derivation of the Generic Standards (i.e., if site-specific value is less conservative than MECP default value, why it is appropriate to use Generic Standards for the property).

New Risk Assessment Comments (March 2021)

16. Section 5.4.2 – Site-specific groundwater data were considered in the ERA to directly evaluate parameters exceeding S-GW3 values. A discussion should be provided confirming that adequate groundwater quality data is available in the areas where parameters exceeding S-GW3 values are present in soil to support this approach.

17. Section 5.5.6 – It is indicated in this section that there are potential effects to aquatic receptors from groundwater discharging to downgradient water bodies from anthracene and PHC F2. However, the discussion in Section 5.5.3.4 also identifies PHC F1 and zinc in exceedance of GW3 values. Clarification is required.

Phase Two Conceptual Site Model Comments

Previous comments have been addressed.

Summary and Conclusions

Several issues have been identified in the review of the risk assessment that will need to be clarified before the risk assessment can be accepted under O. Reg. 153/04.

Comments On Risk Management

1 – Figure I-1 needs to be updated to remove the reference to existing trees.

2 – The QP is reminded at barriers to on-site soils are required over the entirety of the property (existing or new). If barriers are not required over the entirety of the property, a figure clearly outlining areas of the property where barriers are not required needs to be prepared and incorporated into the RMP. If the areas are irregular, then a legal survey is required. If not, then please update section 7.2.2, second last paragraph on page 7-5 to specifically reflect that barriers to on-site soils are required over the entirety of the property to avoid any future confusion. Section I.1.2 of Appendix I will also need to be updated accordable.

3 – Please contact the District Office directly to discuss the area of LNAPL restrictions as identified in Figure 7.2 of the RA.

4 – The District Office has had public inquiries into the RA being completed for this property in the past few months. The members of the public have been directed to contact the City to obtain a copy of the RA and that any comments in regards to the RA be provided back to the City to allow the QP to consider the comments within the RA and respond accordingly. Please ensure that all correspondence and consideration of all public comments that have been received by the City be clearly documented and included in an appendix of the next resubmission.

RESUBMISSION

The risk assessment should be revised and resubmitted to the following address:

The Director
Client Services and Permissions Branch
135 St. Clair Avenue West, 1st Floor
Toronto, ON, M4V 1P5

Telephone 416-314-8001

Four hard copies of the risk assessment should be submitted (one marked original), including a stand-alone, electronic copy of the risk assessment report (in USB format). However, if the ministry is still working remotely, then please follow the interim submission process for risk assessments. Please ensure the electronic copy submitted during the interim submission process is a stand-alone document and that all sections within the submission are bookmarked.

To assist MECP in its review of the resubmission, changes to the risk assessment from the version that is the subject of the above review should be outlined in a revision table or errata sheet attached to the resubmission. Use of a redline method in the body of the revised risk assessment also is

recommended, if possible and where practicable.

It also is recommended that the QP_{RA} provide responses to the MECP review comments as an attachment to the submission or as an appendix in the revised risk assessment. This will provide an opportunity for the QP_{RA} to explain to MECP reviewers how the MECP review comments have been addressed in the risk assessment. The QP_{RA} should note that submission of a response to the MECP review comments without a revised risk assessment or addendum is not considered to be a resubmission of the risk assessment under the Regulation and it may not be reviewed.

The Property Owner and QP_{RA} should note that upon receipt and review of the resubmission, the Director may issue a decision under Section 168.5 (1) EPA to accept or not to accept the risk assessment. If the decision is not to accept the risk assessment, then subsequent resubmissions or provision of additional information cannot be accepted by the Ministry for review. Advancement of a risk assessment of the subject property will require submission of a new Pre Submission Form followed by a new risk assessment of the site in accordance with Schedule C of the Regulation.

It is recommended that before resubmission of the risk assessment, the QP_{RA} review the mandatory requirements for risk assessments submitted under the Regulation, as outlined in Section 4 and Table 1 of Schedule C of the Regulation. As well, the Ministry's *Procedures for Use of Risk Assessment Under Part XV.1 of the Environmental Protection Act* should be used for guidance in how to satisfy the requirements of the Regulation. **It is important that the QP_{RA} also confer with the QP_{ESA} to determine whether the PSS provided will support filing of a record of site condition.**

Some of the comments included in this document (Schedule A) may be related to the adequacy of the environmental site assessment (ESA) work performed to support the approach and conclusions of the risk assessment (RA). Note that acceptance of the qualified person (QP's) responses on these ESA-related matters is for the purpose of supporting a decision on the RA only; a full regulatory review of the ESAs has not been conducted. The Ministry may undertake a more in depth review of the phase one and phase two ESA reports at the time the record of site condition (RSC) is submitted for filing to ensure that all the regulatory requirements have been met. Information relevant to the phase one and two ESA reports (e.g., table of areas of environmental concern, the conceptual site models) that is amended as part of the RA should be reflected in updated phase one and two ESA reports prior to submitting RSCs for filing. In addition, if the work on the phase one and two ESA exceeds 18 months prior to the submission date of the RSC, the phase one and two ESA reports will need to be updated prior to submitting RSCs for filing.

If the QP_{ESA} has any questions regarding meeting the ESA requirements at the time of RSC filing, it is suggested that they contact Rose Ash of Client Services and Permissions Branch; email: rosemary.ash@ontario.ca

If the QP_{RA} has questions regarding the application of the Regulation or the above comments, they should be forwarded by email to:

Ann-Marie Deonarine
Risk Assessment Review Coordinator
Technical Assessment and Standards Development Branch
ann-marie.deonarine@ontario.ca

APPENDIX A4

MECP Comments on RA and Jacobs Response to Comments – March 2021

	March 18, 2021 MECP Comment	Jacobs Response	Document Location
PSF Comments			
1	No response required.	No response required.	--
2	The comment was previously addressed.	No response required.	--
3	The following responses are provided a) The response is noted. b) The response addresses the comment. c) Further discussion should be provided on the attempts made to recover free product in this area and to discuss whether active recovery is feasible.	a) No response required. b) No response required. c) Additional text has been added to Section 3.2.1 to document previous LNAPL recovery efforts as part of annual groundwater monitoring programs by AECOM (only 100 – 350 mL recovery reported each event) and specify that active LNAPL extraction was determined not to be feasible due to the depth at which it has been seen (within the bedrock, observed in fractures up to 4.6 mbgs).	Section 3
4	The following comments are provided: a) The comment was previously addressed. b) The response partially addresses the comment. The CCME guideline for tin is actually one of the interim guidelines from 1991 and these do not necessarily offer a similar level of protection to MECP standards or more recent CCME guidelines. The CCME 1991 values actually include both assessment criteria and remediation objectives (with 300 ug/g representing the remediation objective). The assessment criteria for tin is 5 ug/g and this is meant to be representative of either background levels or the analytical detection limit at the time. As such, the assessment criteria would be more comparable to the OTR98 values being applied in this evaluation. The Reviewer is also aware of other investigations where tin concentrations ranging up to approximately 10 ug/g were reasonably evaluated as representing background conditions. As such, the conclusion that the observed tin concentrations at the site could reasonably be considered as being representative of background conditions would appear to be acceptable. The discussion should be updated to reflect such a comparison to background conditions as opposed to comparison to the interim remediation objective. c) The comment was previously addressed.	a) No response required. b) A range of 5 to 9.2 µg/g has been added to Table F-1 as an alternate soil screening value for tin. The following information has been added as a footnote to the table: *For tin, a range has been shown represented by the CCME agricultural value of 5 µg/g (CCME 2020) on the low end; the high end value of 9.2 µg/g is the 98th percentile value of tin based on a soil survey conducted in agricultural soils in Southern Ontario by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMFRA). These values represent the reasonable range of background tin concentrations that could be encountered in Ontario soils. The British Columbia Ministry of the Environment has derived a risk-based value for tin protective of human health of 25,000 µg/g and appears to have adopted the CCME value of 5 µg/g for the protection of ecological health. A search of soil screening values for ecological health on the Risk Assessment Information System (RAIS) website indicates that values between 7.62 µg/g and 2,000 µg/g are generally protective of ecological receptors (7.62 µg/g protective of mammals [masked shrew]; 50 µg/g protective of plants; 2,000 µg/g protective of soil microbes; 19 µg/g representing Dutch Background). Therefore, the CCME and background values are considered appropriate to use in the absence of MECP screening values for the selection of COCs. All tin concentrations measured onsite, apart from the maximum concentration are within the 5 to 9.2 µg/g range considered to be representative of "background". The maximum concentration of 9.6 µg/g is within the same order-of-magnitude as the "background" concentration range and could be within range if 20% analytical variability (a typical assumption) is considered. As such, tin was not retained as a COC for the Site.* c) No response required.	Table F-1

	March 18, 2021 MECP Comment	Jacobs Response	Document Location
	d) The response does not address the comment. Detected chemical parameters would not be considered to be contaminants at the site if they are present at concentrations consistent with naturally occurring background levels and would not be associated with APECs at the site. A site with a long history of foundry operations with iron and steel production can reasonably be expected to have a variety of metal contaminants present. Where metals are then detected at concentrations exceeding expected naturally occurring background levels, the reasonable conclusion would then be that the metals are associated with the past site operations. The Reviewer agrees that there is not a great deal of available information on background concentrations of bismuth in soils; however, where such data is available, very low bismuth concentrations (e.g., <1 ug/g) appear to be typical (e.g., North American transect data from USGS: https://pubs.usgs.gov/of/2005/1253/), and this is consistent with other sites in Ontario the Reviewer is familiar with where bismuth has been analyzed. Bismuth should be carried forward as a contaminant for consideration in the RA, where comparison to the TCEQ value referenced previously would be appropriate, and/or other qualitative or semi-quantitative approaches as required. The QP-ESA should also consider whether the existing bismuth dataset is sufficient for delineation purposes.	d) Bismuth has been updated and carried forward as a contaminant for consideration in the RA. Additional bismuth data was obtained from the analytical laboratory from all Phase Two ESA sampling locations (2017 to 2020) collected for metal analysis and was added to the data set to ensure sufficient delineation at the Property.	Appendix D2 and D3 Section 4 text and tables Section 5 text and tables
5	The comment was previously addressed.	No response required.	--
6	The comment was previously addressed.	No response required.	--
7	The comment was previously addressed.	No response required.	--
Risk Assessment			
1	Section 3.3.5 – As indicated in a previous comment, detected chemical parameters would not be considered to be contaminants at the site if they are present at concentrations consistent with naturally occurring background levels and would not be associated with APECs at the site. A site with a long history of foundry operations with iron and steel production can reasonably be expected to have a variety of metal contaminants present. Where metals are then detected at concentrations exceeding expected naturally occurring background levels, the reasonable conclusion would then be that the metals are associated with the past site operations. The Reviewer also notes that metals in general were flagged as potential contaminants at the site by the Phase One ESA a) The response does not address the comment. Iron was clearly used as part of foundry operations at the site and therefore it is very unclear what the basis is for the QP's assertion that it would not be associated with APECs at the site. The Reviewer is also unclear as to what the QP is referring to when speaking of 'nutrient balance' issues and this would require additional context if being used as a line of evidence. Iron should be carried forward as a contaminant for consideration in the RA, where qualitative or semi-quantitative approaches can readily be applied as required. The QP-ESA should also consider whether the existing iron dataset is sufficient for delineation purposes. b) The response partially addresses the comment. The specific responses relating to phosphorus and strontium are acceptable. For magnesium, and similarly for calcium, these may both also be components used in foundry processes. The fact that these are also present in bedrock formations in the area is not entirely convincing as shallow limestone and dolostone formations are very common in Ontario and would be representative of many of the sites used to establish the OTR98 concentrations. Further rationale should be provided or these should also be carried forward for evaluation in the RA.	a) Iron has been updated and carried forward as a contaminant for consideration in the RA. Additional iron data was obtained from the analytical laboratory from all Phase Two ESA sampling locations (2017 to 2020) collected for metal analysis and was added to the data set to ensure sufficient delineation at the Property. b) Magnesium and calcium have been updated and carried forward as contaminants for consideration in the RA. Additional magnesium and calcium data was obtained from the analytical laboratory for all Phase Two ESA sampling locations (2017 to 2020) collected for metal analysis and was added to the data set to ensure sufficient delineation at the Property	Appendix D2 and D3 Section 4 text and tables Section 5 text and tables Appendix D2 and D3 Section 4 text and tables Section 5 text and tables
2	The response addresses the comment.	No response required.	--
3	The response addresses the comment.	No response required.	--
4	The response addresses the comment.	No response required.	--
5	The response addresses the comment.	No response required.	--
6	The response partially addresses the comment. The QP is also required to consider and discuss lateral migration of soil (i.e. gas migration through the vadose zone) (e.g. 10 m (for biodegradable chemicals) and 30 m (for recalcitrant chemicals)).	Additional text has been added to Section 4.4.3.2, examining the specific locations where onsite soil concentrations are greater than the ICC S-IA component (given that no residential homes are located within 30 m of a volatile soil exceedance) and their distance to the property boundary/potential nearest offsite ICC receptor. The conclusions remain unchanged. This comment was again discussed with the MECP District	Section 4.4.3.2

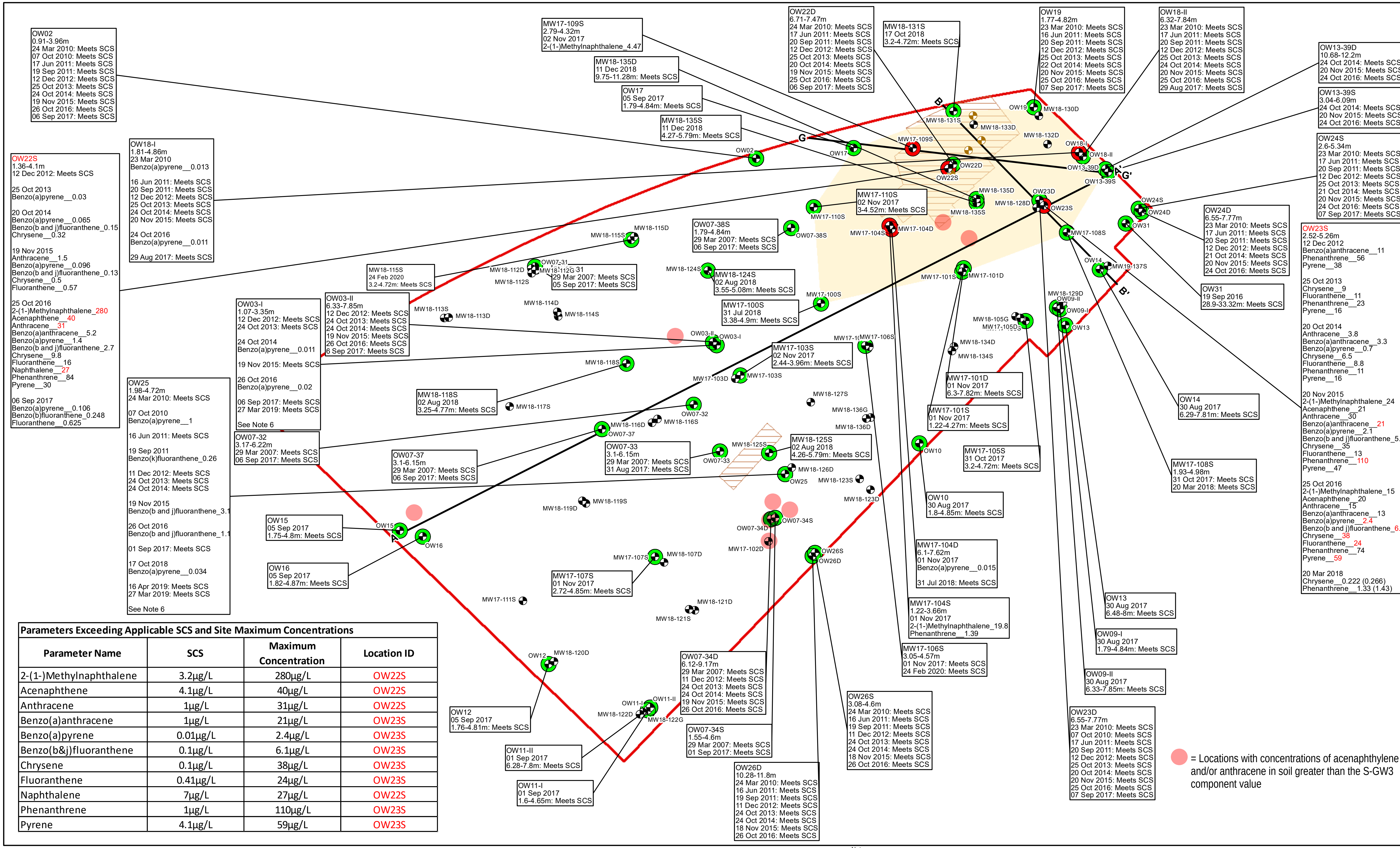
	March 18, 2021 MECP Comment	Jacobs Response	Document Location
		Engineer, and it was determined that no additional RMMs above and beyond those already proposed in the RMP are required for this pathway. A Groundwater Monitoring Program is proposed in the RMP, with contingency measures that include the installation of soil vapour probes as a potential action stemming from the monitoring program as part of the CPU.	
7	The response addresses the comment.	No response required.	--
8	The response addresses the comment.	No response required.	--
9	The response addresses the comment.	No response required.	--
10	The response addresses the comment.	No response required.	--
11	The following comments are provided: a) The response addresses the comment; however, the QP is also referred to PSF comment 3. b) The response addresses the comment. c) The response partially addresses the comment. It is not clear whether or not a fill cap thickness of 150 mm is still recommended as an interim RMM for the existing mature trees until site redevelopment. Table I-1 and its footnote in Appendix I and footnote in Figure I-3 refers to 150mm fill cap for existing trees (Detail 2). Clarification is required.	a) No response required. b) No response required. c) Removal of some references to existing trees were inadvertently missed during the last RA revision. The two references to existing trees were removed in Table I-1. The reference to existing trees was removed in the notes on Figure I-3 as well as in the second paragraph of Section I.1.3.	Appendix I, Table I-1, Figure I-3, and Section I.1.3
12	The response addresses the comment.	No response required.	--
13	Section 6.3 – See PSF Comment 3.	No response required.	--
14	The response addresses the comment as pertains to Section 6. However, it is unclear whether the FCTCs take into account ecological pathways (e.g. S-GW3, etc.). This will also need to be addressed, as the proposed RMMs must also be protective of all receptors and pathways. For example, it is noted that the anthracene FCTC is greater than the Table 2 SGW3 component value.	Section 5.5.8 and Table 5-13 have been updated to include the generic S-GW3 values in the derivation of the fill cap targets for ecological pathways. Five values were revised. The values from Table 5-13 were updated in Table 6-3.	Section 5.5.8 Table 5-13 Table 6-3
15	The response partially addresses the comment. A discussion should be provided regarding the applicability of using the Generic Standards considering differences between site-specific and MECP default hydrogeological/geological values (e.g., size of contaminated area, etc.) used in the derivation of the Generic Standards (i.e., if site-specific value is less conservative than MECP default value, why it is appropriate to use Generic Standards for the property).	The following text has been added to Appendix D2: *Jacobs also notes that the source size of 340 cubic metres for some contaminant groups may be larger than that assumed by the MECP in the derivation of the generic standards; this difference may affect specific component values where source depletion or groundwater transport was assumed. However, the nature of the RA is generally conservative, which may minimize the specific impact that the aforementioned differences may have on the assessment. The use of the MECP SCS and associated component values were considered appropriate for use in the RA for the selection of contaminants of concern and for secondary screening purposes.*	Appendix D2
New Risk Assessment Comments			
16	Section 5.4.2 – Site-specific groundwater data were considered in the ERA to directly evaluate parameters exceeding S-GW3 values. A discussion should be provided confirming that adequate groundwater quality data is available in the areas where parameters exceeding S-GW3 values are present in soil to support this approach.	As stated in Section 5.4.2, the approach taken is supported by groundwater data dating back approximately a decade (2010) from almost 100 monitoring wells across the Site. The figures presented in the Phase Two CSM (Appendix D3) demonstrate the coverage for PAHs and PHCs in groundwater. These figures have been marked up as Figure A4-1 (PAHs) and Figure A4-2 (PHCs) (included at the end of this appendix) to show the locations where acenaphthylene, anthracene, and PHC F2 in soil were detected at concentrations greater than the Table 2 S-GW3 component values. As shown on Figure A4-1 (PAHs), the S-GW3 exceedances on the west side of the Site are randomly distributed with no evidence of associated PAHs impacts in groundwater. On the east side of the Site, the S-GW3 exceedance locations for PAHs are co-located with other PAHs impacts in groundwater; therefore, using	Appendix A4: Figures A4-1 and A4-2

March 18, 2021 MECP Comment		Jacobs Response	Document Location
		the known groundwater quality is an appropriate way to assess and evaluate potential risks to downgradient offsite aquatic receptors from PAHs. As shown on Figure A4-2 (PHCs), the S-GW3 exceedances are all located in an area known to be impacted by PHCs in groundwater. Therefore, the known groundwater quality is an appropriate way to assess and evaluate potential risks to downgradient offsite aquatic receptors from PHCs. As described in Section 5.4.2, the contamination at the Site is from historical sources; therefore, the measured groundwater data is reflective of the past and present potential for contaminant leaching from soil. The GW3 assessment is considered to be more direct and site-specific way of evaluating the potential risks from the Site to offsite aquatic receptors via groundwater flow to a downgradient water body.	
17	Section 5.5.6 – It is indicated in this section that there are potential effects to aquatic receptors from groundwater discharging to downgradient water bodies from anthracene and PHC F2. However, the discussion in Section 5.5.3.4 also identifies PHC F1 and zinc in exceedance of GW3 values. Clarification is required.	PHC F1 and zinc were inadvertently omitted from the introductory paragraph for the bullets in Section 5.5.3.4, but the details of the GW3 exceedances were provided in the bullets. The introductory paragraph has been revised to also list PHC F1 and zinc as having GW3 exceedances. The mention of a "site-specific GW3" was also deleted in this paragraph, since the assessment utilized the generic MECP GW3 values. The same text as above was repeated in Section 5.5.6, this text has also been revised, per the changes described above.	Section 5.5.3.4 Section 5.5.6
Phase Two CSM Comments			
--	Previous Comments have been addressed.	No response required.	--
Risk Management			
1	Figure I-1 needs to be updated to remove the reference to existing trees.	**Figure** I-1 details the hard cap barrier and does not reference existing trees. However, two references to existing trees were located and removed in **Table** I-1. A reference to existing trees was found in the notes on Figure I-3 as well as in the second paragraph of Section I.1.3; these references have been removed.	Appendix I, Table I-1, Figure I-3, and Section I.1.3
2	The QP is reminded that barriers to on-site soils are required over the entirety of the property (existing or new). If barriers are not required over the entirety of the property, a figure clearly outlining areas of the property where barriers are not required needs to be prepared and incorporated into the RMP. If the areas are irregular, then a legal survey is required. If not, then please update section 7.2.2, second last paragraph on page 7-5 to specifically reflect that barriers to on-site soils are required over the entirety of the property to avoid any future confusion. Section I.1.2 of Appendix I will also need to be updated accordingly.	The following statement has been added to Sections 7.2.2 and I.1.: "Upon redevelopment of the RA Property, a physical barrier (either a fill or hard cap) is required across the entire Site." The following statement has been removed in Section 7.2.2 and I.1.2 as it implies that fill caps are only required in specific areas: "…where there are potential risks to terrestrial plants, soil invertebrates, birds, and small mammals…" For any soil to remain in place at the Site as part of the Fill cap, it must be demonstrated that this soil meets the FCTCs as per Section I.1.2.	Appendix I, Sections I.1 and I.1.2 Section 7.2.2
3	Please contact the District Office directly to discuss the area of LNAPL restrictions as identified in Figure 7.2 of the RA.	The District Office has been consulted and the LNAPL restriction area has been reduced to include the region up to the next shallow well with no trace of LNAPL or exceedances.	Figure 7-2
4	The District Office has had public inquiries into the RA being completed for this property in the past few months. The members of the public have been directed to contact the City to obtain a copy of the RA and that any comments in regards to the RA be provided back to the City to allow the QP to consider the comments within the RA and respond accordingly. Please ensure that all correspondence and consideration of all public comments that have been received by the City be clearly documented and included in an appendix of the next resubmission.	The newly received public comments and responses are included as Appendix J2. The previously provided Public Communication materials remain unaltered as Appendix J1. Section 8 of the RA was also updated to reference the new appendix materials.	Section 8 Appendix J2

Notes:

APEC = area of potential environmental concern
CCME = Canadian Council of Ministers of the Environment
City = City of Guelph
COC = contaminant of concern
CSM = conceptual site model
ERA = Environmental Risk Assessment
ESA = Environmental Site Assessment
PGMIS = Provincial Groundwater Monitoring Information System
PHC = petroleum hydrocarbon
PSF = pre-submission form
P2 = Phase Two
QP = Qualified Person
RA = Risk Assessment
RSC = Record of Site Condition

March 18, 2021 MECP Comment		Jacobs Response	Document Location
HH = human health	RMM = risk management measure		
HSP = health and safety plan	RMP = risk management plan		
HQ = hazard quotient	SCS = site condition standard		
LNAPL = light non-aqueous phase liquid	SF = slope factor		
MECP = Ontario Ministry of the Environment, Conservation and Parks	TRV = toxicity reference value		
NAPL = non-aqueous phase liquid	URF = unit risk factor		
OTR = Ontario Typical Range	VOC = volatile organic compound		



Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
2-(1-)Methylnaphthalene	3.2µg/L	280µg/L	OW22S
Acenaphthene	4.1µg/L	40µg/L	OW22S
Anthracene	1µg/L	31µg/L	OW22S
Benzo(a)anthracene	1µg/L	21µg/L	OW23S
Benzo(a)pyrene	0.01µg/L	2.4µg/L	OW23S
Benzo(b&j)fluoranthene	0.1µg/L	6.1µg/L	OW23S
Chrysene	0.1µg/L	38µg/L	OW23S
Fluoranthene	0.41µg/L	24µg/L	OW23S
Naphthalene	7µg/L	27µg/L	OW22S
Phenanthrene	1µg/L	110µg/L	OW23S
Pyrene	4.1µg/L	59µg/L	OW23S

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure A4-1
Groundwater Exceedances - PAHs with Select S-GW3 Exceedances
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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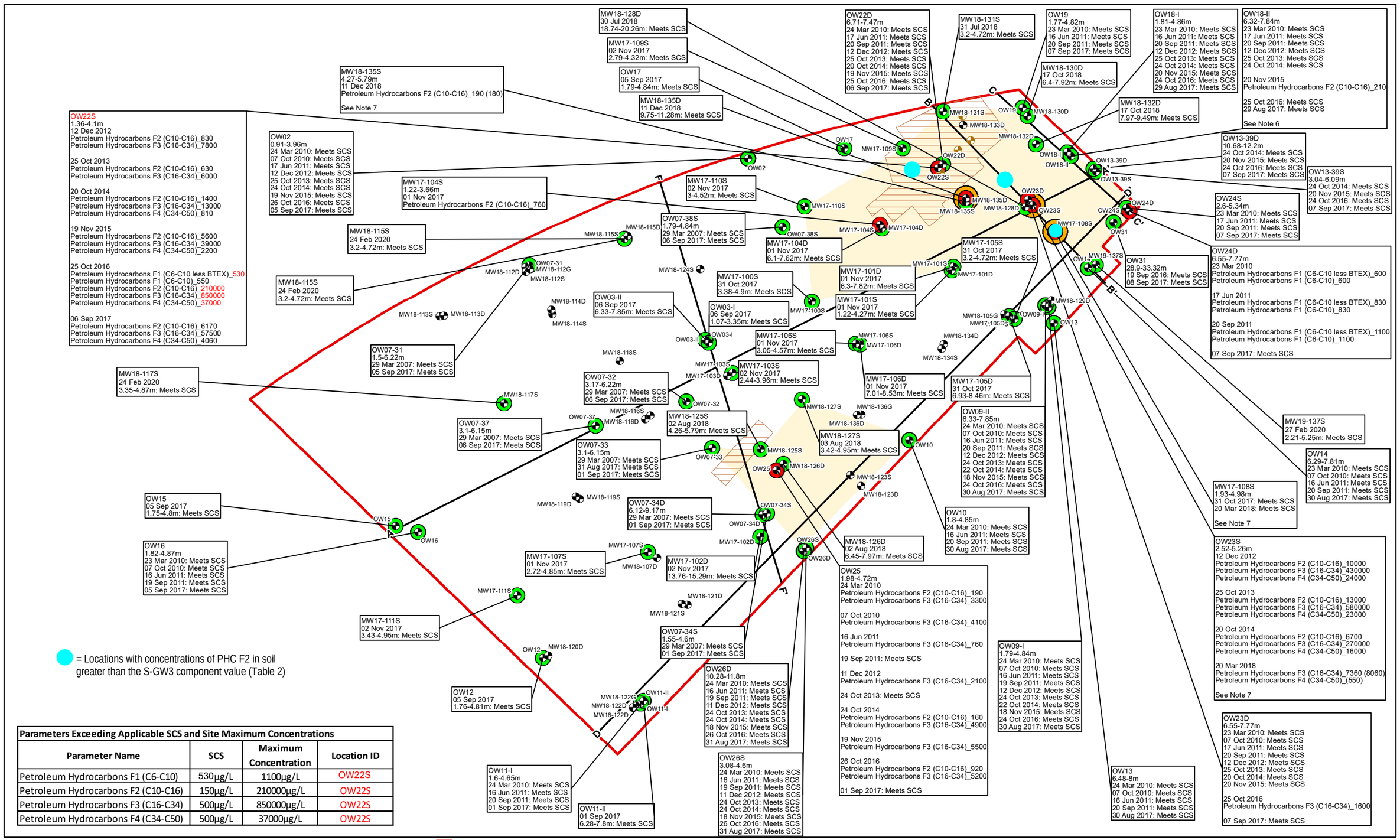

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Petroleum Hydrocarbons F1 (C6-C10)	530µg/L	1100µg/L	OW22S
Petroleum Hydrocarbons F2 (C10-C16)	150µg/L	210000µg/L	OW22S
Petroleum Hydrocarbons F3 (C16-C34)	500µg/L	850000µg/L	OW22S
Petroleum Hydrocarbons F4 (C34-C50)	500µg/L	37000µg/L	OW22S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

Exceedance
No Exceedance
Location with measurable NAPL
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1.Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.
7. 2017 and 2018 results shown at the noted locations are from groundwater samples collected at a depth below the measured NAPL, within the screened interval. Results were collected for vertical delineation purposes to show dissolved concentrations immediately below the NAPL; the monitoring well location is not considered to meet the SCS.

Figure A4-2
Groundwater Exceedances - PHCs with Select S-GW3 Exceedances
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Appendix B
Curriculum Vitae

Jacobs

EDUCATION/QUALIFICATIONS

Post-Degree Graduate Certificate (Co-op), Environmental Engineering Applications, Conestoga College Institute of Technology and Advanced Learning, Ontario

B.E.S., Environmental Studies (Honours), University of Waterloo, Ontario

MEMBERSHIPS AND AFFILIATIONS

Member of ECO Canada, Environmental Professional (Site Assessment and Reclamation)

Katherine Appleby, B.E.S.

RISK ASSESSMENT

Katherine Appleby has 14 years of experience in the field of RA and ESA. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening-level risk assessments (SLRAs), and comprehensive RAs. Katherine has experience performing, reviewing, and supervising the completion of both HHRAs and ERAs for land- and water-based sites. Her skills include developing RA conceptual site models (CSMs), selecting ecological and human health receptors, exposure modelling, selecting toxicity reference values, calculating risk estimates, developing risk management measures (RMMs), reporting, performing peer review, and responding to client and regulator comments on RA reports. Katherine has authored, led, or contributed to the completion of over 50 focused, comprehensive, or screening-level RA reports using both provincial (Ontario Ministry of the Environment, Conservation and Parks [Ministry] and Environment Yukon) and federal (Health Canada and Canadian Council of Ministers of the Environment [CCME]) frameworks. She is familiar with provincial and federal environmental legislation, such as Ontario Regulation (O. Reg.) 153/04 (as amended) and the Record of Site Condition (RSC) filing process.

Areas of Expertise

- 14 years of experience in the field of risk assessment (RA) and environmental site assessment (ESA)
- Experience performing, reviewing, and supervising the completion of both human health and ecological risk assessments (HHRAs and ERAs) for land- and water-based sites.

Relevant Project Experience

Confidential Project, Ontario, Canada

Client: AkzoNobel Inc.

Title: Risk Assessor

Start/End Dates: January to March 2017

Scope/Description: Assessed the human health risk from the groundwater-to-indoor-air inhalation pathway related to chlorinated solvents and tetrahydrofuran (an emerging contaminant of concern) at a building currently used for industrial/commercial purposes.

Confidential Project, Ontario, Canada

Client: Confidential Client

Title: Risk Assessor

Start/End Dates: January to March 2017

Scope/Description: Technical lead for the completion of a due-diligence RA (DDRA) report. Assessed the human health and ecological risks in soil, groundwater, sediment, and surface water from contamination associated with historical creosoting operations at a site in northern Ontario. RA reporting was completed in accordance with O. Reg. 153/04 to potentially support a future RSC.

Confidential Project, Ontario, Canada

Client: AkzoNobel Inc.

Title: Risk Assessor

Start/End Dates: August to October 2016

Scope/Description: Author of a technical memorandum documenting the development of generic groundwater criteria for tetrahydrofuran (an emerging contaminant of concern) for the groundwater-to-indoor-air inhalation pathway (for both residential and industrial/commercial land uses). The memo was prepared at the request of the Ministry District Office and reviewed by the Ministry Standards Development Branch. The Ministry endorsed the derived values for application to onsite and offsite properties associated with the project area.

Quantitative Human Health and Ecological Risk Assessment (QHHERA), Old Crow, Yukon

Client: Government of Yukon

Title: Risk Assessor

Start/End Dates: September 2015 to Present

Scope/Description: Assessed the human health and ecological risk associated with historical hydrocarbon contamination in soil and suprapermafrost groundwater at the Nursing Station in Old Crow. Lead author of an SLRA to provide a preliminary evaluation of potential risks at the site. Lead author of the QHHERA, which included the interpretation of toxicity studies to determine the effects of hydrocarbon on the site's northern plants and soil invertebrates. The QHHERA was completed using Yukon, BC, CCME, and Health Canada methodology and will be used to develop remedial strategies and options for the site.

Due-Diligence for the Cornwall Harbour, Cornwall, Ontario

Client: Public Works and Government Services Canada (PWGSC)

Title: Risk Assessor

Start/End Dates: September to December 2015

Scope/Description: Technical Lead for the completion of a DDRA report, including the assessment of both human and ecological health. RA reporting was completed in accordance with O. Reg. 153/04 to potentially support an RSC following the proposed future divestiture of this federal property, managed by Transport Canada. Prepared and presented materials summarizing the results of the DDRA to stakeholders (including the City of Cornwall, First Nations, Transport Canada, and PWGSC).

Greenwich-Mohawk Brownfield, Brantford, Ontario

Client: City of Brantford

Title: Risk Assessor

Start/End Dates: February 2014 to Present

Scope/Description: Technical Lead for the completion of draft RA reports for two sites, including the assessment of both human and ecological health. Supported the development of the draft RA report for one other site and PSFs for all three sites. Reporting was completed to the requirements of O. Reg. 154/04. To meet the City's funding agreement deadlines and develop remedial targets, the draft RAs were

completed on a compressed schedule. Currently supervising the completion of three revised RAs to incorporate the remediated condition of these sites for Ministry review and eventual RSC filing.

Preliminary Quantitative Risk Assessment (PQRA) and Preliminary Quantitative Ecological Risk Assessment (PQERA) for the Wye Marsh National Wildlife Area, Midland, Ontario

Client: PWGSC

Title: Risk Assessor

Start/End Dates: November 2013 to March 2014

Scope/Description: Completed the human health portion of a PQRA to the requirements of HC for a trail area located on federal property, managed by Environment Canada and Climate Change. Tasks included compiling soil data into a database, contaminant screening, risk calculations, and reporting. Provided peer review for the ecological portion of the PQERA.

Sydenham-Pearl Brownfield; Brantford, Ontario

Client: City of Brantford

Title: Risk Assessor

Start/End Dates: June 2013 to February 2017

Scope/Description: Lead the preparation of a PSF submitted for Ministry review to support future RA and RSC filing for an industrial site to be sold and redeveloped for residential/parkland use. Lead the preparation of two draft RA reports to be used to guide risk management and remedial actions. Tasks included identification of contaminants of concern (COCs), identification of potentially complete human exposure pathways, exposure modelling, use of the Johnson & Ettinger Models, calculation of human health and ecological risk estimates, development of property-specific standards (PSSs), and associated reporting. Both RAs have been acknowledged by the Ministry.

West Don Lands (WDL); Toronto, Ontario

Client: Infrastructure Ontario (IO)

Title: RMM Verification Team Member

Start/End Dates: June to December 2011

Scope/Description: The largest brownfield site currently under development in Ontario, this former industrial site will encompass mixed-use residential and commercial development, as well as a substantial parkland component, having served as the Pan American Athletes' Village (PAAV) for the 2015 Pan/Parapan American Games (Pan Am Games). The PAAV housed over 8,000 athletes and coaching staff. This revitalization project involved an aggressive schedule to secure the environmental approvals required in advance of infrastructure and building construction by development partners. Site characterization, RA, remedial option feasibility studies (ROFSs), remediation, and RMMs are key project components. Jacobs conducted field investigations and prepared multiple Phase One and Phase Two ESA, ROFS, and RA reports in parallel to meet the development schedule. The reports complied with O. Reg. 153/04 under the *Environmental Protection Act*, as amended by O. Reg. 511/09, such that RSCs will be obtained on properties prior to development. Currently, Jacobs is acting as the third-party Ministry Qualified Person (QP) to audit compliance with the Certificates of Property Use (CPUs) and RAs during the implementation of the RMMs.

In October 2011, the WDL project was selected by the Canadian Urban Institute for the ***2011 Brownie Award*** as the project that best demonstrated ***Excellence in Project Development at the Neighbourhood Scale***. The annual Brownie Awards program recognizes leadership, innovation, and environmental sustainability in brownfield redevelopment across Canada.

As part of the RMM Verification team, performed quality assurance (QA) and quality control (QC) audits on received data, and compared constituent concentrations to RA-determined PSSs and Ministry Soil Cap Standards, as appropriate. Worked under the direction of the RMM Verification Coordinator to review documents and information from IO and other stakeholders to facilitate RMM verification and produce reportable documents (technical memorandums and other documents, as required).

RA and Risk Management Plan (RMP) for 55 Ontario Street, Kingston; Kingston, Ontario

Client: PWGSC

Title: Risk Assessor

Start/End Dates: November 2011 to August 2012

Scope/Description: Assisted with the development of a sampling and analysis plan (SAP) to bring the intrusive investigation reporting for the site up to date with the requirements of the revised provincial O. Reg. 153/04 for potential RSC filing for this federal property, managed by PWGSC. Tasks included compilation of soil and groundwater data into a database, contaminant screening, risk calculations, and reporting for both the ERA and HHRA portions of the RA report.

Contaminated Sediment Assessment for the Kingston Dry Dock; Kingston, Ontario

Client: PWGSC

Title: Risk Assessor

Start/End Dates: August 2011 to March 2012

Scope/Description: Assessment involved the evaluation of multiple lines of evidence related to sediment quality (including sediment chemistry, sediment toxicity, and the benthic invertebrate community) following the Canada-Ontario Decision-Making Framework for Assessment of Great Lakes Contaminated Sediments.

IO; Toronto, Ontario

Client: WDL

Title: HHRA and ERA Team Member

Start/End Dates: May to August 2010 and January 2011

Scope/Description: As a HHRA and ERA team member, responsible for ensuring the RA reports were completed with a high level of quality. Contributed to numerous technical aspects related to the development of the RA(s), including the completion of PSFs, identification of COCs for an environmentally sensitive site using Table 1 Site Condition Standards (SCS), automation of risk calculations, performance of risk calculations, development of PSSs, and implementation of various QC procedures. Also participated in the comment resolution process, ensuring client comments were appropriately addressed in the final products.

RA and RMP for the York Community Centre; Toronto, Ontario

Client: City of Toronto

Title: Risk Assessor

Start/End Dates: January 2010 to September 2013

Scope/Description: Lead author of an RA for the re-development of City-owned land to a community centre. Tasks included preparing a PSF, contaminant screening, compiling toxicity data, performing pathway analysis and risk calculations, and reporting for the HHRA and ERA. The RA was acknowledged by the Ministry.

RA and RMP for Port Stanley Harbour; Port Stanley, Ontario

Client: PWGSC

Title: Risk Assessor

Start/End Dates: March 2009 to January 2011

Scope/Description: Completed two RAs for the federally-owned Port Stanley Harbour, one each for the land-based portion of the site (assessing soil and groundwater) and one for the water lot portion (assessing sediment and surface water). Tasks included preparing a PSF, managing the database, contaminant screening, performing pathway analysis and risk calculations, and reporting for the HHRA and ERA sections within each RA. Prepared and presented materials to the public in two public information sessions as a part of the wider area of abatement designation for Port Stanley Harbour.

Environmental Consulting Standing Offer; Canadian Forces Base (CFB) Suffield, Alberta

Client: Defence Construction Canada (DCC)

Title: Risk Assessor

Start/End Dates: 2009

Scope/Description: Performed a technical review of historical reports related to HHRA and ERA, which evaluate chemical warfare agents and conventional contaminants at the experimental proving ground at CFB Suffield. The review was completed to develop project understanding and identify data gaps for additional investigations.

SLRA for Gods Lake Mine; Elk Island, Manitoba

Client: Mines Branch, Manitoba Science, Technology, Energy and Mines

Title: Risk Assessor

Start/End Dates: 2009 to 2010

Scope/Description: Assisted in the preparation of an SLRA for the Gods Lake Mine Site. Tasks include contaminant screening, risk calculations, and reporting for the HHRA and ERA. The results of the RA will be used to guide risk management actions through the development of a mine closure plan.

Aquatic RA; Ontario

Client: Confidential Client

Title: Risk Assessor

Start/End Dates: 2008 to 2010

Scope/Description: Conducted RA reporting to assess the effectiveness of stream rehabilitation work at a former manufacturing facility where investigations indicated that polychlorinated biphenyls (PCBs) were migrating offsite and that they were biologically available and may be having an adverse effect on the aquatic ecosystem within a local creek (sediment, surface water, and aquatic biota).

RA at Former Epton Facility; Kitchener, Ontario

Client: Confidential Client

Title: Risk Assessor

Start/End Dates: February 2007 to September 2009

Scope/Description: Completed revisions to the HHRA to address Ministry reviewer comments. Tasks included contaminant screening, pathway analysis, risk calculations, and reporting for the HHRA for an

industrial site. The Parcel 1 RA and RSC were acknowledged by Ministry. RAs for additional parcels are being considered.

RA and RMP for Don Valley Brickworks; Toronto, Ontario

Client: City of Toronto

Title: Risk Assessor

Start/End Dates: September 2006 to January 2009

Scope/Description: Tasks included contaminant screening, compiling toxicity data, pathway analysis, risk calculations, reporting, and drafting for the HHRA. Media assessed included soil, groundwater, sediment, and surface water. Additional tasks included gathering supporting information to facilitate the filing of an RSC. The RA was acknowledged by the Ministry.

Pre- and Post-Closure RAs; Deloro, Ontario

Client: Ministry

Title: Environmental Consultant

Start/End Dates: December 2006 to January 2007

Scope/Description: Assisted in the preparation of the Pre- and Post-Closure RAs for the Deloro Mine Site. Tasks include contaminant screening, risk calculations, and reporting for the HHRA portion of the RA. The results of the RA were used to develop site-specific cleanup criteria and further guide risk management actions.

Wellington Block Development RA; Hamilton, Ontario

Client: Hamilton Health Sciences

Title: Risk Assessor

Start/End Dates: December 2006

Scope/Description: Completed revisions to the HHRA to address Ministry reviewer comments. Tasks included contaminant screening, risk calculations, groundwater fate and transport modelling, and reporting. The RA was acknowledged by the Ministry.

SLRAs for Three Sites

Client: PWGSC

Title: Risk Assessor

Start/End Dates: September to December 2005

Scope/Description: Tasks included compiling toxicity values for COCs at each federally owned site (Fisheries and Oceans Canada), calculating dose assumptions for each exposure scenario, and assisted with report writing.

Jacobs

EDUCATION/QUALIFICATIONS

B.A.Sc., Environmental Engineering, University of British Columbia and University of Northern British Columbia (Joint Program), 2016 Graduation

Alexander Biczok, B.A.Sc

HYDROGEOLOGY

Distinguishing Qualifications

- 16 months of field experience for a variety of environmental monitoring and management programs in the mining and civil services industries
- Environmental engineering experience in the mining, civil services, and oil and gas industries

Relevant Project Experience

Imperial Oil Resources Kearl Project; Groundwater Flow and Contaminant Transport Model, Analysis and Report of Results

Start/End Dates: July – August 2017

Scope/Description: Used groundwater vistas to import and interpret results of a MODFLOW groundwater flow and contaminant transport simulation. Created export profiles of hydraulic head and several contaminant transport profiles. Calculated groundwater and contaminant discharge to river boundaries. Provided text and editing for client report. Wrote a technical memorandum, analyzing results and comparing data to a previous model.

Industrial Wastewater Treatment Plant-Engineering Capstone Design; Prince George, BC

Client: University of Northern British Columbia

Start/End Dates: September-December 2015

Scope/Description: Designed a wastewater treatment plant for an industrial client, which would allow a process stream to be recycled as boiler feed. Analyzed the client's wastewater stream for contaminants of concern, and identified effective treatment solutions for each to meet control objectives. Prepared design specifications for each treatment solution and recommended manufacturers and suppliers. Wrote a full technical report on the project for the client.

Borrow Pit Reclamation Design

Client: Suncor Energy

Start/End Dates: July – August 2015

Scope/Description: Designed a reclamation plan for a material borrow pit at an oil sands facility. Used MineScape (three-dimensional [3D] mapping and computer-aided design [CAD] software) in conjunction with aerial maps and site investigation reports, to identify hazards and reclamation objectives. Designed a new landscape to address slope stability, site drainage and appropriate soil cover. Provided a material balance estimate on soil stockpiles to identify surpluses and shortfalls in cover materials.

Water Conveyance System

Client: Suncor Energy

Start/End Dates: February 2015

Scope/Description: Designed a pump-and-pipe system to transport water across a tailings area. Used MineScape (3D mapping and CAD software) to examine the project area, plan a route, and calculate distance and height requirements. Performed necessary hydraulic calculations to identify the required pump specifications and suitable pipe size. Recommended a pump model and pipe material, based on available suppliers.

Regulation and Permit Assessment

Client: Suncor Energy

Start/End Dates: January – August 2015

Scope/Description: Reviewed current and legacy permits related to site activities and disturbed areas, in preparation for new closure plan submissions. Identified closure requirements from permits and organized them to be incorporated into new reclamation and closure work. Undertook document control work to ensure long-term accessibility of documents.

Boundary Bay Environmental Sampling Program

Client: Metro Vancouver

Start/End Dates: November 2014

Scope/Description: Carried out a water sampling program at offshore locations around the Metro Vancouver region. Prepared sampling equipment and material before field work began. Collected water samples from the surface and at depth, and took field measurements of water quality. Recorded results to environmental database software.

General Environmental Sampling; Northern Ontario

Client: Goldcorp Canada – Musselwhite Mine

Start/End Dates: 2011-2013 (May to August, each year)

Scope/Description: Responsible for a variety of field sampling and monitoring programs, including for mine tailings water, surface water, groundwater, offshore, acid rock drainage, dust, noise, and tailings dam stability. Collected samples and used field instruments to take in situ readings, where appropriate. Prepared sample equipment and materials before scheduled sampling days, and maintained inventory of equipment. Performed some in-house lab tests on water quality. Operated trucks, boats and all-terrain vehicles, and was transported in helicopters, to reach sample locations. Remained current on safe operating and work procedures for all field work.

Jacobs

EDUCATION/QUALIFICATIONS

B.A.Sc., Civil Engineering, University of Waterloo, Ontario

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer: Ontario

Jennifer L. Caron

SENIOR PROJECT ENGINEER AND RISK ASSESSOR

As a project engineer with Jacobs, Jennifer Caron has been involved in the management and execution of groundwater and soil cleanup programs for a variety of industrial and municipal clients for over 25 years. She has extensive experience in contaminant hydrogeology, site characterization, and Risk Assessment (RA) projects. Her role in site characterization and RA projects during the past 20 years has been primarily as lead risk assessor as well as report author for Phase One and Two Environmental Site Assessments (ESAs). She is a registered Professional Engineer in Ontario and a Qualified Person under Regulation 153/04 (ESA and RA). She has been responsible for developing the conceptual model, modelling, and exposure and risk characterization calculations, in addition to the evaluation of existing site data, data gap analysis and planning of Phase Two investigations for site characterization projects that have included a variety of contaminants. In addition, she is involved in various aspects of project management including: project scope and project budget development for Phase Two ESAs, RA and remedial programs, field program management and subcontractor and client invoice reviews.

Relevant Project Experience

Former Metal Processing Site, 721 Eastern Avenue, Toronto, Ontario

Client: General Motors of Canada Company

Title: Risk Assessor/Project Engineer

Start/End Dates: 2016 to Present

Scope/Description: Conducting an RA for MECP submittal for a portion of the property to be conveyed to the City of Toronto to facilitate development of the remaining portion of the property for commercial use. Jennifer has been involved in all aspects of the project. Supervised and assisted with the Phase One and Two ESA work across the whole of the Site which was conducted in support of the RA and long-term and development management of the Site, including budget development, project coordination and invoicing. Jennifer also coordinated the submittal of the technical studies required for the Plan of Subdivision and Zoning By-law Amendment Applications to the City of Toronto and ushered these through several iterations of development plans.

Monitored Natural Attenuation Assessment, Tiverton, Ontario

Client: Bruce Power

Title: Project Engineer/Risk Assessment

Start/End Dates: January 2020 to Present

Scope/Description: Jacobs has been assisting Bruce Power with two ongoing remediation projects at two Bruce B sites, referred to as the Bruce B Emergency Generators and the Bruce B Standby Generators since 2011. Our activities have included soil and groundwater investigations to delineate and assess the subsurface impacts as a result of released fuel oil at the sites, evaluation and selection of a mobile pump and treat system at each site, ongoing routine groundwater monitoring, sampling and data evaluation along with reporting and environmental consulting services. Jennifer has recently assisted with the detailed evaluation of site data in order to evaluate the effectiveness of the monitored natural attenuation approach selected for long term remediation at the Site, as well as updating the impact assessment for this approach.

Monitored Natural Attenuation Annual Monitoring Program, 521 King Street West, Kitchener, Ontario

Client: PolyOne

Title: Senior Reviewer

Start/End Dates: 2008 to Present

Scope/Description: Conducted senior review and assessment of data collected as part of an ongoing monitored natural attenuation program to assess movement of chlorinated solvents with groundwater. In 2013 this also included an assessment and presentation of onsite data collected as part of the source area bioaugmentation program.

Legal Counsel, Impacts to Adjacent Property from Chlorinated Solvent Plume, Ontario

Title: Risk Assessor/Project Engineer

Start/End Dates: November 2010 to 2019

Scope/Description: Reviewing other consultants' work and providing professional opinion regarding groundwater impacts and remedial activity associated with chlorinated solvent plume from adjacent property. Remedial activity includes an assessment of natural attenuation and RA. Has developed budget for ongoing work and assists with ongoing management of project.

Groundwater Assessment, Hamilton, Ontario

Client: Union Gas Limited

Title: Risk Assessor/Project Engineer

Start/End Dates: March 2009 to 2015

Scope/Description: Provided project support for a site impacted by historic chlorinated solvent and polychlorinated biphenyl (PCB) impacts. Worked with adjacent property owners to address MECP concerns regarding potential offsite impacts, attenuation of the identified groundwater plume and movement of PCBs in the sewer system. Previously completed 1998 Human Health Risk Assessment (HHRA) for the property. In 2014 assisted with coordination of specific environmental aspects of the decommissioning of the Site, in particular addressing contaminant migration pathways to storm sewers through evaluation of remedial options, cost estimates for work and coordination of subcontractors selected to conduct decommissioning work.

Human Health and Ecological RA, Brantford, Ontario

Client: Union Gas Limited

Title: Risk Assessor

Start/End Dates: January 2008 to 2015

Scope/Description: Conducted an RA at a former coal gasification site under the Ontario Regulation (O. Reg) 153/04. Also conducted an updated Phase I and Phase II ESA for the property including

management of task budgets and coordination of field work associated with ESAs and RA. The primary chemicals of concern included polycyclic aromatic hydrocarbons (PAHs) and benzene, toluene, ethylbenzene, and xylenes (BTEX) and a preliminary evaluation of fate and transport of the chemicals of concern in the groundwater system. Other receptor pathways considered included vapour intrusion and direct contact with soils. RA was been submitted to MECP and involved extensive Risk Management Measures. Also assisted with project management and technical support for focused risk management remedial activities to address contaminant migration pathways through onsite storm sewers.

Phase Two Investigation and Due-Diligence Risk Assessment (DDRA), Cornwall, Ontario

Client: Public Works and Government Services Canada (PWGSC)

Title: Project Engineer/Hydrogeologist

Start/End Dates: January 2015 to February 2016

Scope/Description: Responsible for geological and hydrogeological portions of Phase Two ESA including interpretation of hydraulic conductivity testing and in support of DDRA on large complex Harbour site. Recommended and then directed scope of work for Soil Vapour Investigation (SVI) in support of DDRA and prepared the SVI report.

Phase Two Investigation, Port Stanley, Ontario

Client: PWGSC

Title: Project Engineer/Hydrogeologist

Start/End Dates: January 2012 to March 2013

Scope/Description: Responsible for geological and hydrogeological portion of Phase Two Investigation including interpretation of hydraulic conductivity testing and interactions with surface water in support of Risk Assessment on large complex site on shore of Lake Erie.

Environmental Data Gap Analysis, CFB/ASU Petawawa Range and Training Area 2/DF

Client: Department of National Defence

Title: Project Engineer/Hydrogeologist

Start/End Dates: February to March 2013

Scope/Description: Provided review and hydrogeological/geology input to assist with gap analysis.

Phase Two Investigation, Port Hope, Ontario

Client: PWGSC

Title: Project Engineer/Hydrogeologist

Start/End Dates: March 2013

Scope/Description: Responsible for geological and hydrogeological portion of Phase Two Assessment, including interpretation of hydraulic conductivity testing and interactions with surface water.

Monitored Natural Attenuation Annual Monitoring Program, St. David Street, Kawartha Lakes, Ontario

Client: City of Kawartha Lakes

Title: Senior Reviewer

Start/End Dates: 2008 to Present

Scope/Description: Conducted senior review and assessment of data collected as part of the ongoing monitored natural attenuation program to assess movement of chlorinated solvents with groundwater.

Phase Two Investigation, Port Hope, Ontario

Client: PWGSC

Title: Project Engineer/Hydrogeologist

Start/End Dates: March 2013

Scope/Description: Responsible for geological and hydrogeological portion of Phase Two Assessment including interpretation of hydraulic conductivity testing and interactions with surface water.

Focused Risk Assessment, Kitchener, Ontario

Client: PolyOne

Title: Risk Assessor

Start/End Dates: January to May 2009

Scope/Description: Completed a focused RA to evaluate potential risk from vapours emanating from chlorinated hydrocarbon-impacted groundwater. The objective of this project is to provide a document for the property owner to obtain re-financing of their property.

Publications/Presentations

Presented at 2002 Society for Risk Analysis Meeting in New Orleans, LA. Presentation entitled: Methodology for Evaluating Vapor Transport from Free Phase versus Dissolved Phase PHC Mixtures in the Subsurface and its Significance to Indoor Air Quality.

Presented at 1999 Society for Risk Analysis Meeting in Atlanta, GA. Presentation entitled: Development of Human Health Risk Model and Validation for Indoor Air Exposure to Hydrocarbons.

Jacobs

EDUCATION/QUALIFICATIONS

B.Sc., Wildlife Biology & Conservation, University of Guelph, 2014

Minor in Statistics, University of Guelph, 2014

Dipl., Environmental Technician, Seneca College, 2017

Jennifer (Jenny) Mannisto, B.Sc., Dipl.

ENVIRONMENTAL SCIENTIST

Jennifer is an Environmental Scientist with over 2 years of experience in the environmental consulting industry. Her areas of expertise include environmental assessments, including conducting human health risk assessments (HHRAs), ecological risk assessments (ERAs), and Phase One environmental site assessments (ESAs); data entry and processing; client communication; and writing technical reports. She has prepared numerous technical reports including pre-submission forms (PSFs), Phase I/ One and Phase II/ Two ESAs, groundwater monitoring reports, soil management plans (SMPs), and comprehensive risk assessments (RAs). Her skills include calculating risk estimates, reporting, and data management. She is familiar with provincial and federal environmental legislation, such as Ontario Regulation (O. Reg.) 153/04 (as amended) and the Record of Site Condition (RSC) filing process.

Distinguishing Qualifications

- Experience working in environmental consulting, including report writing, data processing and analysis, and risk calculations for Risk Assessments.
- Excellent communication skills demonstrated through the ability to collaborate with project team members and clients.

Relevant Project Experience

Port Lands Flood Protection and Enabling Infrastructure; Toronto, Ontario

Client: Waterfront Toronto

Title: Technical Support Coordinator, and Junior Risk Assessor

Start/End Dates: September 2017 to present

Scope/Description: The Port Lands Flood Protection and Enabling Infrastructure (PLFP) project is a $1B remediation and redevelopment project in Toronto, Ontario. PLFP will create a new, naturalized river valley at the mouth of the Don River and additional flood protection infrastructure to allow redevelopment of the Port Lands.

Jacobs is working closely with Waterfront Toronto to revitalize the Port Lands through development of the site geo-environmental characterization, environmental site investigation, and risk assessments. Jennifer's involvement with this large scale project is extensive. She runs weekly meetings with the client, works directly with the third parties completing the field investigative work, manages incoming data, and works on various deliverables including PSFs, RAs, Phase Two ESAs, SMPs, risk management plans, and developing strategies for soil reuse, among others. Jennifer has been described as a valued and integral member of the team.

West Don Lands; Toronto, Ontario

Client: Infrastructure Ontario

Title: Environmental Scientist

Start/End Dates: November 2017 to present

Scope/Description: The largest brownfield site development in Ontario, this former industrial site encompasses a mixed-use residential and commercial development, as well as a substantial parkland component, after it served as the Pan American Athletes' Village (PAAV) for the 2015 Pan/Parapn American Games (Pan Am Games).

A certificate of property use (CPU) issued by the Ontario Ministry of Environment, Conservation and Parks (Ministry) identifies specific risk management measures (RMMs) within each RA group. Jennifer has been involved in writing requests for CPU amendments and revoking CPU requirements, a site plan, groundwater monitoring reports, barrier inspection reports, soil vapour reports, as well as writing the annual reports for the RA groups within the West Don Lands (WDL). Some of these deliverables have required data and trend analyses of soil and groundwater quality, data comparison to property-specific standards and MECP site condition standards, and risk evaluation calculations.

City of Toronto Roster; Toronto, Ontario

Client: City of Toronto

Title: Environmental Scientist

Start/End Dates: November 2018 to present

Scope/Description: As part of a Standing Offer agreement with the City of Toronto, environmental consulting services for all scopes and sizes are provided.

Jennifer has completed numerous Phase One/ I ESA reports; developing SMPs, health and safety plans, and barrier inspection plans; working on PSFs and RAs; and completing remediation reports.

Coastal GasLink Pipeline Project; British Columbia

Client: Coastal GasLink

Title: Environmental Scientist

Start/ End Dates: June 2019 to present

Scope/ Description: The Coastal GasLink Pipeline Project is an approximately 670-kilometre natural gas transmission pipeline between the communities of Groundbirch and Kitimat, British Columbia (BC). Coastal GasLink has been concerned about environmental liabilities within the site footprint. Jennifer has completed seven due diligence Phase I ESA reports to date to identify any potential risk of contamination for each of the identified sites. She completed the desktop portion of the reports, including the review of historical reports, information from municipal and provincial databases, and preparing reports.

Third-Party Verification of Greenhouse Gas Emissions; Global

Client: Vermillion Energy Inc.

Title: Data Analyst/ Emission Auditor

Start/ End Dates: February 2019 to July 2019; January 2020 to present

Scope/ Description: Annually, Jacobs conducts a third-party verification of greenhouse gas (GHG) emissions from various sources for Vermilion's Carbon Disclosure Report. The verification provides a limited level of assurance that the reported emissions are reliable and accurate, and are sufficient for its intended use.

Jennifer reviewed the 2018 and 2019 GHG emission inventory and performed a desk-top audit for completeness, transparency, consistency, and accuracy for each of the 8 countries for which data was provided. An assessment of risk in the documentation and a magnitude and sensitivity analysis was conducted on the data.

Cherry Street Stormwater and Lakefilling; Toronto, Ontario

Client: Waterfront Toronto

Title: Environmental Scientist

Start/End Dates: May 2018 to March 2020

Scope/Description: As part of the overall PLFP project, the Cherry Street Stormwater and Lakefilling (CSLF) Project created new landmass around the existing Essroc Quay land through lakefilling in Toronto, Ontario. The new landmass will help to stabilize the area shoreline under flood conditions, as well as improve water quality, optimize water and storm infrastructure, and create new naturalized open spaces and aquatic habitat.

Before importing soil to the site, a third party tested the quality of soil materials from the proposed source sites. Jacobs acted as the receiving site Qualified Person (QP). As part of the Jacobs team, Jennifer evaluated the sample results for approval of importation to the Site. Soil quality was compared to applicable lakefilling standards, while naturally occurring compounds, urban contaminants, biogenic organic compounds, and chemicals pertinent to shallow soil were additional factors that were considered. Additionally, Jennifer documented lakefilling activities and developed a Site Plan for the CSLF Project area.

Plastics Circular Economy; Guam

Client: Guam Environmental Protection Agency

Title: Environmental Scientist

Start/ End Dates: January 2020 to March 2020

Scope/ Description: Jacobs is working with the Guam Environmental Protection Agency (EPA) to develop a plastics circular economy, the goal of which is to eliminate unnecessary plastics, ensure the plastics needed are reusable, recyclable, or compostable, and recirculate those needed plastics within the economy so as to minimize the depletion of resources and materials being sent to landfill. Jennifer was involved in gathering and reviewing information specific to Guam's current recycling situations, including on-island and off-island markets; researching current management systems; reviewing solutions and emerging innovative technologies, and providing recommendations.

George Street Revitalization; Toronto, Ontario

Client: Infrastructure Ontario

Title: Environmental Scientist

Start/End Dates: March 2018 to April 2018

Scope/Description: George Street Revitalization will see the reinvention of the northernmost block of George Street and transform Seaton House men's shelter into a world-class facility providing specialized care for vulnerable populations, including a long-term care home, a transitional living facility, an emergency shelter, affordable housing, and a community hub serving residents of both the site and the local neighbourhood. Jennifer aided in the research and writing of two Phase One Environmental Site Assessment reports in accordance with O. Reg. 153/04, with one being filed to support filing an RSC.

Jacobs

EDUCATION/QUALIFICATIONS

B.A.Sc., Environmental Engineering (Chemical Specialization), University of Waterloo

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer: Ontario (Licence 100184628)

PROFESSIONAL DEVELOPMENT

40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training

Workplace Hazardous Material Information System (WHMIS)

Ministry Waste Comprehensive Certificate of Approval Orientation Session

Fundamentals of Engineering Examination (Michigan, U.S.)

CH2M Environmental Design Manager Training

Tania McCarthy

ENVIRONMENTAL SCIENTIST

Tania McCarthy has over 16 years of experience in environmental services, specializing in Phase I and II and One and Two Environmental Site Assessments (ESAs), contaminated site characterization, remedial investigations, Risk Assessments (RAs), and preparation of Records of Site Condition (RSCs) for various sites in Canada. Her experience also includes fill/soil management plans, solid waste management and landfill gas (LFG) projects within Ontario; and site assessments, remediation, and monitoring reports for projects within the United States (U.S.).

Distinguishing Qualifications

- More than 16 years of experience in providing environmental services, including high profile projects
- Involved in Phase One and Two ESAs, Remedial Investigations, RAs, and RSCs under Ontario Regulation (O. Reg.) 153/04, as amended
- Qualified Person for Environmental Site Assessment (QP_{ESA}) under the Ontario Ministry of the Environment, Parks and Conservation (MECP)

Relevant Project Experience

Port Lands Flood Protection and Enabling Infrastructure Project; Toronto, Ontario

Client: Waterfront Toronto

Title: Project Engineer/QP_{ESA}

Start/End Dates: 2015 to Present

Scope/Description: Responsible/Lead for ESA portions of a Community Based Risk Assessment (CBRA) to support the construction of a river valley through the CBRA Project Area (101 hectares within the Port Lands); Environmental Lead/provided senior review on several Conceptual Site Models (CSMs) for PSF/RA submissions and several Phase Two ESA Reports for properties within the Port Lands area requiring eventual RSC filing prior to redevelopment for multiple land uses.

Former IMICo Site, Guelph, Ontario

Client: City of Guelph

Title: Project Engineer and Coordinator

Start/End Dates: 2017 to Present

Scope/Description: Environmental Lead/ Project Engineer for a former industrial site in Guelph, primarily impacted with VOCs in bedrock groundwater, requiring eventual RSC filing to support the change in land use. Involvement included the review and compilation of historical data

for the completion of a Phase One ESA report, the development of the sampling and analysis plans to support the completion of a Phase Two ESA, PSF and eventual RA for the Site, client communication.

Greenwich Mohawk Brownfield; Brantford, Ontario

Client: City of Brantford

Title: Environmental Scientist/Coordinator

Start/End Dates: 2012 to 2014; 2019

Scope/Description: Responsible for the completion of Phase One Site assessments, drafting Phase One and Two ESA reports and preparation of the Certificates of Property Use (CPUs) in accordance with the amended O. Reg. 153/04 on three former industrial properties covering approximately 21 hectares (ha). Tasks involved database management, and coordination of presentations and meetings with the client, and for public information sessions for an industrial site such that RSCs could be obtained on properties prior to redevelopment for multiple land uses. Involved in the review and consolidation of chemical and geological data from numerous historical investigations completed by others to determine data gaps and plan subsequent investigations. The contaminants include benzene, toluene, ethylbenzene, and xylenes (BTEX) and petroleum hydrocarbons (PHCs); volatile organic compounds (VOCs) and heavy metals in soil; and polycyclic aromatic hydrocarbons (PAHs), PHCs, and chlorinated VOCs in groundwater.

Former Calcium Chloride Plant, Amherstburg, Ontario

Client: Amherstburg Land Holdings

Title: Project Engineer and Scientist

Start/End Dates: 2012 to 2018.

Scope/Description: Environmental support for the decommissioning activities on a 300,000-square-foot (ft^2) former chemical production facility. Coordination of groundwater monitoring and reports, delineation investigations, remediation, sampling plans for stockpiles and imported fill. Database management and ESA reporting to support an RA on the property required for potential sale. RA activities also included helping develop a strategy document for submission to the Ontario Ministry of the Environment, Conservation and Parks (Ministry), and supporting RA calculations, data management, and characterization of the property.

Arsenic Impacted Soils Remediation; Windsor, Ontario

Client: Windsor Detroit Bridge Authority

Title: Environmental Lead/QP_{ESA}

Start/End Dates: 2017 to 2018

Scope/Description: Responsible for the development of a data gap assessment, and soils management plan associated with an arsenic impacted soils remediation project of lands associated with the construction of the new Gordie Howe International Bridge. Soil and groundwater at the site and that associated with the excavation, backfill and capping were compared to site specific criteria developed based on a combination of the federal and provincial guidelines.

Sydenham-Pearl Brownfield; Brantford, Ontario

Client: City of Brantford

Title: Environmental Coordinator/Project Engineer

Start/End Dates: 2012 to 2018

Scope/Description: Responsible for the completion of Phase One Site assessments, drafting Phase One and Two ESA reports, and filing RSCs in accordance with the amended O. Reg. 153/04 on two former industrial properties approximately 6.2 ha in size. Tasks involved database management, and coordination of presentations and meetings with the client, and for public information sessions. Assisted and provided technical input on remedial option strategies for the industrial sites such that RSCs could be obtained on properties prior to redevelopment for multiple land uses. Involved in the review and consolidation of chemical and geological data from numerous historical investigations completed by others to determine data gaps and plan subsequent investigations. The main contaminants on the properties include PHCs, VOCs, and heavy metals in soil, and PHCs and chlorinated VOC in groundwater.

Bus Rapid Transit Expansion Project, York Region, Ontario

Client: York Region Rapid Transit Commission

Title: Environmental Specialist

Start/End Dates: 2018

Scope/Description: Provided technical advisory and construction oversight services for environmental activities associated with the bus rapid transit expansion project for the Highway 7 and the Yonge Street segments. Provided peer review and cost verification of costs of site assessments, sampling plans, remedial action plans, and remediation reports.

Various City Water and Sewer Projects, Toronto, Ontario

Client: Metrolinx

Title: Environmental Specialist

Start/End Dates: 2017 to 2018

Scope/Description: Provided environmental advisory and technical review for various environmental sampling programs, investigations and reports.

Environmental Advisory Services, Historical Chemicals Plant; Brampton, Ontario

Client: Reichhold Inc. Facility

Title: Environmental Scientist

Start/End Dates: 2010 to 2014

Scope/Description: Provided environmental advisory services as required for the management of environmental conditions associated with a former chemicals plant. Services provided included the preparation and implementation of an annual groundwater quality monitoring program, including installation of additional investigation locations, remediation activities, and the consolidation of over 50 documents into a comprehensive summary document for submission to the Ministry, which included past soil and groundwater investigations, remediation activities, soil gas sampling activities in support of an RA program, and monitoring of an ongoing phytoremediation program.

West Don Lands (WDL); Toronto, Ontario

Client: Infrastructure Ontario (IO)

Title: ESA Coordinator and Team Member

Start/End Dates: 2010 to 2013

Scope/Description: The largest brownfield site currently under development in Ontario, this former industrial site encompasses mixed-use residential and commercial development, as well as a substantial parkland component, after it served as the Pan American Athletes' Village (PAAV) for the 2015 Pan/Parapan American Games (Pan Am Games). The PAAV housed over 8,000 athletes and

coaching staff. This revitalization project involved an aggressive schedule to secure the environmental approvals required in advance of infrastructure and building construction by development partners. Site characterization, RA, remedial option feasibility studies (ROFSs), remediation, and risk mitigation measures (RMMs) are key project components. Jacobs conducted field investigations and prepared multiple Phase One and Phase Two ESA, ROFS, and RA reports in parallel in order to meet the development schedule. The reports complied with O. Reg. 153/04 under the *Environmental Protection Act*, as amended by O. Reg. 511/09, such that RSCs could be obtained on properties prior to development. Currently, Jacobs is acting as the third-party Ministry Qualified Person (QP) to audit compliance with the Certificates of Property Use (CPUs) and RAs during the implementation of the RMMs.

In October 2011, the WDL project was selected by the Canadian Urban Institute for the ***2011 Brownie Award*** as the project that best demonstrated ***Excellence in Project Development at the Neighbourhood Scale***. The annual Brownie Awards program recognizes leadership, innovation, and environmental sustainability in brownfield redevelopment across Canada.

Responsible for coordinating and providing technical support for the preparation of 5 Phase One ESA reports, 8 Phase Two ESA reports (including 8 additional investigation and remediation reports), 2 preliminary Phase Two ESA summary memos, and 13 RSCs for the 63-Block on the WDL. The accelerated schedule and multiple stakeholder input characterizing Phase Two ESA reports have required us to implement best practices and templates that facilitate schedule and quality compliance. The ESA team evaluated data at approximately 195 areas of potential environmental concern (APECs) and 1,933 sample locations across the site. Data generated were being used to build the conceptual site model (CSM) for each Phase Two grouping of blocks, to feed information into eight RA reports, and to develop the CSMs supporting filing RSCs for the properties.

Limited Phase I and II ESA; Ingersoll, Ontario

Client: Loblaws Properties Limited

Title: Site Assessor

Start/End Dates: 2013

Scope/Description: Completed a limited Phase I and II ESA for due diligence, which included the review and consolidation of past investigations completed by others, and a borehole and groundwater monitoring well installation program.

Wallace Avenue Site; Toronto, Ontario

Client: Akzo Nobel

Title: Environmental Scientist

Start/End Dates: 2012 to 2013

Scope/Description: Professional environmental services to support a response to an Ministry audit on an RSC completed by another consultant. Work included a review of existing soil and groundwater data, additional field investigations, and corrections to the RSC submission.

Hydrogeological Investigation Program; Thunder Bay, Ontario

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2009 to 2013

Scope/Description: Preparation of a Hydrogeological Investigation Program Report on the characterization of a closed landfill and the surrounding physical setting to characterize waste, and geological and hydrogeological setting of the landfill, as well as assess the potential for migration of

contaminants. Additional environmental services included the preparation of an Environmental Compliance Approval (ECA) Application for the post-closure maintenance, the supporting documentation and financial assurance, and a monitoring report.

Various projects, Toronto, Ontario

Client: General Motors of Canada Limited

Title: ESA Coordinator

Start/End Dates: 2012

Scope/Description: Responsible for the completion of Phase I and II ESAs in accordance with CSA Group (CSA) standards for the potential sale of the property.

Confidential Project; Strathroy, Ontario

Client: Meridian Technologies

Title: Environmental Scientist

Start/End Dates: 2010 to 2011

Scope/Description: Preparation of a technical memorandum on the extent of contamination of chlorinated VOCs in groundwater on the project site with relation to the known contamination on an adjacent property.

Phase I and II ESAs, Erb Street; Waterloo, Ontario

Client: City of Waterloo

Title: Environmental Scientist

Start/End Dates: 2009 to 2010

Scope/Description: Completion of Phase I and II ESAs, including the coordination of site activities and the completion of Phase I and II reports.

Groundwater Sampling Program; Oshawa, Ontario

Client: General Motors Canada

Title: Environmental Scientist

Start/End Dates: 2009 to 2010

Scope/Description: Coordination of field work, and preparation of a groundwater sampling report.

Multiple Project Sites

Client: TransCanada Pipelines

Title: Environmental Scientist

Start/End Dates: 2009 to 2010

Scope/Description: Coordination of field work, and preparation of investigation and sampling reports for various TransCanada Pipeline sites in Bracebridge, Kapuskasing and Maple, Ontario.

Cambridge Landfill; Cambridge, Ontario

Client: Region of Waterloo

Title: Environmental Scientist

Start/End Dates: 2009 and 2010

Scope/Description: Provided support for the completion of an annual monitoring report.

Site Closure of Highway Service Centres; Southern Ontario

Client: IO

Title: Environmental Scientist

Start/End Dates: 2009 to 2009

Scope/Description: Completion of RSC requirement reports, baseline conditions reports, water supply and sewage system reviews, and site visits during remedial works for 23 service centre sites across Ontario, to support the property redevelopment and transfer of leases of the highway service centres.

Nanticoke Generation Station; Nanticoke, Ontario

Client: Ontario Power Generation

Title: Environmental Scientist

Start/End Dates: 2009

Scope/Description: Preparation of various documentation to support the decommissioning of fuel-oil tanks.

Pottersburg Creek Polychlorinated Biphenyls (PCB) Vault Remediation; London, Ontario

Client: Ministry

Title: Environmental Scientist

Start/End Dates: 2009

Scope/Description: Provided support for the completion of a Phase I ESA and ongoing remediation and excavation activities to support the decommissioning of PCB vaults, including removal and transportation of soil for destruction.

Humberstone and Bridge Street Landfill; Ontario

Client: Niagara Region

Title: Environmental Scientist

Start/End Dates: 2009

Scope/Description: Preparation of alternatives for landfill expansion, including volume estimates and cost evaluations.

Stisted Landfill; Huntsville, Ontario

Client: Regional District of Muskoka

Title: Environmental Scientist

Start/End Dates: 2009

Scope/Description: Various support work for the proposed evapotranspiration cover and closure report for the landfill.

Experience Prior to Jacobs

Groundwater Well Installation and Monitoring Program; Brampton, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2008

Scope/Description: Coordination and supervision of the installation and repairs of monitoring wells; monitoring, sampling, and analysis of results; and reporting.

Surficial Soil Sampling Program; Brampton, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2008

Scope/Description: Coordination and completion of a semiannual surficial soil sampling program, analysis of results, and reporting.

Environmental Management Systems (EMS); Toronto, Ontario

Client: Confidential Client;

Title: Environmental Scientist

Start/End Dates: 2008

Scope/Description: Coordination and involvement in various EMS projects, including asbestos survey, waste audit, and sanitary and stormwater sampling.

Surface Water Sampling Program; Niagara Falls, Ontario

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2008

Scope/Description: Coordination and completion of surface water sampling requirements for Municipal Industrial Strategy for Abatement (MISA) program, analysis of results, and reporting.

Soil Remediation; Niagara Falls, Ontario

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2008

Scope/Description: Conducted oversight for a remedial excavation program of impacted soils; completed analysis of results and reporting.

Closed Landfill; Toronto, Ontario

Client: City of Toronto

Title: Environmental Scientist

Start/End Dates: 2008

Scope/Description: Provided drilling oversight for the installation of an LFG management system.

Various projects, Toronto, Ontario

Client: Confidential Clients

Title: Environmental Scientist

Start/End Dates: 2006 to 2008

Scope/Description: Coordinated and conducted installation of monitoring wells, coordinated and provided oversight for well maintenance and repairs, and conducted single-well response tests, conducted groundwater sampling, analyzed results, and completed reporting.

Various Industrial Sites

Client: Various Clients

Title: Environmental Scientist

Start/End Dates: 2006 to 2008

Scope/Description: Coordinated and conducted groundwater monitoring and sampling programs at numerous sites.

Three PHC-impacted Sites; Toronto, Ontario

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2006 to 2008

Scope/Description: Coordinated and conducted monthly maintenance, monitoring, and sampling of water treatment systems; conducted quarterly groundwater sampling; analyzed results; and completed reporting.

Bedford PCB Remediation; Indiana, U.S.

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2003 to 2006

Scope/Description: Provided project support for the completion of corrective actions, and remedial investigations and feasibility studies (RI/FSs). Provided coordination and oversight of quality assurance (QA) and quality control (QC) activities. Facilitated e-Monitor software implementation. Conducted air, soil, sediment, and surface water sampling.

Former Assembly Plant; Massachusetts, U.S.

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2003 to 2006

Scope/Description: Provided project support for the completion of a RI/FS and remedial implementation programs, including the completion of detailed cost analysis, and present worth and annual costs. Completed various management and coordination tasks, including invoicing, scheduling, budgeting, and change orders.

Former Lagoon Site; New York, U.S.

Client: Confidential Client

Title: Environmental Scientist

Start/End Dates: 2003 to 2005

Scope/Description: Provided project support for a natural attenuation former lagoon site on monitoring reports and natural attenuation study. Reviewed human health and ecological RAs. Completed various management and coordination tasks, including invoicing, scheduling, budgeting, and change orders.

Jacobs

Victoria Peters, GIT

ENVIRONMENTAL SCIENTIST

EDUCATION/ QUALIFICATIONS

Bachelor of Science in Environmental Sciences, (B.Sc. Env.), Earth and Atmospheric Science, University of Guelph, Ontario

Post-degree studies, Earth Science, University of Waterloo, Ontario

REGISTRATIONS/ CERTIFICATIONS

Geoscientist-in-Training – Association of Professional Geoscientists of Ontario (APGO)

OSHA 40 HR HAZWOPER, 2017

8 HR HAZWOPER Refresher, 2018, 2019

Standard First Aid, CPR C & AED, July 2017

Ground Disturbance Supervisor, 2019

Contaminant & Hazardous Waste Site Management, 2017

WHMIS 2017

Victoria joined Jacobs as a Junior Environmental Scientist in 2017, working in the Federal and Environmental Solutions Group from Jacobs' Kitchener office. Victoria has experience preparing technical reports, including Phase One and Two Environmental Site Assessments (ESAs), sediment characterization technical memorandums, and soil management plans. She also has experience working on remedial excavations and environmental monitoring projects, including soil and groundwater sampling, surface water and sediment sampling, and test pit installation and confirmatory sampling. Victoria has experience with the Ontario *Clean Water Act* and source water protection and has conducted drinking water threat inventories for a regional municipality.

Relevant Project Experience

Technical Writer; Soil Management Plan; Confidential Client; Great Lakes, Ontario; 2017 to present. Responsible for the preparation of a Soil Management Plan in consultation with the Ministry of the Environment, Conservation, and Parks, and Environment and Climate Change Canada, for the remediation of PAH and PCB impacted sediments in Lake Ontario.

Field Technician/Junior Environmental Site Assessor; Phase Two Environmental Site Assessment; City of Guelph; Ontario 2018 to present. Supported completion of Phase Two Environmental Site Assessments (ESA) reporting in accordance with O. Reg 153/04 for two sites in preparation for future development, including a NAPL impacted site. Tasks included providing technical support for the preparation of a Phase Two ESA report, including technical writing and data analysis, as well as field tasks including drilling and monitoring well installation, groundwater sampling using passive sampling methods, and hydrogeological investigation and analysis of hydraulic conductivity tests.

Construction Oversight; Remedial Excavations; ATCO Electric; Grande Prairie, Alberta. Supervised the remedial excavations of pesticide impacted soils in two residential areas in Grande Prairie. Responsible for confirmatory sampling of remedial excavations and backfilling sources, and confirming quantities for payment certificates.

Field Coordinator; Quarterly Groundwater Sampling; Amherstburg Land Holdings; Ontario; 2017 to present. Coordinated annual and quarterly groundwater monitoring program evaluating surface water and groundwater. Collected groundwater samples and a water level snapshot of a series of shallow and deep monitoring wells, as well as groundwater seeps and surface water samples from nearby creeks. Coordinated and authored technical memorandums and annual reports on the results of the quarterly and annual sampling. Monitored flow in nearby creek and collected samples during high flow events.

Junior Environmental Site Assessor; Phase Two Environmental Site Assessment; Waterfront Toronto – Portlands; Toronto, Ontario; 2018 to present. Worked as part of a team to prepare the Phase Two ESA for various Records of Site Condition (RSCs) for the Toronto Portlands. Responsible for evaluating soil and groundwater data, confirming delineation of the contaminants of concern, preparation of sampling and analysis plans, and report writing.

Field Technician; Bi-Annual Groundwater Sampling; Nouryon; Cornwall, Ontario; 2018 to present. Supported Bi-annual groundwater and landfill gas monitoring program. Collected water levels for groundwater modeling and groundwater samples from a VOC impacted site using passive sampling methods.

Field Technician; Confirmatory Sampling of Potential Fill Sources; Amherstburg Land Holdings; Windsor, Ontario; 2018 to present. Confirmatory sampling and review of analysis to determine acceptability of potential fill sources. Desktop review of potential fill locations to determine analytical requirements. Supervision of test pit installation and responsible for the collection of soil samples. Review of analytical results and the determination of acceptability of the material based on the project's Fill Management Plan.

Construction Inspector; Arsenic Impacted Soils Remediation Project; Windsor Detroit Bridge Authority; Ontario; 2018. Performed construction oversight for the remediation of arsenic impacted soils associated with the construction of the new Gordie Howe International Bridge. Monitored site activities including the remedial excavation, backfilling, monitoring well decommission, and stockpile construction. Assisted with contract administration duties including confirming quantities for payment certificates, and drafting and distributing meeting minutes. Responsible for confirmatory sampling of remedial excavations, backfilling sources and capping materials. Liaise with contractor regarding work to be completed and contractual expectations.

Field Technician; Environmental Drilling in Thermal Remediation; Confidential Client; Sarnia, Ontario; 2018. Drilling in thermal remediation to determine efficacy of the treatment system and characterization of VOC impacted soils. Field supervised a drilling crew during borehole investigations and impact delineation. Collected environmental soil samples for confirmatory analysis of VOCs to determine the efficacy of the treatment system, and the delineation of areas that required ongoing treatment.

Field Support/Junior Environmental Site Assessor; Phase One and Two ESA for a Confidential Project; Infrastructure Ontario; Toronto, Ontario; 2017. Supported completion of Phase One Site assessments of three land parcels, drafting Phase One ESA reports in general accordance with O. Reg. 153/04. Tasks involved providing technical support for the preparation of the 3 Phase One ESA reports, and field support for environmental and geotechnical investigations for one Phase Two ESA report.

Field Support/Technical Writer; Stormwater Management Facility Sediment Analysis; Guelph, Ontario, 2017 to 2019. Collected sediment samples from stormwater management ponds to determine the suitability of the sediment for alternative uses and divert the sediment from going to the landfill. Activities included working safely around water, communicating professionally with members of the public, following proper sampling and material handling procedures, and follow up data management. Analysis included chromatogram comparisons of PAH and PHC sources to samples collected.

Jacobs

EDUCATION/QUALIFICATIONS

M.A.Sc., Chemical Engineering, University of Toronto

B.Eng., Environmental Engineering, National University of Singapore

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer: Alberta and Ontario

QP_{ESA} (O. Reg. 153/04)

QP_{RA} (O. Reg. 153/04)

Travis Tan

ENVIRONMENTAL PROJECT MANAGER

Travis has over 11 years of experience in the environmental field, specializing in providing solutions for brownfield redevelopment, including risk assessment, risk management, and remediation.

Travis is a Qualified Person for Environmental Site Assessment (QP_{ESA}) as defined by Ontario Regulation (O. Reg.) 153/04. He has managed and provided senior technical oversight on environmental site assessment (ESA) work for more than 100 sites across Ontario and Alberta. These sites include a 69-hectare (ha) (170-acre) former power plant, an operating aircraft manufacturing facility, a 101-ha (250-acre) former chemical manufacturing plant, a 36-ha (90-acre) former wood treatment plant, and retail gasoline stations.

Travis has extensive experience in providing solutions for brownfield redevelopment and management of environmental liability. He has been involved in planning and managing risk assessments, including risk management plans (RMPs), and environmental remediation for complex brownfield sites. As a Qualified Person for Risk Assessment (QP_{RA}) as defined by O. Reg. 153/04, Travis has worked on approximately 30 risk assessments (RAs) on sites across Ontario, of which 15 have been accepted by the Ontario Ministry of the Environment, Conservation and Parks (MECP), and Records of Site Condition (RSCs) were subsequently filed.

Travis has provided due diligence consultation on numerous property transactions, including one valued at more than $200 million. He has also provided technical support for some of the top environmental attorneys in Ontario, and served as expert witness on environmental litigation.

Travis holds a Bachelor of Engineering degree in Environmental Engineering from the National University of Singapore and a Master of Applied Science degree in Chemical Engineering from the University of Toronto. He is a registered Professional Engineer in Ontario and Alberta.

Areas of Expertise

- Project Management
- Phase One and Two ESAs and RSCs
- Risk Assessment and Risk Management
- Remedial Action and RMP
- Litigation Support
- Peer Review

Relevant Project Experience

Former Coal-Fired Power Plant — Mississauga, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2017 – 2019

Scope/Description: The approximately 69-ha site is located along the shore of Lake Ontario in Mississauga, Ontario. The site was formerly a coal-fired power plant and is now undergoing redevelopment for mixed commercial, institutional, and residential use. The contaminations onsite included extensive petroleum hydrocarbons (PHCs) in soil and groundwater with light nonaqueous phase liquid (LNAPL), as well as polycyclic aromatic hydrocarbons (PAHs), heavy metals, and high levels of polychlorinated biphenyls (PCBs) in soil.

Responsibilities: Provided due diligence consultation during a property transaction valued at more than $200 million, and served as the project manager on the multimillion-dollar project. Led the strategizing of the RSC approach, including the RMP, formulating one that would best fit the redevelopment plan and provide opportunities to expedite the development of at least portions of the property and cost-effectively fulfill RSC requirements. Served as the technical lead on all environmental work, including Phase One and Two ESAs, RAs, and remediation to support the filing of multiple RSCs for the proposed redevelopment and for municipal land conveyances. Liaised with the City of Mississauga and the MECP to enhance project delivery.

Former Domtar Wood Preserving Plant — Edmonton, Alberta

Client: Cherokee Canada Inc.

Title: Project Manager and Technical Lead

Start/End Dates: 2012 – 2019

Scope/Description: The subject property is a former wood preserving plant in Edmonton covering more than 36 ha. The project objective was to obtain site closure from Alberta Environment and Parks (AEP) for future residential development.

Responsibilities: Served as the project manager on the multimillion-dollar project; served as the technical lead on all environmental work, including site characterization; remediation of more than 150,000 tonnes of soil contaminated with creosote, pentachlorophenol, dioxins and furans (D/F), and heavy metals; RA; construction of a safety berm as a means of exposure control; and application of remediation and reclamation certificates. Liaised with the City of Edmonton and AEP to enhance project delivery, and served as an expert witness at a hearing conducted by the Environmental Appeals Board of Alberta.

Risk Assessment of Oncoming Chlorinated Solvent Plume —Toronto, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2012 – 2019

Scope/Description: The subject property is impacted with high levels of chlorinated solvent resulting from groundwater migrating from an adjacent site, where a former electrical component manufacturer operated.

Responsibilities: Served as the project manager and technical lead on all environmental work, including Phase One and Two ESAs, RA, preparation of an RMP, and evaluation of indoor air quality to support the

filing of an RSC. Provided technical support for ongoing litigation, including peer reviewing environmental documents, preparing remediation cost estimates, and providing expert statements.

High-rise Condominium Development — Toronto, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2017 – 2019

Scope/Description: The brownfield site was undergoing redevelopment for residential use with a high-rise condominium tower. The site was contaminated with PHCs from former leaky underground storage tanks (LUSTs), and widespread LNAPL was observed. Filing of an RSC was required to support redevelopment.

Responsibilities: Served as the project manager and technical lead on all environmental work, including Phase One and Two ESAs. Prepared a complex conceptual site model (CSM), estimated cost and soil volume for remediation, supervised remediation, and performed confirmatory groundwater sampling. Liaised with the City of Toronto to facilitate a land conveyance.

Former Electroplating Operation — Toronto, Ontario

Client: Confidential Client

Title: Senior Reviewer

Start/End Dates: 2018 – 2019

Scope/Description: The site was formerly used for electroplating operations. The contaminants of concern (COCs) in the bedrock groundwater include volatile organic compounds (VOCs), PHCs, and heavy metals. A permeable reactive barrier (PRB) was installed to mitigate offsite migration of the groundwater contamination.

Responsibilities: Served as the QP_{ESA} and $QP_{RA,}$ and provided senior review of all environmental work, including Phase One and Two ESAs and RA, including development of an RMP.

Former Metal Works — Cambridge, Ontario

Client: Confidential Client

Title: Senior Reviewer

Start/End Dates: 2015 – 2019

Scope/Description: The site is located within the Middleton Wellfield and is impacted with chlorinated solvents in soil and groundwater from historical metal works, and heavy metals and PAH from previous infilling activities. The groundwater impact was found in fractured bedrock and comingled with a regional plume, creating a highly complex CSM. The filing of an RSC was required to support redevelopment for mixed residential/commercial use.

Responsibilities: Served as the QP_{ESA} and QP_{RA}, and provided senior review on all environmental work, including Phase One and Two ESAs, RA, and the preparation of a complex RMP to protect onsite receptors from vapour inhalation and direct exposure risks, as well as the Middleton Wellfield from potential migration of the groundwater impact in the fractured bedrock during and after site construction activities. Liaised with the MECP and Regional Municipality of Waterloo on issues pertaining to the RA and RMP, and the protection of the Middleton Wellfield.

Multiple Sites across Ontario

Client: Confidential Client

Title: Account Manager, Project Manager, and Technical Lead

Start/End Dates: 2015 – 2019

Scope/Description: Projects for a private developer of residential and commercial properties across Ontario and Alberta.

Responsibilities: Served as the account manager, project manager, and technical lead on all environmental work. Provided due diligence consultations on more than 10 sites, one involving multiple land transactions for a 1.6-ha development in downtown Toronto. Also managed Phase One and Two ESAs and remediation work for the client, including a remediation of a 20-ha site in Toronto formerly used as a warehouse. The site was impacted with PHCs that leaked from several former underground storage tanks (USTs). The work included the removal of the USTs and about 50,000 tonnes of impacted soil.

Former Tannery — Toronto, Ontario

Client: Confidential Client

Title: Senior Reviewer

Start/End Dates: 2015 – 2018

Scope/Description: The site was a former tannery located in a residential area in Aurora, Ontario contaminated with VOCs, PHCs, PAHs, and inorganic parameters, including heavy metals, sulphide, and salt.

Responsibilities: Served as the QP_{ESA} and QP_{RA}, and provided senior review on all environmental work, including Phase One and Two ESAs, remediation, RA, and the preparation of an RMP. The RMP included mitigation of vapour and direct exposure risks, and had to be worked into the overall plans for flood protection and rehabilitation of Tannery Creek. Several rounds of consultations with the stakeholders, including the MECP, Regional Municipality of York, and Lake Simcoe Region Conservation Authority were conducted.

Operating Furniture Manufacturing Site — Toronto, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2017 – 2018

Scope/Description: The site had high levels of chlorinated solvents in soil and groundwater resulting from a leaking degreasing tank. The projective objective was to manage the environmental liability for financing.

Responsibilities: Served as the project manager and technical lead on all environmental work, including soil and groundwater assessment, RA, indoor air sampling, remedial excavation, and injection of potassium permanganate to break down the COC.

Land Conveyance — Toronto, Ontario

Client: Confidential Client

Title: Senior Reviewer

Start/End Dates: 2017 – 2018

Scope/Description: The site had PHCs, PAHs, and metals impact in soil related to historical infilling along Lake Ontario.

Responsibilities: Served as QP_{ESA}, $QP_{RA,}$ and senior reviewer for an RA conducted to support the filing of an RSC for land conveyance to the City of Toronto, and an RMP that included measures to protect

construction and utility workers, ensuring that the RMP was consistent with the City of Toronto land conveyance policy.

Former Lead Smelting Facility — Calgary, Alberta

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2012 – 2018

Scope/Description: The site was contaminated with lead in soil at levels as high as several hundred thousand parts per million (ppm), resulting from former lead smelting operations. The objective of the project was to obtain site closure from AEP.

Responsibilities: Served as the project manager and technical lead on all environmental work to obtain site closure, including site characterization, RA, and preparation of an exposure control plan and a health and safety plan (HASP). Liaised with AEP to enhance project delivery.

Former Auto Repair Garage — Whitby, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2016 - 2018

Scope/Description: The site was heavily impacted with waste oil and hydraulic oil from a former LUST and in-ground hydraulic hoists. Extensive LNAPL was observed and delineated.

Responsibilities: Served as the project manager and technical lead on all environmental work, including Phase One and Two ESAs, preparing a remedial action plan (RAP), coordinating geotechnical assessment to confirm the stability of the adjacent building during remedial excavation, excavating heavily contaminated soil for offsite disposal, and injecting chemical oxidant.

Multiple Sites across Canada

Client: A multinational retail company

Title: Account Manager, Project Manager, and Technical Lead

Start/End Dates: 2016 - 2018

Scope/Description: Environmental work for a multinational retail company on sites across Ontario, and one in British Columbia.

Responsibilities: Provided due diligence consultations and Phase One and Two ESA work; and cross-sold other services to the client.

Aircraft Parts Manufacturing Plant — Ajax, Ontario

Client: Confidential Client

Title: Project Manager and Technical Lead

Start/End Dates: 2011 – 2018

Scope/Description: The subject property is an operating aircraft parts manufacturing plant. Groundwater was contaminated with chlorinated solvents from degreasing operations.

Responsibilities: Served as the project manager and technical lead for an RA conducted to support the health and safety program at the facility. The work included Phase One and Two ESAs, RAs, RMP preparation, and assessment of indoor air quality through indoor air and subslab vapour sampling.

Multiple Sites across Canada

Client: A global fast food chain

Title: Account Manager, Project Manager, and Technical Lead

Start/End Dates: 2015 - 2017

Scope/Description: Environmental work for a global fast food chain on sites across Ontario, and one in Saskatchewan.

Responsibilities: Served as the account manager, project manager, and technical lead on all environmental work, including due diligence consultations and Phase One and Two ESA work

Former Paper Manufacturing Facility — Peterborough, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2014 - 2016

Scope/Description: The site was previously used for paper manufacturing, and a major spill of toluene took place during its operation. Widespread LNAPL was delineated, and the groundwater plume was migrating offsite onto the downgradient residential properties.

Responsibilities: Served as the project manager on all environmental work, including delineation assessment and operation of a pump-and-treat system.

Multiple Phase I Environmental Site Assessments in Texas

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2016

Scope/Description: Due diligence Phase I ESAs were completed in support of the purchase of about eight properties in Texas used for storing equipment for oil and gas drilling.

Responsibilities: Served as the project manage on all environmental work r.

Former Appliance Manufacturing Plant — Mississauga, Ontario

Client: Trinity Development Group Inc.

Title: Project Manager and Technical Lead

Start/End Dates: 2012 - 2015

Scope/Description: The site, situated on shallow bedrock, was impacted with chlorinated solvents in soil and groundwater from previous appliance manufacturing operations.

Responsibilities: Served as the project manager and technical lead on all environmental work. The filing of multiple RSCs was required to support redevelopment for mixed commercial, residential, and parkland use, and land conveyance to the City of Mississauga for the construction of the Beechwood sewage pumping station. The work involved Phase One and Two ESAs, remediation, RA, and RMP preparation and implementation. The scope of the RMP included vapour mitigating measures, protection of construction and utility workers, hydraulic barrier in utility conduits, and monitoring of groundwater and indoor air. The RA and RSC filing were completed under a challenging timeline and site conditions. Liaised with the City of Mississauga during RMP preparation; had an advisory role to the construction manager during RMP implementation; and liaised with the MECP during an audit of the RMP implementation.

Former Chemical Processing Plant — Edmonton, Alberta

Client: A multinational company

Title: Environmental Engineer

Start/End Dates: 2009 - 2014

Scope/Description: The subject property is a former industrial manufacturing plant in Edmonton covering more than 101 ha. Soil and groundwater were impacted with a wide range of VOCs, including acetone, benzene, and chlorinated solvents and degradation products; as well as aldehydes and alcohols, organic acids, pesticides, and heavy metals. The work included drilling investigations, annual groundwater monitoring, preparation of a CSM and RA, and modelling of fate and transport of COCs in groundwater.

Responsibilities: Scoped and managed all field investigations work and groundwater monitoring work across the 101-ha site, and assumed a leading role in the preparation of a CSM and modelling of contaminant fate and transport.

Former Food Processing Plant — Toronto, Ontario

Client: Trinity Development Group Inc.

Title: Project Manager

Start/End Dates: 2011 - 2014

Scope/Description: Contaminated soil containing PHCs, heavy metals, and PAHs from historical infilling activities was found across the site. The site was undergoing redevelopment for commercial retail use.

Responsibilities: Served as the project manager on all environmental work, including Phase One and Two ESAs and RA, including preparation of an RMP, to support an RSC filing.

Former Electrical Component Manufacturing Plant — Toronto, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2009 - 2013

Scope/Description: The site was contaminated with high levels of chlorinated solvents and degradation products from historical electrical component manufacturing operations. The filing of an RSC was required for the planned redevelopment for residential use.

Responsibilities: Served as the project manager on all environmental work, including Phase One and Two ESAs, RA, and preparation of an RMP.

Former Waste Recycling Facility — Toronto, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2011 - 2013

Scope/Description: The site was impacted with PHCs from a former waste oil LUST.

Responsibilities: Served as the project manager on all environmental work, including conducting field investigation, preparing a RAP, and executing remediation via in situ chemical oxidation (ISCO).

Parking Garage — Markham, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2008 - 2012

Scope/Description: The site had contaminated soil, reportedly brought in during subway construction. The COCs included PHCs, heavy metals, and PAHs.

Responsibilities: Conducted field investigations, and served as the project manager on all environmental work, including Phase One and Two ESAs and RA, including preparation of an RMP to support an RSC filing.

High-rise Condominium Development — Toronto, Ontario

Client: Confidential Client

Title: Project Manager

Start/End Dates: 2009 - 2012

Scope/Description: The downtown Toronto site was contaminated with chlorinated solvents in groundwater, extending into bedrock.

Responsibilities: Served as the project manager on all environmental work, including Phase One and Two ESAs, RA, and preparation of an RMP to support an RSC filing.

Former Retail Gasoline Station — Cannington, Ontario

Client: Confidential Client

Title: Environmental Engineer

Start/End Dates: 2008 - 2011

Scope/Description: The site was heavily impacted with fuel oil from a LUST and was improperly handled by a previous consultant.

Responsibilities: Conducted field investigation and conducted remediation via ISCO; and prepared reports for litigation support.

Former Film Manufacturing Facility — Toronto, Ontario

Client: Confidential Client

Title: Environmental Engineer

Start/End Dates: 2007 - 2010

Scope/Description: The 19-ha site was previously used for film and camera-related manufacturing. The COCs included chlorinated solvents, heavy metals, and cyanide. The environmental work included Phase One and Two ESAs, and RA to support an RSC filing.

Responsibilities: Prepared CSM and RA.

Operating Self-storage Facility — Toronto, Ontario

Client: Confidential Client

Title: Environmental Engineer-in-Training

Start/End Dates: 2007 - 2009

Scope/Description: The self-storage site had impacts of PAH and heavy metals from historical importation of impacted fill material. The environmental work included Phase One and Two ESAs and RA, including preparation of an RMP.

Responsibilities: Conducted field sampling, prepared Phase One and Two ESAs, developed a CSM, prepared RMP, and carried out RMP monitoring.

Due Diligence Assessment — Multiple sites across Canada

Client: Confidential Client

Title: Environmental Engineer-in-Training

Start/End Dates: 2008

Scope/Description: Due diligence assessment was conducted for the sale of several aluminum processing plants in British Columbia, Alberta, Ontario, and Quebec.

Responsibilities: Review of environmental documents, site inspections, and report preparation. Work was completed under challenging timelines.

Multiple Phase One Environmental Site Assessments in Ontario

Client: Confidential Client

Title: Environmental Engineer-in-Training

Start/End Dates: 2007

Scope/Description: Due diligence Phase One ESAs were completed in support of the purchase of about 20 properties in Ontario used by asphalt manufacturing operation.

Responsibilities: Review of environmental documents, site inspections, and report preparation for the 20 sites.

Edgar (Ed) H. Taves

PROJECT LEAD

Ed Taves has over 31 years of professional experience in environmental consulting. He specializes in environmental liability/due diligence assessments (Phase One and Two ESAs), site investigation/characterization, risk assessment, remedial option analysis, contaminant hydrogeology, facility decommissioning and Brownfield redevelopment, preparation of Record of Site Conditions (RSCs), regulatory compliance, waste material characterization and hazardous waste management, remedial planning, data analysis and interpretation, and procurement and contract oversight. Clients have included a variety of federal and provincial departments and ministries, municipal governments, industries, as well as members of the legal, financial, accounting, and land development communities. Projects have been completed for a wide variety of contaminants including petroleum hydrocarbons (PHCs) occurring as LNAPL and dissolved phase; a variety of volatile organic carbons (VOCs) including chlorinated aliphatics (dissolved and as DNAPL), polynuclear aromatic hydrocarbons (PAHs); a variety of metals; polychlorinated biphenyls (PCBs); pesticides; nutrients such as phosphorus and ammonia; energetic, unexploded ordnance; chemical warfare agents, and radiologicals. He has acted in a number of roles including project manager, task manager, senior technical consultant, and public and regulatory agency liaison.

Distinguishing Qualifications

- Over 31 years of professional experience in environmental consulting
- Specializes in environmental liability/due diligence assessments (Phase One and Two Environmental Site Assessments [ESAs]), site investigation/characterization, risk assessment, remedial option analysis, contaminant hydrogeology, facility decommissioning and Brownfield redevelopment, preparation of Record of Site Conditions (RSCs), regulatory compliance, waste material characterization and hazardous waste management, remedial planning, data analysis and interpretation, and procurement and contract oversight.

Relevant Project Experience

Greenwich Mohawk Brownfield Site; City of Brantford, Ontario

Client: Corporation of the City of Brantford

Title: Project Manager/Senior Environmental Scientist

Start/End Dates: 2014 to Present

Scope/Description: Providing environmental advisory services for the ESAs, risk assessments and remediation on three former

EDUCATION/QUALIFICATIONS

M.Sc. (Biochemistry), University of Western Ontario

B.Sc. Double Honours (Chemistry and Biology), University of Waterloo

REGISTRATIONS/ CERTIFICATIONS

Association of Professional Geoscientists of Ontario – Professional Geoscientist (P. Geo., Limited (Ontario)

Qualified Person (Environmental Site Assessment) (QPESA), as defined by O.Reg. 153/04

Association of the Chemical Profession of Ontario – Chartered Chemist (C.Chem.)

AWARDS/HONORS

- Project Manager, Brownie Award by the Canadian Brownfields Network, for Sustainable Remediation and Technological Innovation
- Project Team, Brownie Award by the Canadian Brownfields Network, for Excellence in Project Development at the Neighbourhood Scale

PROFESSIONAL ORGANIZATIONS/AFFILIATIONS

- Association of Professional Geoscientists Ontario
- Association of the Chemical Profession of Ontario

PUBLICATIONS/PRESENTATIONS

- McBean, E.A. and E.H. Taves. 2000. International Landfill Remediation Project and Energy Cell Development in Latvia, Environmental Science and Engineering. November.
- Taves, E.H. 1994. Design and Operation of a WWTP for Crude Oil Pipeline Hydrotest Water, Water and Environment Association of Ontario. Proceedings of 23rd Annual Symposium.

industrial properties covering approximately 21 hectares of land with the intent of redeveloping to parkland/community/residential use. Services provided include a data gap assessment, Phase I and II ESAs, remedial strategies, risk assessment, remedial design, pilot testing, construction oversight for the remediation and design reports, with the eventual purpose of filing record of site conditions (RSCs) for the properties. The contaminants include PHCs, VOCs and heavy metals in soil and PAHs, PHCs and chlorinated VOCs in groundwater. Over 140,000 of oil/LNAPL was recovered and recycled and 105,000 m^3 of LNAPL impacted soil was treated via soil washing and biopiling, and reused on site.

Sydenham-Pearl Brownfield Site; Brantford, Ontario

Client: Corporation of the City of Brantford

Title: Project Manager/Senior Environmental Scientist

Start/End Dates: 2012 to Present

Scope/Description: Providing environmental advisory services for the Phase I and II ESAs, risk assessments and remediation on two former industrial properties approximately 6.2 hectares in size with the intent of redeveloping to parkland/community/residential use. Services provided include a data gap assessment, Phase I and II ESAs, remedial options evaluations, developing a remedial strategy plan, cost estimates, contract administration and public consultation, with the eventual purpose of filing record of site conditions (RSCs) for the properties. The main contaminants on the properties include PHCs, VOCs, and heavy metals in soil, and PHCs and chlorinated VOC in groundwater. In 2016 this project was awarded a **Brownie Award by the Canadian Brownfields Network, for Sustainable Remediation and Technological Innovation**.

West Don Lands; Toronto, Ontario

Client: Ontario Infrastructure and Lands Corporation (IO)

Title: Senior Environmental Scientist

Start/End Dates: 2010 to 2016

Scope/Description: The largest brownfield site then under development in Ontario, this former industrial site was to include mixed-use residential and commercial development, as well as a substantial parkland component, after it served as the Pan American Athletes' Village (PAAV) for the 2015 Pan/Parapan American Games (Pan Am Games). The PAAV housed over 8,000 athletes and coaching staff. This revitalization project involved an aggressive schedule to secure the environmental approvals required in advance of infrastructure and building construction by development partners. Site characterization, risk assessment (RA), remedial option feasibility studies (ROFSs), remediation, and risk mitigation measures (RMMs) were key project components. CH2M conducted field investigations and prepared multiple Phase One and Phase Two environmental site assessments (ESAs), ROFS, and RA reports in parallel in order to meet the development schedule. The reports complied with Ontario Regulation (O. Reg.) 153/04 under the *Environmental Protection Act*, as amended by O. Reg. 511/09, such that Records of Site Condition (RSCs) were obtained on properties prior to development. CH2M is currently acting as the third-party Ontario Ministry of the Environment (MOE) Qualified Person (QP) to audit compliance with the Certificates of Property Use (CPUs) and RAs during the implementation of the RMMs.

In October 2011, the WDL project was selected by the Canadian Urban Institute for the ***2011 Brownie Award*** as the project that best demonstrated ***Excellence in Project Development at the Neighbourhood Scale***. The annual Brownie Awards program recognizes leadership, innovation, and environmental sustainability in brownfield redevelopment across Canada.

Providing senior review functions for the completion of Phase I and II ESA, and risk assessment programs. The subject site includes a large block of land with a wide variety of industrial occupancy over a 150-year period. A variety of assessment methods and remedial solutions are being implemented to facilitate the intended completion of numerous RSCs for varying end land uses.

Historical Pesticides Plant; Burlington, Ontario

Client: Reichhold Inc.

Title: Project Manager/Senior Environmental Scientist

Start/End Dates: 2010 to Present

Scope/Description: Providing environmental advisory and management services as required for the management of environmental conditions associated with a former pesticides plant currently leased for unrelated industrial operations. Services provided include liaison with regulatory parties for environmental permit approval and compliance monitoring, groundwater/wastewater sampling, data interpretation and reporting; as well as tendering and contract oversight for facility demolition.

Standing Offer for UXO, Environmental, and Cultural Resources Investigations; Former Camp Ipperwash; DCC

Client: Department of National Defence

Title: Senior Environmental Investigation Manager

Start/End Dates: 2010 to 2016

Scope/Description: Provided technical input to the environmental site assessments team under the Federal Approach to Contaminated Sites and the Department of National Defence's Contaminated Site Remediation Framework. Project work includes historical reviews, developing work plans for soil and groundwater sampling, and cost estimating. All site work is completed under UXO avoidance. $10M over 3 years.

Environmental Advisory Services, Historical Chemicals Plant; Brampton, Ontario

Client: Reichhold Inc.

Title: Project Manager/Senior Environmental Scientist

Start/End Dates: 2010 to Present

Scope/Description: Providing environmental advisory and management services as required for the management of environmental conditions associated with a former chemicals plant. Services provided include preparation and implementation of an annual groundwater quality monitoring program, liaison with neighbouring land owners, soil gas sampling activities in support of a risk assessment program; monitoring of an ongoing phytoremediation program.

Windsor-Essex Parkway; Public Private Partnership (P3) Project, Infrastructure Ontario (IO); Windsor, Ontario

Title: Senior Project Consultant

Start/End Dates: 2009 to 2010

Scope/Description: CH2M provided IO with contract development and administration services in association with the development of a P3 project for the Windsor-Essex Parkway of the Detroit River International Crossing. Providing environmental technical support as required.

Phase One/Two ESAs of an Automotive Facility; Windsor, Ontario

Client: General Motors of Canada Limited (GMCL)

Title: Project Manager/Lead Technical Scientist

Start/End Dates: 2009 to 2012

Scope/Description: Providing environmental advisory services for the ESA and closure of a large (over 1,000,000 square feet) automotive facility, with nearly 100 years of manufacturing history including

foundries, automotive parts manufacturing and assembly operations. Contaminants of concern include a wide variety of petroleum products, metals, VOCs, PAHs, PCBs, and asbestos. Evaluated remedial options analysis and currently implementing preferred remedial approach, in anticipation of property transaction.

Phase III ESA; Squirrel Island, Ontario

Client: Public Works and Government Services Canada (PWGSC)

Title: Project Manager and Senior Environmental Scientist

Start/End Dates: 2010 to 2011

Scope/Description: Retained by PWGSC on behalf of the Department of Fisheries and Oceans (DFO) to provide lateral and vertical delineation of metal related contamination in association with a marine navigation light. Remedial options were evaluated and the preferred remedial program recommended. The results of the Phase III ESA field program used to update the National Classification System for Contaminated Sites (NCSCS) score for the site.

Technology Review and Environmental Impact Assessment Proposed Biodiesel Manufacturing Facility; Welland, Ontario

Client: OPG

Title: Bioversel Sarnia, Inc

Start/End Dates: 2010

Scope/Description: Managed the completion of a Technology Review for biodiesel manufacturing equipment proposed for import and use in Canada. Managed the completion of an Environmental Impact Statement for the development of a proposed biodiesel manufacturing facility. Both tasks were completed to meet a very aggressive schedule to comply with the requirements of the ecoENERGY for Biofuels Program.

Preparation of an Application for a Certificate of Approval (CofA) (Air & Noise), Proposed Biodiesel Manufacturing Facility, Welland, Ontario

Client: Bioversel

Title: Project Manager

Start/End Dates: 2010

Scope/Description: Managed the preparation of an application for a CofA (Air & Noise) for a proposed biodiesel manufacturing facility.

Closure of a Flyash Pond; Sarnia, Ontario

Client: LANXESS Inc.

Title: Project Manager/Senior Environmental Scientist

Start/End Dates: 2010

Scope/Description: Prepared a Strategy Paper for the long term management of a closed flyash pond. Ongoing work elements include a surface water quality monitoring program.

Phase I and II ESA; Brampton, Ontario

Client: Textile Rubber & Chemical Co. Limited

Title: Project Manager/Technical Lead

Start/End Dates: 2009

Scope/Description: Phase I and II ESA activities were completed in support of the divestiture of industrial lands. A light nonaqueous phase liquid (LNAPL) was identified in an onsite groundwater monitoring well. The LNAPL was sampled and characterized. Contaminant source assessment activities were completed and applicable stratigraphic and hydrogeologic conditions identified. Remedial options were identified and evaluated, the preferred remedial solution implemented, and the contaminant remediated to meet applicable environmental standards.

Radiological Survey and Phase Two ESA, CFAD Angus

Client: CFB Borden; Defence Construction Canada (DCC)

Title: Senior Environmental Consultant

Start/End Dates: 2009 to 2010

Scope/Description: Managed the development and implementation of a Phase Two ESA to assess Areas of Potential Environmental Concern (APEC) and Areas of Potential Radiological Concern (APRC) associated with radiological wastes, unexploded ordnance (UXO), and chemical warfare agents (CWAs). The work plan included development of field work and sampling protocols, and a health and safety program to address subject risks including UXO avoidance, CWAs including mustard, lewisite and nerve agent, and Ra^{226}.

Standing Offer for Environmental Consulting Services; Suffield, Alberta; DCC

Client: DRDC Experimental Proving Grounds

Title: Senior Environmental Investigation and Assessor

Start/End Dates: 2009 to 2010

Scope/Description: Scope of services includes UXO demilitarization planning, contaminated sites investigation and assessment, remedial action planning, design and implementation of technology evaluations, and risk assessments for more than 50 APEC impacted by munitions, CWAs, and environmental contamination. Services commissioned to date include GIS, data management, technology reviews / feasibility studies, geophysical investigation review, and development of investigation work plans. Contract value: $1.5M over 2 years.

Radiological Survey and Environmental Site Investigation

Client: Confidential Client

Title: Assistant Project Manager

Start/End Dates: 2009 to 2010

Scope/Description: Managed the development and implementation of a program to assess environmental liabilities associated with radiological wastes, unexploded ordnance, and chemical warfare agents. The work plan included development of field work and sampling protocols, and a health and safety program to address subject risks.

Review of Geochemistry Baseline Condition – Proposed Petaquilla Copper Mine; Panama

Client: LGL Limited

Title: Project Manager

Start/End Dates: 2009

Scope/Description: Managed the peer review of Environmental Assessment (EA) documents pertaining to the assessment of the geochemistry baseline for the proposed Petaquilla copper mine.

International Experience

Capacity Transfer for Solid Waste Management; Riga, Latvia

Client: Canadian International Development Agency (CIDA)

Title: Project Manager

Start/End Dates: 1999 to 2002

Scope/Description: Retained by CIDA to supervise and monitor a World Bank funded municipal solid waste (MSW) management project in Riga, Latvia. An existing landfill was rehabilitated to include leachate control measures, energy cell technology, and landfill gas collection for electricity production.

Screening Level Environmental Assessment; Shenyang, China

Client: Innovative Board Technologies

Title: Project Manager and Senior Consultant

Start/End Dates: 1999 to 2001

Scope/Description: Retained to complete a Screening Level EA under the *Canadian Environmental Assessment Act* (CEEA), and the Regulation for Projects Outside Canada, for the development of a fibreboard and door manufacturing facility in Shenyang, China. These assessments included an engineering review of environmental aspects of the developments in accordance with applicable Chinese and Canadian regulations.

Preparation of Draft International Organization for Standardization (ISO) 14001 Program; Shenyang, China

Client: Innovative Board Technologies

Title: Project Manager and Senior Consultant

Start/End Dates: 2002 to 2003

Scope/Description: Prepared a draft ISO 14001 Environmental Management System (EMS) for the above-noted facility in Shenyang, China. Prepared the EMS in consultation with facility personnel located in both China and Canada. Prepared and led the EMS training sessions for plant personnel in China.

Baseline Study, Clean Development Mechanism (CDM) Project; Province of Tucuman, Argentina

Client: Export Development Canada (EDC)

Title: Senior Consultant

Start/End Dates: 2000

Scope/Description: Completed a Baseline Study for a CDM project in accordance with Section 12 of the Kyoto Protocol and associated guidance documents, for a landfill redevelopment project in the Province of Tucuman, Argentina. Completion of the Baseline Study required reviewing existing baselining methodologies, selecting the preferred baselining option, and reviewing applicable Argentinean regulations and socio-economic considerations.

Canadian Projects

Environmental Assessment of Shamrock Industrial Subdivision; London, Ontario

Client: City of London

Title: Project Manager and Senior Consultant

Start/End Dates: 2007 to 2009

Scope/Description: Project Manager for the investigation of latent environmental liabilities in association with a 5-hectare (ha) Brownfield property which was contaminated with various industrial and municipal wastes including pesticides, solvent and metals. The City of London was considering acquiring the site subsequent to a failed tax sale. Due diligence activities were completed, including detailed Phase I and II ESAs, remedial options analysis and cost estimating. Several presentations were made to municipal Council.

Environmental Remediation Program; Sarnia, Ontario

Client: Aamjiwnaang First Nation (AFN), Department of Indian and Northern Affairs (INAC) and Ontario Ministry of the Environment (MOE)

Title: Project Manager

Start/End Dates: 2006.

Scope/Description: Conducted an expedited program of screening level Phase I and II ESA activities in response to the discovery of drummed chemical wastes on AFN lands. The nature and extent of contamination was investigated, remedial options reviewed and engineering cost estimates prepared, and contractor quotations obtained for the completion of remedial activities. Managed the development and implementation of a remedial program and confirmatory testing to document project completion. Acted as liaison between AFN and project personnel, including Band Council, INAC, MOE and the public. First Nations subcontractors were used for the completion of project tasks. Project activities considered both provincial and federal (Canadian Council of Ministers of the Environment [CCME]) environmental standards. The work was completed to the satisfaction of all parties with no repeat investigation, remediation, confirmatory testing or reporting activities required.

Phase I and II ESA Activities; Port Hope, Ontario

Client: Cameco Corporation

Title: Senior Consultant

Start/End Dates: 2008 to 2009

Scope/Description: Technical lead for the completion of a Phase I ESA for the Port Hope Conversion Facility. Scope of work included interview of management and operations staff, and review of historical documentation to identify contaminants of concern (COCs) associated with existing and historical operations, contaminant releases and source areas, and potential migration pathways. Provided senior review functions for the intrusive investigation program.

Environmental Investigation in Support of a Property; London, Ontario

Client: Transaction; Natrel Inc.

Title: Project Manager

Start/End Dates: 2005 to 2007

Scope/Description: Managed the completion of due diligence activities in support of the divestiture of a parcel of Brownfield land known to be contaminated with free phase coal gasification wastes. Managed negotiations between the vendor and the City of London. Environmental risks were successfully characterized and the property title was successfully transferred.

Contaminated Sediment Assessment for the Kingston Dry Dock; Kingston, Ontario

Client: Public Works and Government Services Canada (PWGSC)

Title: Hydrogeologist

Start/End Dates: 2012

Scope/Description: Hydrogeological evaluation of surface water and groundwater interaction in support of an RA. An RA and supplemental investigation was completed for sediment contamination in waterlots and soil and groundwater conditions in uplands associated with the proposed divestiture of federal lands to a local municipality. The RA was completed to federal and provincial standards leading to filing of an RSC.

Development of a Risk Ranking System (RRS); Ontario

Client: Hydro One

Title: Project Manager and Senior Consultant

Start/End Dates: 1998 to 2002

Scope/Description: Retained by a large electrical transmission utility company with over 1600 properties to develop an environmental RRS. The RRS provided a technically defensible and socially acceptable assessment rationale to facilitate the ranking of their properties based on environmental considerations. The ranking results were used to prioritize specific properties for environmental remediation, investigation, or mitigation measures.

Phase II ESA and Risk Assessment Program

Client: Confidential Client

Title: Hydrogeologist

Start/End Dates: 1997 to 2002

Scope/Description: Retained by a large manufacturing facility to complete a focused site-specific risk assessment to assess the potential for adverse effects resulting from chlorinated solvent impacted groundwater egressing their property.

Facility Decommissioning; Old Dutch; Guelph

Client: Old Dutch

Title: Project Manager

Start/End Dates: 1994 to 1995

Scope/Description: Retained to oversee the cleaning, dismantling, and relocation of a bleach (sodium hypochlorite) manufacturing facility. Project works included characterization of residual process wastes, cleaning of all process tanks, reaction vessels and piping, characterization and offsite disposal of all residual process wastes and cleaning fluids, and transportation of all salvaged process tanks, reaction vessels, piping and appurtenances to a new facility for reconstruction.

Phase II/III Environmental Site Assessment; Red Lake, Ontario

Client: Ontario Ministry of the Environment

Title: Project Manager

Start/End Dates: 1993 to 1994

Scope/Description: Designed and constructed equipment to sample, in-situ (underwater), abandoned sealed drums in a northern Ontario lake without any loss of drum contents. Drums were resealed after sampling. Over 200 drums were identified using a magnetometer and accurately located by total station. In consultation with MOE personnel, a representative subset of the drums was selected and sampled in-situ. Subsequently retained to supervise the removal of all intact drums and properly dispose of their contents.

Spill Response and Site Remediation; Port Stanley, Ontario

Client: Ontario Ministry of the Environment

Title: Project Manager and Senior Consultant

Start/End Dates: 1993 to 1995

Scope/Description: Retained to assist provincial and federal authorities with the decommissioning of an oil gasification/fertilizer manufacturing site under the Orphan Sites and National Contaminated Sites Remediation Program (NCSRP). Project works included sampling and characterizing all wastes, identifying disposal options, preparing contract specifications for the decontamination, demolition and offsite disposal of all above- and below-grade structures and related appurtenances, and contract administration. Managed the collection and disposal of large volumes of coal tar liquids, and the excavation and management of free-phase PAH contaminated soils, including development and implementation of work programs and health and safety plans.

Jacobs

EDUCATION/QUALIFICATIONS

B.Sc., Physical Sciences, University of Guelph, Ontario

Post-graduate certificate, Environmental Engineering Applications, Conestoga College, Ontario

Brandi Wilson

RISK ASSESSMENT

Brandi Wilson is an Environmental Scientist with 3.5 years of experience in the environmental consulting industry. Her areas of expertise include environmental assessments, including conducting human health risk assessments (HHRAs), ecological risk assessments (ERAs), and Phase One environmental site assessments (ESAs); chromatogram analysis; data entry and processing; writing technical memorandums. She has prepared numerous technical reports, including pre-submission forms (PSFs), screening level risk assessments (SLRAs), and comprehensive risk assessments (RAs). Her skills include developing exposure modelling, calculating risk estimates, reporting, and responding to client and regulator comments on RA reports. She is familiar with provincial and federal environmental legislation, such as Ontario Regulation (O. Reg.) 153/04 (as amended) and the Record of Site Condition (RSC) filing process. Brandi also has experience with stormwater management (SWM) pond sediment chemistry related disposal versus beneficial use evaluations.

Distinguishing Qualifications

- Experience working in environmental consulting, including report writing, data processing, sediments sampling, using groundwater purge methods, and performing air emissions work.
- Excellent communication skills demonstrated through the ability to collaborate with project team members.

Relevant Project Experience

Method 3 Risk Assessment for a Former Resin and Plastics Manufacturing Facility in Massachusetts

Client: Confidential Client

Title: Junior Risk Assessor

Start/End Dates: May 2019 – Present

Scope/Description: Worked as part of team of risk assessors to develop a Method 3 HHRA report to assess the feasibility of a permanent solution for the release tracking numbers. Supported the development of the draft RA report and response to client comments. Reporting was completed to the requirements of 310 *Code of Massachusetts* Regulation (CMR) 40.0000, known as the Massachusetts Contingency Plan. Supported the development of Upper Concentration Levels in anticipation of an anticipated regulation update.

Risk Assessment of Per- and Polyfluoroalkyl Substances in Support of Brownfield Development; Ontario

Client: Internal Report

Title: Junior Risk Assessor

Start/End Dates: December 2018 – January 2019

Scope/Description: The potential presence of per- and polyfluoroalkyl substances (PFASs) at brownfield sites has implications for their redevelopment as the means of evaluating the risks associated with these emerging contaminants, and processing the sites through applicable regulatory frameworks, is largely undefined. While research, data, and information are evolving quickly on PFAS toxicology, as well as the fate and transport of these parameters in the environment, regulatory screening values and risk assessment approaches are largely lagging.

This internal report examines the approach by which human health and ecological risk assessment can be completed for a brownfield site in Ontario at which aqueous film-forming foam (AFFF) was applied during a historic fire. Currently, the Brownfield Regulation in Ontario does not include guidance or regulatory standards specific to PFAS. This report focuses on the potable groundwater ingestion pathway for humans as well as offsite groundwater migration and potential risks to aquatic organisms in offsite surface water bodies. It outlines the screening levels and toxicity values that may be applied to support the assessment of risk, as well as the conceptual human health and ecological exposure models needed to complete risk evaluations. By stepping through the risk assessment process for the site, a viable framework for assessing and addressing PFAS at brownfield sites will be established.

Port Lands; Toronto, Ontario

Client: Waterfront Toronto

Title: Junior Risk Assessor

Start/End Dates: December 2016 to Present

Scope/Description: Worked as part of a team of risk assessors to develop an SLRA for the Toronto Port Lands. Specific tasks included development of site-specific risk-based criteria and target levels for soil and groundwater. Currently working as part of a team to develop a Community Based Risk Assessment (CBRA) in support of the Port Lands Flood Protection and Enabling Infrastructure Project.

153 Eastern Avenue, Block 8W, and 18/20 Trinity Street; West Don Lands; Toronto, Ontario

Client: Infrastructure Ontario

Title: Junior Risk Assessor

Start/End Dates: December 2016 to Present

Scope/Description: Worked as part of team of risk assessors to develop RA reports for three sites, including the assessment of both human and ecological health. Supported the development of the draft RA report and response to client and regulator comments for all three sites. Reporting was completed to the requirements of O. Reg. 154/04. Worked as part of team to address the revision of the three RAs to incorporate the remediated condition of these sites; the reports are currently with the Ontario Ministry of Environment, Conservation and Parks (Ministry) for review and comment.

Confidential Site

Client: Infrastructure Ontario

Title: Junior Risk Assessor

Start/End Dates: July 2017 to Present

Scope/Description: Worked as part of team of risk assessors to develop due diligence RA (DDRA) report for a contaminated site, including the assessment of both human and ecological health. Supported the development of the draft DDRA report and response to client and regulator comments for all three sites. Work was completed to support a remedial options feasibility study.

Greenwich Mohawk Brownfield

Client: City of Brantford

Title: Junior Risk Assessor

Start/End Dates: July 2017 to Present

Scope/Description: Worked as part of team of risk assessors to develop RA reports for three sites, including the assessment of both human and ecological health. Supported the development of the draft RA report and response to client and regulator comments for all three sites. Reporting was completed to the requirements of O. Reg. 154/04. To meet the City's funding agreement deadlines and develop remedial targets, the draft RAs were completed on a compressed schedule. Lead the revision of the three RAs to incorporate the remediated condition of these sites; the reports are currently with the Ontario Ministry of Environment, Conservation and Parks (Ministry) for review and comment.

Sediment Quality and Beneficial Reuse; Calgary, Alberta

Client: The City of Calgary

Title: Environmental Scientist

Start/End Dates: January 2016 to December 2017

Scope/Description: Worked as part of a team to develop a beneficial reuse of SWM pond sediment for 17 SWM ponds located in Calgary. Performed polyaromatic hydrocarbon (PAH) modelling, petroleum hydrocarbon (PHC) analysis, and chromatogram review to support the development of the draft sediment quality reports for all 17 SWM ponds.

Phase I ESA, 61L/61AL Transmission Line Removal; Wainwright, Alberta

Client: AltaLink Management Inc.

Title: Junior Project Team Member

Start/End Dates: August to September 2016

Scope/Description: Jacobs was retained by AltaLink to prepare a Phase I ESA for the removal, salvage, and reclamation of 498 pole structures from the 61L/61AL transmission line from the existing right-of-way (ROW) onto the road allowance. The pole structures comprise single and double wood poles installed between the 1940s and 2010. The purpose of the Phase I ESA is to evaluate the potential of residual pentachlorophenol (PCP) and creosote impacts in soil around power poles following the decommissioning of these structures. In addition, a number of the pole structures are located adjacent to or within wetlands.

Experience Prior to Jacobs

Wellington Source Water Protection; Kitchener, Ontario

Client: Conestoga College

Title: Project Team Member

Start/End Dates: January to August 2016

Scope/Description: Prepared an area-wide modified Phase One ESA to help Wellington Source Water Protection administer the *Clean Water Act* in Mount Forest, Ontario. Collaborated with a team to conduct a records review, site reconnaissance, and interviews and assess other archival sources to locate areas of potential concern that would affect Wellhead Protection Areas in Mount Forest.

University of Guelph; Guelph, Ontario

Title: Laboratory Assistant

Start/End Dates: September 2011 to April 2012

Scope/Description: Collected and analyzed data from static and time-resolved visual spectrostropy equipment to determine conformational changes in the chlorine transport pathway of a proteo-halo-rhodopsin protein. Trained in laboratory health and safety, including laser operation, Workplace Hazardous Materials Information System (WHMIS), and operation and calibration of equipment. Prepared gel suspensions of the sample protein in various media and buffer solutions to obtain defensible results for publication.

Jacobs

Jinlong Zang

HYDROGEOLOGY

Jinlong Zang is a hydrogeologist with over 21 years of quantitative and physical hydrogeology experience in environmental site assessments (ESAs), contaminated groundwater evaluation, groundwater resources management, and oil sands mine closure and reclamation. He specializes in quantitative hydrogeological evaluations, and the application of numerical and analytical groundwater simulation tools, which includes groundwater flow and contaminant transport modelling at local and regional scales. Jinlong has extensive experience in hydrogeological investigation for both clean water and contaminated sites, including hydrogeological baseline studies, environmental impact assessments (EIAs), ESAs, and remediation options design and evaluation. He is an experienced project manager, including project planning, costing, and technical reporting; liaising with clients, contractors, and regulatory agencies; and managing project delivery.

Distinguishing Qualifications

- Over 21 years of hydrogeology and water resources experience, with a specialization in quantitative hydrogeological evaluations
- Significant knowledge of environmental regulations, standards, and guidelines
- Extensive experience in developing three-dimensional (3D) groundwater flow and contaminant transport modelling

Relevant Project Experience

Groundwater Management Impact Assessment - Groundwater Flow and Contaminant Transport Simulation for Pickering Nuclear Generating Station (PNGS); Ontario

Client: Ontario Power Generation (OPG)

Title: Senior Hydrogeologist and Groundwater Modelling Lead

Start/End Dates: 2015 to 2017

Scope/Description: OPG retained CH2M to support the execution of the Groundwater Management Impact Assessment, which was a hydrogeological study in support of the development of the Safe Storage groundwater management strategy at Pickering Nuclear Generating Station (PNGS). The assessment was completed in several phases. The first phase comprised several deliverables that referred to as the Groundwater Management Impact Assessment (GMIA). The GMIA used a groundwater modelling approach to represent the current groundwater conditions and assess various Safe Storage configurations in support of the development of the groundwater management strategy.

EDUCATION/QUALIFICATIONS

M.Sc., University of Guelph, Water Resources Engineering

B.A.Sc., Tianjin University, Water Resources Engineering

REGISTRATIONS/ CERTIFICATIONS

Professional Engineer: Ontario (100111406)

AWARDS/HONORS

Ontario Onsite Wastewater Association Graduate Scholarship, 2004

Ontario Graduate Scholarship in Science and Technology (OGSST), 2004

Award for Consultancy of Marine Work of LING'AO Nuclear Power Station (Tianjin, China), 1999

SPECIALIZED COMPUTER SKILLS

- MODFLOW
- MT3DMS
- MODPATH
- GROUNDWATER VISTAS
- VISUAL MODFLOW MODFLOW-SURFACT
- SEAWAT
- FORTRAN
- BIOCHLOR
- BIOSCREEN
- SURFER
- GRAPHER

PROFESSIONAL DEVELOPMENT

- PEST and Advanced Uncertainty Analysis (San Francisco, CA, 2014)
- Introduction to FEFLOW (Calgary, AB, 2013)
- GoldSIM Workshop (Sacramento, CA, 2012)
- CH2M HILL Foundations of Project Management Training (Denver, CO, 2010)

Eight different hydrostratigraphic units including overburden and bedrock aquifers were characterized and incorporated into the study. In addition to the complex stratigraphic and hydrostratigraphic units, an extensive network of buried structures and utilities is present beneath the PNGS site.

Update current understanding of three dimensional (3D) groundwater flow characteristics, develop a groundwater flow model representing the current groundwater flow characteristics to establish baseline conditions, construct a contaminant fate and transport model, and complete forecast contaminant transport simulations. The existing conditions as presented by the model were considered as the baseline conditions for PNGS. Subsequent modelling scenarios were developed to present future conditions under Safe Storage at PNGS, which were then compared back to the baseline conditions to assist in understanding potential environmental impacts and the appropriate management approaches for significant or adverse changes from the baseline conditions. Subsequent model scenarios were used to represent various Safe Storage configurations and evaluate the effects resulting from the hypothetical changes on the groundwater flow conditions and contaminant plume transport, including evaluation of the potential discharge to surface water features such as intake channel and Lake Ontario, in support of the development of the groundwater management strategy.

East Brampton Water Mains Hydrogeological Investigation; Region of Peel; Ontario

Client: Region of Peel

Title: Senior Hydrogeologist

Start/End Dates: 2015 to 2018

Scope/Description: Senior hydrogeologist working on behalf of the Region responsible for hydrogeological technical review and data gap analysis, design of hydrogeological investigation program, request for tender preparation, review of hydrogeological assessment of the site including overburden and bedrock geology, hydrostratigraphic units, hydraulic testing (single well response test and pumping test), groundwater level and quality, construction groundwater control evaluation, and groundwater surface water interaction assessment.

Kearl Lake Oil Sands Life of Mine Closure Planning; Alberta

Client: Imperial Oil Canada Ltd.

Title: Senior Hydrogeologist and Groundwater Modelling Lead

Start/End Dates: 2012 to 2013, 2015 to 2018

Scope/Description: CH2M was responsible for the detailed hydrologic and hydrogeologic analyses, and wetland and vegetation planning associated with Kearl Lake Oil Sands Mine closure regulatory requirements, with hydrogeological assessment being one of the primary components. The hydrogeological assessment involved review of major hydrogeological and hydrological features likely to be affected by the project activities, and quantitative evaluation of groundwater flow conditions and fate and transport of potential contaminates using a three-dimensional groundwater flow and contaminant fate and transport model, for an area approximately 144,000 hectare (ha). The assessment included compiling water level and flow data from major surface water features such as rivers, lakes, stream/creeks, and wetlands; regional geological and hydrogeological data such as groundwater elevation data groundwater flow conditions and groundwater quality data from Oil Sands Groundwater Agreement database; climate data such as precipitation. The hydrogeological assessment was conducted to evaluate changes in groundwater flow patterns and the groundwater quality in overburden and basal aquifers resulting from mine operations and closure activities, quantitatively evaluate groundwater surface water interactions such as recharge and discharge area and rate, support closure surface water features design; and evaluate potential pathways of soluble materials; evaluate potential changes in groundwater quality by assessing fate and transport of contaminants of concern, such as monitoring the effect of seepage from the tailings-filled mine pits on groundwater quality, and impacts to the surface water features due to

seepage from the tailings. The study identified sensitive areas in the groundwater regime and at the surface water features, that are likely to be affected by the groundwater flow and groundwater quality due to mine operational and closure activates, and developed a groundwater management plan including potential mitigation measures.

Groundwater Management and Modelling, Amherstburg, Ontario

Client: Amherstburg Land Holdings

Title: Senior Hydrogeologist

Start/End Dates: 2011 to Present

Scope/Description: The program includes a site characterization and ESA of a former industrial facility; closure plan development and remedial options evaluations associated with a 176-acre, 9-million-cubic metre (Mm^3) above-grade settling impoundment containing caustic salts (chloride); and monitoring natural attenuation (MNA) of an arsenic and chloride plume in a bedrock aquifer. Tasks include hydrogeological investigation and characterization, groundwater sampling program, surface water groundwater interaction assessment, groundwater flow and contaminant transport model, and remedial options evaluations.

Developed a 3D groundwater flow and contaminant transport model for the Soda Ash Settling Basin (SASB) to predict the long-term, steady-state chloride extent and magnitude resulting from the SASB chloride loading to the underlying aquifer system. The model was used to support long-term management alternatives and the site closure plan. Specific objectives of the model included: (1) predict the long-term, steady-state chloride plume extent and magnitude in the shallow groundwater zone, (2) predict the interaction between the shallow groundwater and Big Creek under long-term average conditions, and (3) predict the steady-state chloride plume extent and magnitude in the underlying bedrock aquifer.

Greenwich-Mohawk Brownfield; Brantford, Ontario

Client: City of Brantford

Title: Senior Hydrogeologist

Start/End Dates: 2013 to 2016

Scope/Description: Jinlong was acting as Senior Hydrogeologist providing consulting services for hydrogeological characterization of three former industrial properties covering approximately 21 hectares with a complex legacy of contaminated soil and groundwater, in support of the ESAs, risk assessments and remediation. Jinlong was responsible for the sampling and analysis plan development, overseeing monitoring well installation and groundwater level and quality sampling, single well response tests on multiple wells, design and implementation of a 72-hour step and pumping test, continuous surface water elevation and flow monitoring in Mohawk Canal, and establishing the hydrogeological conceptual site model including reviewing regional and site geological and hydrogeological conditions, obtaining Water Well Records (WWR) from the Ministry of Environment and Climate Change (MOECC), determine groundwater flow direction and gradient, and evaluating interaction between groundwater and Mohawk Canal. Jinlong was also leading a Permit to Take Water (PTTW) application, gaining regulatory approval, and managing follow on groundwater and surface water monitoring, in support of the remedial activities at the site. Additionally, Jinlong acted as hydrogeological lead for the risk assessment which included evaluation of groundwater flow conditions, contaminants fate and transport, and interaction between surface water and groundwater.

Fuel Oil Spills, Delineation and Remediation at Bruce Power; Tiverton, Ontario

Client: Bruce Power LP

Title: Senior Hydrogeologist

Start/End Dates: 2012 to Present

Scope/Description: This project involves subsurface investigation/remediation of contaminated soil and groundwater, resulted from fuel oil spills. Technical lead for groundwater investigation and responsible for establishing conceptual site model, evaluating non-aqueous phase liquid (NAPL) mobility and contaminate fate and transport, hydrogeological site characterization, pumping test design, implementation, analysis and permit to take water application. Lead for developing a 3-D groundwater flow model covering Bruce B area to simulate the potential zone of influence created by the operation of a pump and treat system.

Groundwater Flow Simulation for the Groundwater Monitoring Network and Program at the OPG Western Waste Management Facility (WWMF); Ontario

Client: OPG

Title: Senior Hydrogeologist and Groundwater Modelling Lead

Start/End Dates: 2014 to 2016

Scope/Description: CH2M was retained to conduct an assessment of the groundwater monitoring well network at the WWMF. The scope of work for the project included a four-part assignment to assess the current monitoring well network, to characterize the hydrogeology and current monitoring and sampling program, to repair existing wells and/or construct new wells to enhance the monitoring well network and to provide reporting on a two-year monitoring program. The project included a Hydrogeological Assessment, a Contaminant Source Term Assessment and a Groundwater Modelling Assessment that were used in an iterative process to assess the groundwater monitoring well network for the WWMF. Jinlong worked as Senior Hydrogeologist and was responsible for the Groundwater Modelling Assessment, the task included revising an existing 3D groundwater flow model for the OPG WWMF to evaluate the adequacy of the groundwater monitoring network. The model was used to simulate the flow paths and relative travel times from potential sources to the monitoring wells, also to evaluate the potential effects on the groundwater from the proposed expansion of the WWMF. The project resulted in a comprehensive assessment of the existing and expanded monitoring well network and recommendations on sampling and monitoring programs to provide ongoing groundwater protection for the WWMF. Results of the project were also used to support an environmental assessment for facility expansion.

Pesticide Plume Delineation and Groundwater Monitoring Program; Ontario

Client: Confidential Client

Title: Project Manager and Senior Hydrogeologist

Start/End Dates: 2008 to 2016

Scope/Description: Managed a plume delineation program to identify the horizontal and vertical extents of the subsurface contamination caused by historical spills. Prepared a remedial action plan based on the fate and transport analysis. Managed a groundwater monitoring program to evaluate the natural attenuation of contaminants of concern.

Water Balance Study for a Landfill Site; Ontario

Client: Confidential Client

Title: Senior Hydrogeologist

Start/End Dates: 2014 to 2015

Scope/Description: The purpose of the project was to identify potential leachate generation sources and evaluate alternatives for potentially reducing leachate generation, pumping frequency, or both, with the goal of potentially reducing the overall operations and maintenance (O&M) costs for the landfill site.

Conducted hydrogeological evaluations in support of the selection and conceptual design of groundwater barriers, to evaluate the potential performance on two different cutoff barriers, and to estimate potential reduction of leachate by implementing selected construction solutions.

Phased Environmental Site Investigation; Bramalea, Ontario

Client: Reichhold Inc.

Title: Project Manager and Senior Hydrogeologist

Start/End Dates: 2008 to 2015

Scope/Description: Managed a phased environmental site investigation for a former industrial site. Tasks included soil, soil gas, and hydrogeological investigation to identify contamination caused by historical site activities; contamination remediation, risk assessment (RA), and preparation of an environmental management plan.

Sydenham-Pearl Brownfield; Brantford, Ontario

Client: City of Brantford

Title: Senior Hydrogeologist

Start/End Dates: 2013 to 2014

Scope/Description: Technical lead for ESA hydrogeological investigations and data analysis; interpretation of regional and site geology and hydrogeology; establishment of site hydrogeology CSM, and hydrogeological site characterization.

Muskeg River Oil Sands Processing Plant and Mine Integrated Closure, Conservation, and Reclamation (CC&R) Plan; Alberta

Client: Shell Canada Energy

Title: Senior Hydrogeologist and Groundwater Modelling Lead

Start/End Dates: 2012 to 2013

Scope/Description: Preparation of an integrated closure water management plan as part of the Muskeg River Mine (MRM) CC&R Plan includes quantitative assessment of interactions between groundwater and surface water, wetlands, and soils, as well as an evaluation of possible migration paths of soluble materials. The current level of knowledge about material properties within the mining area, the physical setting of the mine relative to adjacent mining properties, and the complexity of surface drainage criteria warrant construction of a numerical groundwater flow model. A groundwater model was used as a feasibility assessment tool in a multidisciplinary approach to designing closure and reclamation plans.

Saskatoon Manufacturing Facility; Saskatoon, Saskatchewan

Client: ERCO Worldwide

Title: Senior Hydrogeologist and Groundwater Modelling Lead

Start/End Dates: 2013 to 2014

Scope/Description: Developed a 3D groundwater flow and particle tracking model to simulate the groundwater flow paths through the aquifer system beneath the site. The model was used to determine the direction of the groundwater flow, and estimate the travel times for conservative chemicals in the saturated groundwater environment.

West Don Lands; Toronto, Ontario

Client: Ontario Infrastructure and Lands Corporation (IO)

Title: Lead Hydrogeologist

Start/End Dates: 2010 to 2011

Scope/Description: The largest brownfield site currently under development in Ontario, this former industrial site will encompass mixed-use residential and commercial development, as well as a substantial parkland component, after it served as the Pan American Athletes' Village (PAAV) for the 2015 Pan/Parapan American Games (Pan Am Games). The PAAV housed over 8,000 athletes and coaching staff. This revitalization project involved an aggressive schedule to secure the environmental approvals required in advance of infrastructure and building construction by development partners. Site characterization, RA, remedial option feasibility studies (ROFSs), remediation, and risk mitigation measures (RMMs) are key project components. CH2M HILL Canada Limited CH2M conducted field investigations and prepared multiple Phase One and Phase Two ESAs, ROFSs, and RA reports in parallel in order to meet the development schedule. The reports complied with Ontario Regulation (O. Reg.) 153/04 under the *Environmental Protection Act*, as amended by O. Reg. 511/09, such that Records of Site Condition (RSCs) were obtained on properties prior to development. Currently, CH2M is acting as the third-party MOECC Qualified Person (QP) to audit compliance with the Certificates of Property Use (CPUs) and RAs during the implementation of the RMMs.

In October 2011, the WDL project was selected by the Canadian Urban Institute for the ***2011 Brownie Award*** as the project that best demonstrated ***Excellence in Project Development at the Neighbourhood Scale***. The annual Brownie Awards program recognizes leadership, innovation, and environmental sustainability in brownfield redevelopment across Canada.

Responsible for leading and providing technical support for all hydrogeological related tasks. Tasks included identification of data gaps; preparation of sampling plan for site investigations; hydrogeological investigations and data analysis; interpretation regional and site geology and hydrogeology; establishment of site hydrogeology CSM; groundwater surface water interaction assessment; report preparation; and responses to the comments.

Groundwater Flow Simulation of Darlington Nuclear Generating Station (DNGS), Darlington Refurbishment Project; Darlington, Ontario

Client: OPG

Title: Groundwater Modeller

Start/End Dates: 2010 to 2011

Scope/Description: CH2M was part of the OPG consultant team conducting the Federal Environmental Assessment (EA) for the Darlington Nuclear Generation Station (DNGS) Refurbishment Project. CH2M was responsible for the Geological and Hydrogeological Environment component of the environment as defined for the EA. The purpose of the project was to describe the existing (i.e., "baseline") environmental conditions throughout the study areas relevant to the Project. In characterizing the existing environmental conditions, an initial conceptual model of the Geology and Hydrogeology Environment was developed based on the substantial information available for the DN site including the New Nuclear Darlington Project.

The baseline characterization program relied on the existing hydrogeological investigations of the Darlington Protected Area but was supplemented by additional sampling programs (i.e. precipitation, soil and groundwater), to develop a conceptual model for the site. The conceptual model was then used to develop a groundwater flow model to simulate groundwater flow conditions in the Protected Area. Jinlong was responsible to construct a local study area groundwater flow model to simulate the baseline

conditions and the changes in land use resulting from the Refurbishment Project, and to simulate the migration pathways of tritium from the injection water storage tank (IWST) spill.

Groundwater Flow Simulation in the Area of Water Sampling Hole (WSH) 231 and the Low Level Storage Buildings (LLSBs) at the WWMF; Ontario

Client: OPG

Title: Groundwater Modeller

Start/End Dates: 2009 to 2011

Scope/Description: CH2M was retained by OPG to conduct an investigation of tritium found in Water Sampling Hole (WSH) 231 located adjacent to the Low Level Storage Buildings (LLSBs) at RWOS2 at the OPG WWMF. An increasing trend of tritium concentration has been found in WSH-231 and the source of tritium was unknown. CH2M conducted a detailed hydrogeological investigation to determine and assess the potential source of tritium. Investigations included the sampling of storm sewers, foundation drains, subsurface drainage systems, roof runoff, electrical manholes, site soils and groundwater. To sample groundwater, a new groundwater monitoring system was constructed inside the protected area of the LLSBs. Jinlong worked as groundwater modeler to constructed a 3D groundwater flow model in the area of the LLSBs, and applied the model to track the migration pathway of a tritium plume from the source area to the potential discharge location.

Contaminated Sediment Assessment for the Kingston Dry Dock; Kingston, Ontario

Client: Public Works and Government Services Canada (PWGSC)

Title: Hydrogeologist

Start/End Dates: 2012

Scope/Description: Hydrogeological evaluation of surface water and groundwater interaction in support of an RA. An RA and supplemental investigation was completed for sediment contamination in waterlots and soil and groundwater conditions in uplands associated with the proposed divestiture of federal lands to a local municipality. The RA was completed to federal and provincial standards leading to filing of an RSC.

Updated Phase Two ESA for Four Sites at Port Stanley Harbour; Port Stanley, Ontario

Client: PWGSC

Title: Hydrogeologist

Start/End Dates: 2011 to 2012

Scope/Description: The project's objective was to bring the intrusive investigation reporting for the project up to date with the requirements of the revised O. Reg. 153/04 for RSC filing. Tasks included developing the sampling and analysis plan (SAP), coordinating the field team in relation to carrying out the SAP, and assisting with database development and Phase Two reporting (to the requirements of O. Reg. 153/04 [as amended]) for four separate parcels of land.

ESA for a Former Correctional Facility Owned by the Province of Ontario

Client: Province of Ontario

Title: Hydrogeologist

Start/End Dates: 2010-2011

Scope/Description: The project included full delineation of previously identified contamination at the site, and cost estimation for feasible and cost-effective remediation as part of a comprehensive ESA.

Groundwater Flow Simulation in the Vicinity of New Nuclear-Darlington; Darlington, Ontario

Client: OPG

Title: Technical Reviewer

Start/End Dates: 2008 to 2009

Scope/Description: CH2M was responsible for the Geological and Hydrogeological Environment Existing Environmental Conditions Technical Support Document (TSD) which was intended to describe the existing (i.e., "baseline") environmental conditions throughout the study areas for the New Nuclear – Darlington (NND) Project adjacent to the existing Darlington Nuclear Generating Station (DNGS). Jinlong was rresponsible for the review and assessment of the groundwater flow simulation for the NND project as part of geology and hydrogeology effects assessment.

Groundwater Modelling: Development of Recommended Remediation Options for the Deloro Mine Site Cleanup; Deloro, Ontario

Client: Ontario Ministry of the Environment and Climate Change (MOECC)

Title: Hydrogeologist and Groundwater Modeller

Start/End Dates: 2008 to 2009

Scope/Description: Part of a multidisciplinary team that developed the recommended remediation options for the rehabilitation of the Tailings Area (TA) and the Industrial/ Mine Area (IMA) portions of the site. Provided design basis parameters based on the groundwater flow simulations undertaken for the TA and IMA. A series of groundwater collection wells were proposed and simulated to collect seepage beneath two tailings dams, in conjunction with other remediation features in the TA. A groundwater interceptor trench (GIT) was proposed and simulated in the IMA to lower the water level to isolate the interaction between the groundwater and the waste, to reduce the hydraulic gradient across the site, and to divert and decrease the contaminated groundwater discharge to the river. Also evaluated potential contaminant pathways and receptors, and estimated contaminant travel time, travel distance, and travel velocity for a long-term safety assessment for a federal regulatory submission.

Groundwater Flow Model – Trench Design Simulation; Alexander, Alberta

Client: EnerMark Inc.

Title: Groundwater Modeller

Start/End Dates: 2009

Scope/Description: Developed a 3D groundwater flow model to assist in designing the groundwater re-injection options, including injection wells and trench. Evaluated the re-inject location and flow rates. Predicted the influences of the injection on the groundwater flow regime.

Expansion of Walton Landfill; Walton, Ontario

Client: The Municipality of Huron East

Title: Hydrogeologist and Modelling Lead

Start/End Dates: 2011 to 2012

Scope/Description: Evaluated the potential environmental impacts that resulted from the proposed expansion of the landfill.

Contaminating Lifespan Assessment; Welland Landfill; Welland, Ontario

Client: Graftech International Holdings Inc.

Title: Hydrogeologist and Modeller

Start/End Dates: 2009 to 2010

Scope/Description: Used POLLUTE model to evaluate potential environmental impacts and assess the lifespan of the landfill.

Contaminating Lifespan Assessment; Scott Road Landfill; Sarnia, Ontario

Client: LANXESS Inc.

Title: Hydrogeologist and Modeller

Start/End Dates: 2009

Scope/Description: Applied POLLUTE model to determine the contaminating lifespan and evaluate the long-term potential of the landfill to adversely impact on the surrounding environment.

Landfill Site Lifespan Assessment; Ontario

Client: Confidential Client

Title: Hydrogeologist and Modeller

Start/End Dates: 2009

Scope/Description: Used POLLUTE model to determine the contaminating lifespan and evaluate the long-term potential of the landfill to adversely impact the surrounding environment.

Styrene Contamination Characterization and Remediation; Sarnia, Ontario

Client: LANXESS Inc.

Title: Project Manager

Start/End Dates: 2008-2009

Scope/Description: Managed a soil investigation program through borehole drilling to identify the contaminant extent and magnitude. Managed a soil remediation program through excavation to remove the styrene contaminated soils.

Hydrogeological Assessment for a PTTW Application, Kitchener Wastewater Treatment Plant (WWTP) Ultraviolet (UV), Effluent Pumping Station (EPS), and Plant 2 Upgrades; Kitchener, Ontario

Client: Regional Municipality of Waterloo

Title: Hydrogeologist

Start/End Dates: 2010-2011

Scope/Description: Responsible for the hydrogeological evaluation for the PTTW application, including design and oversight of pumping test, data interpretation, dewatering calculation, report preparation, and PTTW application.

Experience Prior to Jacobs

Density-Dependent Groundwater Flow Simulation; Former OCC Tacoma Facility; Tacoma, Washington, United States (U.S.)

Client: United States Environmental Protection Agency

Title: Groundwater Modeller

Start/End Dates: 2006 to 2008

Scope/Description: Synthesized relevant existing site data into a single overall conceptual hydrogeologic model and quantitative model (SEAWAT). Evaluated the potential optimization of the current groundwater

extraction and injection system. Evaluated the effectiveness of sediment remedial alternatives. Evaluated the effectiveness of potential groundwater remedial alternatives, and guided the development of remedial system monitoring programs.

Groundwater Flow and Contaminant Transport for Broadway Village, Lower Town; Ann Arbor, Michigan, U.S.

Client: The City of Ann Arbor

Title: Groundwater Modeller

Start/End Dates: 2005, 2007 to 2008

Scope/Description: Evaluated the effects of construction of a proposed sheet piling on the groundwater flow regime. Assessed hydraulic conditions associated with the dewatering activities during construction. Evaluated the effects of construction of slurry wall and underground structures. Simulated contaminant fate and transport with different remedial scenarios.

Groundwater Flow and Tritium Transport Simulation; Exelon Generation; Braceville, Illinois, U.S.

Client: Exelon Generation Company, LLC

Title: Groundwater Modeller

Start/End Dates: 2006

Scope/Description: Simulated various remedial pumping scenarios. Simulated tritium transport model predictions from the current conditions for various remedial scenarios. Simulated how the tritium plume would evolve under different conditions.

Groundwater Flow Analysis of Flood Events at Garland Road Landfill Site; Miami County; Ohio, U.S.

Client: Ohio Environmental Protection Agency

Title: Groundwater Modeller

Start/End Dates: 2006

Scope/Description: Performed the groundwater flow simulation (SURFACT) of floodwater saturating the vadose zone soil and emplaced waste. Estimated the amount of floodwater saturating the vadose zone, evaluated the effects of installing a geosynthetic clay liner (GCL) cap and cover system, and assisted in the engineering analyses of the GCL cover system.

Groundwater Flow and Contaminant Transport Modelling, North Sanitary Landfill; Dayton, Ohio, U.S.

Client: Ohio Environmental Protection Agency

Title: Groundwater Modeller

Start/End Dates: 2005 to 2006

Scope/Description: Evaluated infiltration through current and proposed landfill areas; and assessed the stability of the plumes that have been delineated, groundwater extraction remedies (if required), and natural attenuation remedies.

Groundwater Flow and Contaminant Transport Modelling, Closed Landfill; Realm Inc.; Elyria, Ohio, U.S.

Client: Ohio Environmental Protection Agency

Title: Groundwater Modeller

Start/End Dates: 2005

Scope/Description: Estimated the amount of dilution that may occur within groundwater between the landfill and the primary downgradient site boundary. Simulated steady-state plume conditions under the solute transport processes of advection and dispersion.

Groundwater Flow Modelling for Remedial Design (Slurry Wall), Willow Run; Ypsilanti, Michigan, U.S.

Client: General Motors Powertrain (GMPT)

Title: Groundwater Modeller

Start/End Dates: 2005

Scope/Description: Assisted with the preliminary design of the slurry wall, and evaluated the effects of the construction of a slurry wall on the groundwater flow regime in the site vicinity, specifically on the water table elevation beneath the existing site building. Compared the pre- and post-wall conditions to assess the resultant net changes in the groundwater system.

Review and Update Groundwater Modelling for Former AC Rochester Facility; Sioux City, Iowa, U.S.

Client: General Motors Corporation

Title: Groundwater Modeller

Start/End Dates: 2004

Scope/Description: Modified the existing groundwater flow model to incorporate an additional layer. Calibrated the model to a transient response.

Appendix C
Mandatory Certifications

APPENDIX C

Mandatory Certifications

As specified in Ontario Regulation (O. Reg.) 153/04, Schedule C, s. 5, the following Mandatory Certifications are made by the Qualified Person – Risk Assessment (QPRA) conducting and supervising the Risk Assessment (RA) for 200 Beverley Street, Guelph. The RA was prepared by CH2M HILL Canada Limited, now a wholly owned subsidiary of Jacobs Engineering Group Inc. (herein referred to as "Jacobs") on behalf of The City of Guelph on ~~November 16, 2020~~May 18, 2021.

Mandatory Certifications Regarding the RA for 200 Beverley Street, Guelph:

1. I have conducted or supervised a risk assessment report in accordance with the regulation.

2. I am a qualified person, as defined in Section 168.1 of the Act, and have the qualifications required by Section 6 of the regulation.

3. I have in place an insurance policy that satisfies the requirements of Section 7 of the regulation.

4. The risk assessment team included members with expertise in all of the disciplines required to complete the risk assessment in accordance with the regulation.

5. The opinions expressed in the risk assessment are engineering or scientific opinions made in accordance with generally accepted principles and practices as recognized by members of the environmental engineering or science profession or discipline practicing at the same time and in the same or similar location.

6. To the best of my knowledge, the certifications and statements in this risk assessment are true as of ~~November 16, 2020~~May 18, 2021.

7. By making these certifications in this risk assessment report, I make no express or implied warranties or guarantees.

Mandatory Certifications in Relation to the RA Property:

1. As of ~~November 16, 2020~~May 18, 2021, it is my opinion that based on the Phase One environmental site assessment and the Phase Two environmental site assessment and other relevant property information, the approach taken in the conduct of the risk assessment:

    a) is appropriate to evaluate human health and ecological risks from the contaminants of concern at the concentrations proposed as the standards specified in the risk assessment and assuming no measures have been taken at the RA property which have the effect of reducing the risk from the contaminants, and

    b) is consistent with the approach set out in the pre-submission form with the exception of those deviations listed in Section 1 of the report under the heading "Deviations from Pre-Submission Form".

2. As of ~~November 16, 2020~~May 18, 2021, it is my opinion that, taking into consideration the assumptions specified in the risk assessment report, including the use of the property specified in report Section 3 of the risk assessment, and any risk management measures recommended in the report, as long as the RA property satisfies those assumptions and meets the standards specified in

the risk assessment report, the contaminants of concern are unlikely to pose a human health or ecological risk greater than the level of risk that was intended in the development of the applicable full-depth site condition standards for those contaminants.

3. As of ~~November 16, 2020~~May 18, 2021, it is my opinion that the implementation of the risk management plan described in Section 7 of the risk assessment report is necessary for a contaminant of concern addressed in the risk assessment report to prevent, eliminate, or ameliorate any adverse effect from that contaminant to the human or ecological receptors addressed in the report and located on the RA property and is sufficient to address the current and potential future transport and exposure pathways.

4. As of ~~November 16, 2020~~May 18, 2021, the risk assessment report completely and accurately reflects the risk assessment assumptions and conclusions and all pertinent information has been included in the report and the appendices to the report.

Signed:

Katherine Appleby, B.E.S., EP
Qualified Person – Risk Assessment under Ontario Regulation 153/04
Jacobs Engineering Group Inc.

Appendix D
Phase I and II Summaries

Appendix D1
Phase I ESA Summary

Appendix D1. CH2M HILL Phase One Environmental Site Assessment Summary

This appendix summarizes the results and conclusions of the CH2M HILL Canada Limited (CH2M) Draft Phase One Environmental Site Assessment (ESA) document entitled *Phase One Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph, Ontario*, dated August 18, 2017 (CH2M 2017).

City of Guelph (City) retained CH2M to complete a Phase One ESA in 2017 for the property identified as the former International Malleable Iron Company (IMICO) foundry facility, located at 200 Beverley Street in Guelph, Ontario (Site). The Site is approximately 5.2 hectares in size and is located east of the City's downtown. It is understood that the Phase One ESA was requested in support of the potential redevelopment of the Site from an industrial use to residential/parkland/institutional land use purposes. This change in land use requires a Record of Site Condition (RSC). The Site and the Phase One Study Area (defined as lands located within 250 metres [m] of the Site) are shown on Figures 2-1 and 2-2 (Appendix D3). The Phase One Study Area was expanded beyond 250 m from the Site (as shown on Figure 2-1 in Appendix D3) to include the following land:

- To the north to include entire industrial and commercial properties located on Elizabeth Street and Victoria Road South
- To the east to include entire industrial and commercial properties located along Victoria Road South and York Road
- To the south to include entire properties that appear to be former industrial and commercial properties located along the eastern side of Morris Street and northern side of York Road

The purpose of the Phase One ESA was to assess the Site and the Phase One Study Area in accordance with the defined terms of Ontario Regulation (O. Reg.) 153/04, as amended, for potentially contaminating activities (PCAs) to identify areas of potential environmental concern (APECs). To accomplish these goals, CH2M used a combination of activities (such as records review, Site visits, and interviews) to identify areas on or near the Phase One Property that may warrant further investigation. The Phase One ESA included the following components:

- Records review
- Interviews
- Site reconnaissance
- Evaluation of the information gathered from the records review, interviews, and Site reconnaissance
- Preparation of a Phase One ESA report
- Submission of the Phase One ESA report to the owner of the Phase One Property

The Phase One ESA was completed to satisfy the requirements for Phase One ESAs as specified within O. Reg. 153/04 (MECP 2011a). The Phase One ESA findings were used to support the development of a subsequent Phase Two ESA investigation for the Site to assess the subsurface environmental conditions and assist in the development of a recommended remedial or risk management strategy that may be considered for ongoing use or to facilitate potential redevelopment of the Site.

1.1 Current and Past Uses

Based on information obtained from the records review and interviews, the Site was considered to be first developed in 1913 when it was acquired by IMICO for use as an iron-jobbing foundry. Historical onsite buildings/structures and areas were identified from fire insurance plans (FIPs) and site plans in previous reports, including the foundry, annealing room, chipping room, galvanizing buildings, warehousing, storage (coal, sand, bricks, polychlorinated biphenyl [PCB] materials), paint shop, and offices.

The foundry closed in 1989, and the Site was generally vacant from that time on, with the exception of some reported community-type occupancy during the time of the Assembly of the Church of the Universe ownership

(1993 to 1997). A number of fires occurred during this period, and in 1997, the City took over the Site. Demolition of the buildings and removal of various wastes from the Site (including some excavated soil and PCB materials and a large above-ground storage tank [AST]) occurred in 1998 through 1999. The Site is currently vacant with no onsite operations occurring. No buildings or structures are located onsite; however, the majority of the concrete floors, foundations, and footings of historical buildings were present at the time of the Site reconnaissance (June 21 and 29, 2017).

Figure 6-2 identifies the historical buildings onsite. Table 7.1-1 summarizes the current and historical land uses at the Phase One Property, based on the results of the records review; this table includes the inferred historical occupant or activity.

1.2 Environmental Reports

The City provided CH2M with the environmental reports that had been previously completed for the Phase One Property. The intent of the environmental report review was to identify key environmental concerns regarding actual and potential areas of environmental concern within the Site and its adjacent properties.

The report list has been provided as Table 4.1.5-1, with a brief summary of each investigation or study.

1.3 Potentially Contaminating Activities

Based on a review of historical environmental reports, aerial photographs, FIPs, chain of title searches, City directories, interviews, an EcoLog Environmental Risk Information Service database search, and Site reconnaissance, the Phase One ESA identified PCAs or historical land uses of potential environmental interest on the Site.

The following PCAs were identified on the Phase One Property and resulted in an APEC:

- 8 – Chemical Manufacturing, Processing and Bulk Storage
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 30 – Importation of Fill Material of Unknown Quality
- 32 – Iron and Steel Manufacturing and Processing
- 33 – Metal Treatment, Coating, Plating, and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing, and Bulk Storage
- 46 – Rail Yard, Tracks and Spurs
- 55 – Transformer Manufacturing, Processing, and Use

The following PCAs were identified off the Phase One Property but within the Phase One Study Area:

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 10 – Commercial Autobody Shops
- 11 – Commercial Trucking and Container Terminals
- 12 – Concrete, Cement, and Lime Manufacturing
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 33 – Metal Treatment, Coating, Plating, and Finishing
- 34 – Metal Fabrication
- 37 – Operation of Dry Cleaning Equipment (where chemicals are used)
- 39 – Paints Manufacturing, Processing, and Bulk Storage
- 43 – Plastics (including Fibreglass) Manufacturing and Processing
- 45 – Pulp, Paper, and Paperboard Manufacturing and Processing
- 47 – Rubber Manufacturing and Processing
- 49 – Salvage Yard, including automobile wrecking

- 54 – Textile Manufacturing and Processing
- 55 – Transformer Manufacturing, Processing and Use
- 57 – Vehicles and Associated Parts Manufacturing

Figures 4-1a and 4-1b (Appendix D3) show the locations of the on- and offsite PCAs and the resulting APECs on the Phase One Property.

1.4 Areas of Potential Concern

The identified PCAs results in 33 APECs that CH2M considered to have the potential for subsurface environmental impacts to the Site. Of these, 29 APECs on the Site are considered to be attributable to onsite PCAs, and 4 APECs are considered attributable to offsite PCAs within the Phase One Study Area. The APEC locations are presented in Figures 4-1a and 4-1b (Appendix D3) and summarized in Table 7.3-1. Contaminants of potential concern (COPCs) have been identified for each APEC in Table 7.3-1 based on the historical operations and type of PCA associated with each APEC.

The identified APECs are summarized as follows:

1) Foundry – A foundry was operated on the Site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms, using malleable and ductile iron (DCS 2014a). Foundry sands were predominantly located in the concrete pits and sumps of the main foundry building. Foundry sands, sludge materials, and process waste were removed from the Site, and buildings were demolished in 1999 (Earth Tech 1999). The Proctor & Redfern (P&R) investigation also reported that moulding sands and dust collector waste was stored at the northwestern corner of the building and drained to the truck bay (P&R 1991).

2) Machine Shop – A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for "Tumbling and Cleaning" operations, inferred to be in association with the adjacent "Annealing Room" to the north. FIPs prepared in 1929, 1945, and 1960 showed this area changed operations to "Shipping", and a "Pattern Shop."

3) Annealing – An "Annealing Room" with four furnaces is shown on the 1916 FIP. A brick chimney is located on the northern wall. The 1929 FIP shows nine furnaces, with the Annealing Room extended westwards with an additional chimney on the northern wall within the extended area; the southern portion of the Annealing Room is identified as the "Tumbling Dep't." The 1946 FIP shows a structural addition on the eastern side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs and the absence of ASTs or underground storage tanks (USTs) for fuel oil storage on the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel-oil-fired furnace operation is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission, or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the northern side of the Annealing Room.

4) Sand Storage – The 1916 FIP shows a "Sand Shed." The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled "Sand." The 1960 FIP shows the original "Sand Shed" as "Bricks" and the second smaller building to the west labelled as "Sand & Bricks," and an additional area to the north is labelled "Sand." No information was identified as to whether only clean process, spent foundry sands, or both were stored in these buildings; therefore, the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored were not identified. The potential for new and used refractory brick and associated process materials is considered possible.

5) Galvanizing Building – A small free-standing building for "Galvanizing" was present on the southeastern portion of the Site as shown on the 1916, 1929, and 1946 FIPs. The galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as "Fittings Whse" (warehouse). No information was identified regarding process chemical use and storage or waste management practices associated with the galvanizing operations conducted.

6) Chipping/Grinding Room – A "Chipping Room" was shown on the FIPs prepared in 1929, 1946, and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the "Annealing Rm," with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a "Trimming and Grinding" area; this information is inferred to be based on the interview of historical IMICO employees. "Dust control equipment" is shown on Figure 4 of the 1991 P&R report, on the exterior western side of the building.

7) Oil Houses, Boiler House and ASTs – A building is shown on the 1929 FIP to the north of the foundry and east of the power house with a label "Oil," and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the northern building remaining but is not labelled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R investigation figures show a boiler house to the east of the power house and two 45,000-litre (L) (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech 1999).

8) Gasoline UST – As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building and west of scales at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labelled as a "time office") but does not show the UST. The gasoline use is not known; however, it is inferred to be for fuelling gasoline-powered equipment/vehicles used at the plant. The 1991 P&R investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R 1991).

9) Oil House – A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil." The building/structure is not on 1916 FIP where the area is shown as exterior yard area and is not present on the 1960 FIP where the area is occupied.

10) Machine Shop – A machine shop is shown on the 1929, 1946, and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling-mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small, unidentified building in the central area of the future machine shop. The northern portion of the machine shop was removed during the 1999 excavation based on the excavation footprint (EarthTech 1999).

11) Plating/Galvanizing Building – A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R 1991). Investigations by P&R and Gartner Lee Limited (Gartner Lee) indicated high concentrations of zinc, other metals, and oil and grease. Free product was observed in wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 metres below ground surface [mbgs]), and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations as having zinc and total petroleum hydrocarbon concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech 1999). A well nest (OW22S/D) was installed within the

excavation area (the report for this installation was not available, and therefore, the soil conditions are unknown if analyzed as part of the investigation). Test pits and boreholes installed in the area in 2013 by Decommissioning Consulting Services (DCS) indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product that was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel-type odour in the fill, which extends to approximately 1.5 mbgs, and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product but has had concentrations of petroleum hydrocarbons (PHCs) increasing since the annual monitoring at this location began in 2016, up to 850,000 micrograms per litre (µg/L) of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25 percent of the sampling events between 2005 and 2016.

12) Coal Storage – A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R 1991; Gartner Lee 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.

13) Rail Line – A former rail line was shown onsite north of the buildings on the 1916, 1929, and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.

14) Possible Automobile Storage, Maintenance and Repair – An addition south of the foundry building on the eastern side of the offices, is labelled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.

15) Sand Mixing/Storage – Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R 1991; Gartner Lee 1999; Earth Tech 1999) do not have an indication of the building's use.

16) Transformers – Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPs (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.

17) Capacitor Room – PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigation site plan, and later remediated as part of the Earth Tech demolition (P&R 1991; Earth Tech 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 – 1.3 mbgs) to remove concentrations above 5 micrograms per gram (µg/g). Final samples (composite soil, soil, concrete, and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. A well (OW25) was installed within the excavation area (the report for this installation was not available, and therefore, the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated volatile organic compounds (VOCs) and PHCs (mainly F3) greater than the applicable potable water criteria (Table 6 Standards) (DCS 2007b, 2014b; AECOM 2017a, 2017b)

18) Coal Storage – A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional coal piled to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R 1991; DCS 2007a).

19) Coal Storage – A small building for coal storage is shown on the 1960 FIP, east of the time keeper's office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.

20) Garage – A garage was shown on the 1946 and 1960 FIP along Stevenson, on the western side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.

21) Coal Storage – The 1960 FIP indicates coal storage south of the garage on the western side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labelled as coal.

22) Transformer – A 1200-volt transformer is shown on the 1991 Site Plan (P&R 1991).

23) Paint Shop – First shown on the P&R Site plan, a paint shop was located at the northern end of the site, between the shipping building and the storage area (P&R 1991). Drums were stored against the northern wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.

24) PCB Storage Area – An area located at the northeastern corner of the finishing and annealing room with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 parts per million of PCBs were identified. Previous site maps showed this area as "storage" (P&R 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kilograms of PCB-containing ash residue from the top of the concrete pad and the concrete pad itself was removed and taken for offsite disposal (Earth Tech 1999). Confirmatory samples below the pad were 0.63 µg/g and less than 0.05 µg/g. The soil was later excavated to bedrock as part of the soil remediation in the northeastern corner of the property (see APEC-11).

25) Drum Storage – Interviews with former employees as part of the P&R investigation identified drum storage activities that occurred along the northern property boundary (P&R 1991). No additional information was provided on the nature of what was stored and whether there was associated contamination as a result of the materials.

26) Former Substation – A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated nondetect concentrations of PCBs. Similarly, one location installed during the DCS Phase II ESA (2007b) indicated nondetect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.

27) Former Electrical Shop – A small electrical shop was noted to be on the southwestern corner of the foundry (P&R 1991). This addition was not shown on the FIPs from previous years and was shown as the exterior yard area west of the foundry.

28) Waste Oil Storage – Used oil was stored above ground on the southwestern end of the foundry as shown on the P&R Site Plan (P&R 1991).

29) Fill of Unknown Quality – Areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag, and cinders (up to 1.0 m) was found across the site (P&R 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R 1991).

30) Potential Impacts from Adjacent Properties to the North – Historical and current operations on properties to the north have the potential to impact the Phase One Property, including rail lines, paper manufacturing, auto body repair shops, gasoline station, trucking company, concrete products manufacturing, plastic

products manufacturing, electroplating company, window/door manufacturing, paint application, and scrap yard.

31) Potential Impacts from Adjacent Properties to the East – Historical operations on the property to the east have the potential to impact the Phase One Property, including steel manufacturing, foundry operations, packing manufacturing, potential USTs, bulk fuel storage, scrap yard, chemical manufacturer/distribution, and transformer use.

32) Potential Impacts from Adjacent Properties to the South – Historical operations on properties to the south have the potential to impact the Phase One Property, including metal product manufacturing, potential USTs, and a transportation company.

33) Potential Impacts from Adjacent Properties to the West – Historical operations on properties to the west have the potential to impact the Phase One Property, including window manufacturing, metal treatment, metal product manufacturing, former refractory facility, and motor vehicle part manufacturing.

1.5 Soil and Groundwater Quality from Previous Investigations

The Phase One ESA identified areas on the Site where previous subsurface investigations had identified contaminants of concern in soil and groundwater at concentrations exceeding the Ontario Ministry of the Environment, Conservation and Parks' *Table 6 Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* for Residential/ Parkland/ Institutional/ Industrial/ Commercial/ Community property use and coarse textured soils, which are specified in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act,* dated April 15, 2011 (Table 6 Standards) (MECP 2011b). Analytical results were summarized from previous investigations conducted by P&R (1991), Gartner Lee (1999), AECOM (2010 to 2016), Earth Tech (1999), DCS (2007 and 2014), and WSP (2016).

1.5.1 Soil Quality

Previous soil investigations were conducted on the Site by P&R (1991), Gartner Lee (1999), Earth Tech (1999), DCS (2007 and 2014) and WSP (2016) and indicated soil exceedances of the Table 6 Standards for metals and inorganics, VOCs, PHCs, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). The following points summarize the findings of these investigations:

- Inorganic and metals exceedances were widespread across the Site. The predominant chemical found was zinc, with concentrations over 10,000 µg/g found in the northeastern corner of the Site in the area of the former galvanizing/plating building. The area was excavated to bedrock in 1999 and backfilled with granular B material (Earth Tech 1999). Soil samples collected in the area after remediation indicate exceedances of zinc, cadmium, cyanide, and lead. Exceedances over the remainder of the Site other than zinc were mostly due to lead and cadmium.
- VOC concentrations that were detected above the Table 6 Standards were limited to benzene, toluene, ethylbenzene, xylene (BTEX), tetrachloroethylene (PCE), and trichloroethylene (TCE) at five locations. BTEX had marginal exceedances in the area of the former maintenance garage; benzene had a marginal exceedance south of the PCB capacitor room; and TCE and PCE were detected at low concentrations (under 1 µg/g) at three locations near the northeastern property line.
- Locations where PHCs were analyzed in accordance with current methodology were limited to five boreholes and 10 test pits sampled by DCS in 2007 and 2014. Concentrations detected above the Table 6 Standards were found for F3 in two locations: southeast of the former capacitor room and south of the northeastern excavation. Older hydrocarbon analyses showed elevated concentrations near the former maintenance garage in the area of the former fuel ASTs, the paint shop, the southwestern end of the foundry, and at the northeastern excavation area. Confirmatory wall samples of the excavation indicated remaining elevated TPH concentrations.

- PAHs were detected at concentrations above the Table 6 Standards at approximately 30 percent of the locations analyzed. Exceedances were found at various locations across the Site, including samples from the excavated soil at the northeastern portion of the Site. The highest concentrations were found southeast of the former capacitor room at concentrations up to 900 µg/g.
- PCB concentrations above the Table 6 Standards were found in the area of the former maintenance garage, at confirmatory samples from the PCB remediation in the former capacitor room, and southwest of the former machine shop. Concentrations were found up to 10 µg/g.

1.5.2 Groundwater Quality

Previous investigations were conducted by P&R (1991), Gartner Lee (1999 and 2004), AECOM (2010 to 2016), and WSP (2016), and indicated groundwater exceedances of the Table 6 Standards for metals and inorganics, VOCs, PHCs, PAHs, and PCBs. Full site characterization for the monitoring wells and parameter groups has not been conducted since 1998. Subsequent sampling has focused on the eastern portion of the Site for the primary COCs, with annually sampling conducted by AECOM since 2010. The following points summarize the findings of the investigations:

- Metal and inorganic exceedances detected on the Site were mainly due to zinc, which has exhibited exceedances over most of the Site. The highest concentrations of metals were generally found in the northeastern corner of the property by the former galvanizing building. Prior to the excavation, zinc was measured up to 42,000 µg/L; after remediation, concentrations of zinc were found up to 3,200 µg/L. Lead was found at four locations across the Site exceeding the Table 6 Standard with concentrations up to 32 µg/L. Thallium, arsenic, barium, and cadmium were found in localized areas along the southeastern and southwestern property boundary. Other metal exceedances were limited samples collected within the northeastern corner prior to excavation (antimony, beryllium, chromium, cobalt, copper, mercury, molybdenum, nickel, and vanadium).
- VOC exceedances detected on the Site were mainly chlorinated VOCs and BTEX parameters. The chlorinated VOCs were found mainly on the eastern portion of the Site, with high concentrations for TCE, cis- and trans-1,2-dichloroethylene (DCE), and vinyl chloride. Lower concentrations of TCE were found over most of the central and eastern portions of the Site. Other than historical detections prior to the northeastern excavation, trichloroethane (TCA) and derivatives were found on the southern portion of the Site with the highest concentrations downgradient of the former electrical shop at 140 µg/L. The highest concentrations of BTEX were measured in the northeastern portion of the property, from sampling events prior to the soil excavation in the area. BTEX concentrations on the remainder of the property were below the Table 6 Standards with the exception of one location in the vicinity of the former UST.
- Of the samples where PHCs were analyzed in accordance with current methodology, seven locations had exceedances of the Table 6 Standards. Most of these were located in the eastern portion of the Site, with the exception of one located in the vicinity of the former capacitor room. Free product has been observed at OW23S on multiple occasions. Older hydrocarbon analyses indicated elevated concentrations in the northeastern area that was excavated, near the former maintenance garage, in the vicinity of the former ASTs, and near the southern property corner
- PAHs were found exceeding the Table 6 Standards in eight locations onsite. The greatest concentrations were from pre-excavation samples collected in the northeastern area of the Site, up to 229,000 µg/L. Concentrations post-remediation were found up to 280 µg/L. Elevated concentrations were also found at OW23S where free product has been detected. Other areas across the Site reported detected concentrations below 3 µg/L.
- Of 16 locations where PCBs were analyzed, one location exceeded the Table 6 Standards, located southeast of the foundry. The PCB remediated area of the former capacitor room reported concentrations of 1.27 µg/L.

1.6 Phase One Conceptual Site Model

A conceptual site model (CSM) was prepared for the Site. The following bullets summarize the principal elements of the CSM:

- Buildings do not exist on the Phase One Property. Historical building foundations and other potential below-grade structures remain. No buildings were known to have basements; however, based on historical reports, pits and sumps were present throughout the foundry.
- Waterbodies do not exist within the Phase One Study Area. The closest water body to the Site is the Eramosa River, which is approximately 0.5 kilometres (km) southeast of the Site and travels 1.4 km before running into Speed River as shown on Figure 2-1 (Appendix D3).
- There are no areas of natural and scientific interest within the Phase One Study Area based on presently available information.
- No existing drinking water wells were identified on the Phase One Property. Thirty wells indicated as water supply or domestic use wells were identified within 1 km of the Site. The wells were found to be located outside the Phase One Study Area. Water wells within 1 km of the Site are shown on Figure 4-4.
- Figure 6-1 presents the roadways and land use within the Phase One Study Area.
- Based on the Phase One ESA, a number of PCAs occurred in the Phase One Study Area, which are summarized within the APECs in Table 7.3-1, and their locations shown on Figure 4-1a and Figure 4-1b (Appendix D3).
- Based on the Phase One ESA, 29 PCAs were identified onsite and have been identified as APECs. Four APECs associated with offsite PCAs within the Phase One Study Area have been interpreted to have the potential to impact the Phase One Property. The areas where these 33 APECs are interpreted to have potential impacts are shown on Figures 4-1a and 4-1b (Appendix D3).
- The COPCs identified within the Phase One Study Area include metals and inorganics, VOCs, PHCs, PAHs, PCBs, acid base neutral components (ABN) and chlorophenols. This list includes COPCs that are confirmed to be present based on historical investigations. Based on previous reports and contaminant concentrations, there is a potential for free phase product to exist on the Site.
- Although utilities have been disconnected onsite, piping and bedding have not been removed and, therefore, there is a potential for utility corridors to be providing a preferential route of contaminant migration.
- The Site topography varies from approximately 315 and 316.5 metres above sea level (masl) based on topographic information and previous investigations completed at the Site. The Site and surrounding lands generally slope southeast to the Eramosa River.
- Geology from previous investigations indicate subsurface materials consisting of fill (varying from 0.3 to 3.2 m deep), underlain by native silty fine sand. The approximate bedrock depth based on past investigations on the Site was 2.0 mbgs (elevation of 313.5 masl) and ranged from approximately 0.7 m to 3.4 mbgs (elevation of 312.7 to 315.0 masl). The bedrock was described as dolostone, grey, porous, and highly fractured with a rock quality index indicating it is highly weathered and fractured (Gartner Lee 1999).
- The regional geology indicates the Phase One Study Area consists of "silt to sandy silt matrix, becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward" (OGS, 2000), and bedrock of the Guelph Formation, consisting of sandstone, shale, dolostone, siltstone (OGS, 1991). The bedrock elevation is approximately 305 masl based on *OGS Preliminary Map P.2224, Guelph Area, Southern Ontario, Bedrock Topography Series* (Karrow 1979).

- Groundwater levels at the Site have been measured during previous investigations between 2.02 and 4.13 mbgs (310.84 to 316.40 masl) with an inferred groundwater flow direction to the south, towards the Eramosa River.

This information has also been summarized in Table 7.4-1.

Based on the uncertainties documented in the Phase One ESA (CH2M 2017), it is possible that a PCA/APEC or land use has not been identified within the individual components of the Phase One ESA. Information was gathered from numerous sources (including aerial photographs, City Directories, database searches, historical reports, interviews, and site reconnaissance), which decreases the chance that a major PCA or land use was not identified in the Phase One ESA. Many aspects of the CSM have been previously studied and verified through subsurface investigations (for example, groundwater flow direction); these aspects are not directly affected by the noted uncertainties.

1.7 Phase One ESA Conclusions

Based on the findings of the Phase One ESA investigation (CH2M 2017), potential and confirmed impacts exist at Site, and a Phase Two ESA is required before an RSC can be filed. Previous subsurface investigations have been completed onsite and have documented that its subsurface quality does not meet O. Reg. 153/04 standards for potential redevelopment with more sensitive land uses. Additional subsurface characterization and associated environmental work is required before an RSC is filed.

1.8 References

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Tables

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
Environmental Investigation, International Malleable Iron Company, 200 Beverley Street, Guelph Ontario	June 10, 1991	Proctor & Redfern Limited	The Bank of Montreal	An environmental investigation, including a background review, was conducted onsite that incorporated a preliminary investigation conducted by P&R in 1989. The background review included a title search, review of aerial photographs, FIPs, and building permits as supplied by the City of Guelph, discussions with municipal and MOECC personnel, and an interview with a former IMICO employee. The field program included excavating 55 test pits, advancing 5 boreholes (completed as monitoring wells) and completing 16 corehole locations in 1991. The test pit locations included central test pits (A to L in 1989, and 1 to 12) in areas of suspect soil contamination, excavated to clean native soil or bedrock, and an additional 31 shallow test pits to help delineate contaminants.
City of Guelph, Former IMICO Facility Demolition and Waste Removal Report	October 7, 1999	Earth Tech (Canada) Inc.	City of Guelph Works Department Engineering Services Division	Earth Tech (previously P&R) was retained to provide contract tendering and administration of the demolition of buildings and clean up of waste materials at the Site to address the Director's Order issued by the MOECC in 1994. Waste materials (ACM, PCB-containing material, liquid wastes, foundry sands, contaminated concrete) were removed from the Site and Remediation (excavation and disposal) was completed for two areas on the Site: the north east corner of the Site where a previous plating room was located, and the area of the capacitor rooms that formerly housed PCB capacitors. Removal activities in the capacitor room included removal of a concrete floor, a utility trench, a subfloor, and a sump that were all indicated as PCB-impacted; material was excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 µg/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capactor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil and grease in the northeast corner of the Site. The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated some zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines at the time. Groundwater monitoring programs were recommended for areas downgradient of the capacitor room and northeast corner of the Site.
Supplemental Hydrogeological Investigation Former IMICO Site	March 8, 1999	Gartner Lee Limited	The City of Guelph	A hydrogeological site assessment was conducted that consisted of drilling eleven boreholes, installing nine monitoring wells (four in the bedrock) and collecting soil and groundwater samples. The stratigraphy over most of the Site was defined as coarse fill materials underlain by native silty fine sand. The depth of the fill materials ranged from 0.3 to 3.2 m from the southern to the eastern portions of the Site. Shallow groundwater flow was observed from the south to southwest, with a high around OW2. The average lateral velocity was measured at 107 m/yr. Flow in the bedrock was generally to the south with a velocity of 14 m/yr. Vertical gradients were downwards, with the exception of OW9 and OW11 where measurements indicated occassional upward gradients. Soils were found to be impacted with metals (mainly zinc and lead), TPH, VOCs and PAH/phthalates in the area immediately east of the former annealing room, with impacts found up to the top of bedrock (1.5 to 2.0 mbgs). Groundwater was found impacted with TPH (heavy oil), zinc, and lead which were primarily found at the northeast portion of the Site. Some localized exceedances of PAHs were also reported. Elevated chlorinated VOCs (specifically TCE and VC) were observed on the east property boundary (OW18 and OW19). NAPL was identified at OW21-1 within the dolostone bedrock which was determined to be fuel oil comprised of PAHs/phthalates. Suspected free product was previously observed in monitoring wells in the same area (OWI-1). The development of a remedial action plan was recommended.
Contaminant Investigation 490 York Road, Guelph, Ontario	May 12, 2004	Gartner Lee Limited	The City of Guelph	An investigation of the adjacent property at 490 York was conducted in a response to an MOECC Provincial Order (No. 7616-5LAL3S) from 2003 to better define groundwater quality and source of the VOC contamination at the east end of the IMICO site. Three pairs of monitoring wells (OW28, OW29, and OW30) were installed (shallow at approximately 6 m and deep at approximately 12 m), developed and sampled for analysis of major ions, metals, TPH, VOCs, PAHs, and general chemistry. It was noted in the report that groundwater at the northeast corner of the IMICO site may be influenced by water takings (industrial) at Holody, located 500 m to the northeast. Shallow groundwater was noted to flow to the southeast within the investigation area, likely influenced by the presence of the bedrock ridge. Other factors affecting the flow include buried services such as storm drains, low permeable surfaces (asphalt, buildings, concrete), and surface topography. It was noted in the report that groundwater at the northeast corner of the IMICO site may also be influenced by water takings (industrial) at Holody, located 500 m to the northeast. The stratigraphy was found to be composed of fill (up to 0.4 mbgs), native soil, and dolostone bedrock. The depth to bedrock ranged from 2.2 to 4.3 mbgs. Vertical gradients at the newly installed well nests were found to be downward. Chlorinated VOCs (TCE and degradation products), lead, and zinc were found in the groundwater on 490 York Road.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
Phase I Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	December 20, 2007	Decommissioning Consulting Services Limited	The City of Guelph	DCS conducted a Phase I ESA of the Site to prepare for its redevelopment, which required a subsequent Phase II ESA, and remedial action plan activities. The Phase I ESA consisted of a historical review of past land use (ERIS, aerials, ownership information), review of previous reports, and a site reconnaissance. The IMICO Site was determined to be first developed in 1912 as a foundry and was closed/abandoned in September 1989. The site reconnaissance provided limited information as there were no buildings/structures present. Information that was gathered from reports reviewed by DCS that were not available to CH2M are as follows: Philip Environmental - Earthtech Remedial Program 1989/1999 - included the decomissioning of wells OW01-I, OW01-II, OW20 and OW21 in the northeast corner of the site in April 1999, before the excavation of soil in the area. Gartner Lee Investigations 2000/2001 - included the installation of six monitoring wells in three locations (OW22S/D, OW23S/D and OW24S/D) following the excavation of impacted soils in the northeast corner of the property, and an additional well (OW25) in the vicinity of the remediated capacitor room. Additionally, nine test pits were advances in the southwestern portion of the property because of anomalies detected on the geophysical survey conducted. The anomolies were determined to be buried ferrous material. Soil sample collected indicated elevated zinc and TPH concentrations. Free product was noted in two of the shallow monitoring wells (OW22S and OW23S), which was found to be highly weathered with a slight oil/diesel odour. It was noted that the soil and groundwater conditions did not meet the background standards for metals, PHCs, and PAHs at many locations. Additional subsurface investigations were recommended in the following areas: - Current concentrations of the residual contamination at the eastern property boundary in soil and groundwater (metals, VOCs, PHCs); volatiles may have degraded from original concentrations - Further definition of the residual PCB contamination in the soil and groundwater in the vicinity of the capacitor room - Delineation of metal and occasional VOC impacts on the western site boundary - Investigation of groundwater impacts downgradient of the Site on Kingsmill Avenue
Phase II Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	December 21, 2007	Decommissioning Consulting Services Limited	The City of Guelph	A total of 40 boreholes were advanced at the Site, with 10 locations completed with monitoring wells (BH07-40 through BH-71, OW07-31 through OW07-38). Two of the monitoring well locations had both a shallow (5 to 7 mbgs) and deep (10 mbgs) monitoring well installed at the location (OW-24 and OW36). Analytical results were compared to both the Table 1 and Table 2 Standards. Soil exceedances included metals (widespread), PHCs (eastern end of the property, in the vicinity of the former maintenance garage, and one sample south of the capacitor room; F3 the predominant fraction), limited VOC exceedances (BTEX, no chlorinated VOCs identified), PAHs, and PCBs (maintenance garage and south of the former capacitor room). Synthetic leach samples for metals, VOCs, PHCs, PAHs, and PCBs indicated concentrations of copper, lead, and zinc exceeding proposed criteria. Groundwater exceedances included metals (mainly zinc on the east property boundary), PHCs (northeast end of property and south of the capacitor room), VOCs (mainly chlorinated VOCs with the highest concentrations on the east end of the Site), PAHs, and PCBs (one south of the capacitor room). DCS concluded that given the nature of the soil and groundwater quality on the Site, an extensive soil remediation program would be required to clean up to generic standards for the property to be suitable for residential or parkland use. Additionally, they concluded if using a RA, the property boundaries would still need to meet MOECC potable groundwater standards.
Preliminary Remedial Action Plan Former IMICO Property 200 Beverley Street, Guelph, Ontario	March 6, 2008	Decommissioning Consulting Services Limited	The City of Guelph	Four main scenarios were considered for the preliminary remedial action plan: 1) Using applicable Table 1 Standards (background) 2) Completing a limited scope RA to allow for the use of Table 2 Standards (potable) 3) Completing a limited scope RA to allow for the use of Table 2 Standards and elevated zinc background values 4) Completing a full scope RA for the proposed site specific land use Option 1 required the remediation of approximately 80,000 cubic m3 of soil, Option 2 would reduce the remediation required to 54,000 m3 of soil, Option 3 would require 23,000 m3 of soil based on the evidence of elevated background zinc concentrations in the Guelph area. Option 4 assumes many soil impacts can be managed on site by risk management measures and limited soils would require removal. For groundwater, the western part of the Site indicated the most practical approach to be completing a limited scope RA to justify the use of Table 2 Standards and installation of recovery wells and a standby treatment system to prevent potential contamination migrating offsite. For the eastern portion of the Site, recommendations were for an ex situ groundwater remediation system, consisting of particle filter and granular activated carbon unit, was recommended to treat groundwater and discharge to the Guelph Sanitary Sewer. The particle filter would remove suspended particles that might contain metals, PAHs, PCBs, and PAHs, and the activated carbon would treat the VOCs. Further groundwater investigations were recommended as the potential for recontamination was likely high.
2010 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	April 23, 2012	AECOM Canada Limited	The City of Guelph	AECOM (formerly Gartner Lee Limited) has been conducting semi-annual groundwater sampling and quarterly water level monitoring since 1998. The 2010 monitoring events occurred in March, June, October and December with groundwater samples collected in March and October. The groundwater wells in the monitoring well network included those installed offsite on 490 York Road, on Beverley Road, along the CP Rail property and on Simcoe Street, for a total of 18 shallow wells and 13 deep wells. Groundwater flow in the shallow aquifer was determined to be south to southwest, toward the Eramosa River. Deeper groundwater was measured at similar elevations across the site indicating little to no horizontal groundwater flow. LNAPL was measured in OW23 at 0.06 to 0.15m over the four monitoring events. Groundwater chemistry was compared to the Table 2 Standards for industrial/commercial/community property use. Inorganics found exceeding the standards were zinc, chloride and sodium; the chloride and sodium only occuring offsite at the 490 York Road property, likely because of road salting. Zinc was found in six wells, all along the eastern property boundary. PAHs exceeded standards offsite at 490 York Road, and at one location in each the central (OW25) and west (OW16) portion of the Site. PHCs and PCBs were elevated downgradient of the former capacitor room (OW25 and OW26S, respectively) during the 2010 event. The PCB concentration met Table 2 Standards used for comparison, but does not meet current Table 6 Standards. PHCs were also elevated offsite at 490 York Road (specifically F1, differing from the F2-F4 concentrations historically found on the Site) and had not been measured at OW22S or OW23S since 2007. Elevated VOCs included TCE, cis-1,2-DCE, 1,1-DCE, VC, and TCA and were mainly found at the eastern property boundary and on 490 York Road. The highest concentrations of TCE were found offsite at OW30D. Trend analysis indicated that TCE concentrations had mostly stabilized over time, with some wells showing a decreasing trend.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
2011 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	August 15, 2013	AECOM Canada Limited	The City of Guelph	The 2011 monitoring events occurred in June, September, and December, with sampling occuring in the first two events. Groundwater flow in the shallow aquifer was similar to previous events, deeper groundwater indicated a hydraulic high near OW23D. LNAPL was measured in OW23S at 0.04 to 0.15 m the four events. Groundwater exceedances for inorganics were found for zinc at seven wells and lead in one well. Chlorinated VOCs were similar to concentrations found in 2011, and TCE was noted to be decreasing. PAHs and PHCs were similar to previous years concentrations. PCBs were not analyzed and removed from the program in 2011, despite the last measured concentrations being above Table 6 Standards.
2012 & 2013 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverley Street, Guelph, Ontario	March 21, 2014	AECOM Canada Limited	The City of Guelph	The 2012 and 2013 annual report included additional slug test for the offsite wells indicating hydraulic conductivities generally consistent with those measured onsite. Monitoring events reduced to semi-annually and occurred in June and December 2012 and August and October of 2013. Sampling reduced to annually and occurred in December 2012 and October 2013. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater indicated a hydraulic high presented near OW18-II. LNAPL was measured in OW23S between 0.03 to 0.08 m over the four events. Pressure transducers were installed in three well nests (OW18, OW27 and OW30) between August 23 and August 31, 2013 (Friday through Saturday) to observe any possible influence of the water takings from nearby wells. No precipication events occured during the period. Water fluctuations were measured in the shallow wells during 2 weekdays: up to 30 cm in OW27S and OW30S and up to 15 cm in OW18-I. Water levels remained steady in bedrock wells OW18-II and OW30D, but fluctuated daily beginning August 26 (Monday). The MOECC stated that Holody Electro Plating has a PTTW for up to 50 imperial gallons per minute, and the water taking occurs continuously during the work week. This pumping is likely affecting the water levels at the Site and may be influencing groundwater flow direction. Groundwater exceedances for inorganics were found for zinc at five wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011. Degredation products were plotted alongside the TCE concentrations plots. PHC exceedances occured onsite at OW25, OW22S, OW23S (product measured in this well) and offsite at OW36S and OW30D. PAHs were similar to previous years concentrations.
Phase One Environmental Site Assessment 200 Beverley Street, Guelph, Ontario	February 11, 2014	Decommissioning Consulting Services	The City of Guelph	A Phase One ESA was conducted by DCS to assess the existing site environmental conditions and identify environmental concerns that might affect the future use of the Site. A review of historical information including historical reports, aerials, MOECC documents, FIPs, chain of title information, historical databases were completed, as well as a site reconnaissance. Nine APECs were identified by DCS: 1) Fill of Unknown Quality 2) Former UST on the east portion of the Site 3a) Former Iron and Steel Processing including sand mixing and foundry sumps 3b) Former PCB-containing Capacitors in the Foundry 4) Former Metal Treatment, Coating and Finishing 5) Historical Garage, Maintenance and Repair Area on the western property boundary 6) Historical Use and Storage of PCBs in the northeastern portion of the property 7) Former Metal Treatment, Coating and Finishing 8) Chemical Manufacturing, Processing and Bulk Storage (North of the Site) 9) Guelph Rail Line Adjacent to the Site (North of the Site) COCs identified were metals, PHCs, BTEX, PCBs, PAHs, and VOCs. Previous investigations reviewed identified impacts from metals VOCs, PHCs, PAHs, and PCBs. Additional Phase Two work was recommended.
Phase Two Environmental Site Assessment Former IMICO Property 200 Beverley Street, Guelph, Ontario	April 2, 2014	Decommissioning Consulting Services	The City of Guelph	The DCS investigation included excavation of 10 test pits, advancing three boreholes; two of those locations additionally installed a monitoring well. Soil samples were collected for metals, VOCs, PHCs, PAHs, and PCBs. Groundwater samples were collected from the newly installed wells as part of the annual monitoring (AECOM). Groundwater flow was determined to be to the south in the shallow bedrock/overburden, and flow in the deeper bedrock appears to be somewhat radial from the east property boundary. Groundwater velocities in the two units were measured at approximately 15 m/yr and 55 m/yr; an upward gradient was found to be present in some wells. Soil was compared to the MOECC Table 6 Standards and indicated elevated metals across the property and localized exceedances of PAHs and PCBs. Groundwater was found with elevated concentrations mainly on the eastern portion of the Site consiting of VOC, specifically TCE and degredation products, and some PAHs.
Preliminary Remedial Action Plan Former IMICO Property 200 Beverley Street, Guelph, Ontario	April 14, 2014	Decommissioning Consulting Services	The City of Guelph	DCS completed a preliminary remedial action plan for the Site to prepare for its redevelopment. Viable options for soil management included an RA or MGRA in combination with some excavation and offsite disposal. Options for the groundwater were an RA or MGRA with localized free product removal and potential VOC remediation. The source and extent of free product in OW23S would need to also be determined. The presence of offsite impacts were also reported to need further investigation and agreement amoung the City, MOECC, and stakeholders on appropriate remedial measures or management of groundwater impacts.

Table 4.1.5-1. Summary of Environmental Reports

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph

Report Title	Date	Author	Prepared for	Description [a]
2014 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	April 30, 2015	AECOM Canada Limited	The City of Guelph	The 2014 annual monitoring included semi-annual events in July and October with groundwater sampling in October. Wells were re-surveyed accross the Site for top of pipe elevations, with some differences up to 0.45 m from original surveyed elevations, resulting in some minor changes in groundwater flow and hydraulic gradients. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater was reported as generally flat with a hydraulic high presented near OW18-II, as previously reported. LNAPL was measured in OW23S between 0.05 to 0.32 m during 2014. Vertical gradients were generally down, with the exception of OW9, OW11, OW30, OW07-34, and OW07-36, which had upwards hydraulic gradients in 2014. Groundwater exceedances for inorganics were found for zinc at four wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic degredation of TCE in bedrock. PHC and PAHs were similar to previous years' results.
Vertical Delineation of the Extent of Groundwater Impacts at the Former IMICO Site, 200 Beverley Street, Guelph, Ontario	December 8, 2016	WSP Canada Inc.	The City of Guelph	WSP conducted a vertical delineation investigation at the Site to address the concern that over the years concentrations of TCE and related degredation products have been increasing at the northeastern wells. The presence of shalllow porous fractured bedrock (Guelph Formation) has contributed to the migration of TCE and degredation products to deeper depths. The investigation included the installation of a telescopic bedrock monitoring well within an area where identified dense NAPL (TCE and degredation products) were found in the groundwater, in the north east corner of the Site. The well was drilled, cored, and sealed to 29 m, with an open hole left at 29 to 33 m. Geologic features and competent bedrock formations were reported. The Site is underlain by the Lockport Group, consisting of the Guelph Formation, Eramosa Formation, Goat Island Formation, and the Gasport Formation. The Guelph Formation, which is noted to be a major regional aquifer, has a flow from the north to south and discharge points to the Speed and Eramosa Rivers. The Eramosa Formation is considered a regional aquitard and is a semi-confining unit because of vertical and horizontal fractures. The lower portion of this formation (the Vinemount Member) is considered a better aquitard. The region draws water from two major zones: the upper fractured weathered portion of the bedrock and the deeper highly fractured porous Gasport Formation. Groundwater samples were collected during the drilling and run through a handheld gas chromatograph as well as submitted to a lab for PHC and VOC analysis. TCE was found up to approximately 24 m within the Eramosa formation.The highest concentrations of TCE (432 µg/L) and cis-1,2-DCE (244 µg/L) were reported from approximately 9 to 12 m. Degradation products were found in the final investigated depth in the Goat Island Formation above the Table 1 Standards. PHC exceedances were also noted, but were noted to be likely related to the natural presence of hydrocarbons in the Guelph and Eramosa Formations.
2015 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	January 31, 2017	AECOM Canada Limited	The City of Guelph	The 2015 annual monitoring included semi-annual events in September and November with groundwater sampling in November. Groundwater flow in the shallow aquifer was southerly, similar to previous events; deeper groundwater is reported as generally flat with a hydraulic high presented near OW18-II, as previously reported. LNAPL was measured in OW23S between 0.032 to 0.05 m during 2015 and a total of 650 mL of product was purged from the well over two events. Vertical gradients are generally down, with the exception of upwards gradients observed at one or more events for OW9, OW11, OW26, OW07-34, and OW07-36. Groundwater exceedances for inorganics were found for zinc at five wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic degredation of TCE in bedrock. PHC and PAHs were similar to previous years results.
2016 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario	June 26, 2017	AECOM Canada Limited	The City of Guelph	The 2016 annual monitoring included semi-annual events in August and October with groundwater sampling in October. Groundwater flow in the shallow aquifer was southerly similar to previous events; deeper groundwater is reported as generally flat with a hydraulic high presented near OW30D, where groundwater flows in a northeasterly direction. LNAPL was measured in OW23S between 0.04 and 0.02 m during 2016 and approximately 200 millilitres of product was purged from the well over two events. Vertical gradients are generally down, with the exception of upwards gradients observed at one or more events for OW9, OW11, OW26, OW30, OW07-34, OW07-36, and OW13-39. OW27S/D were not sampled, as there was significant damage to the well casing and PVC pipes by road construction on Simcoe Street. Groundwater exceedances for inorganics were found for zinc at three wells. Overall, concentrations of chlorinated VOCs were consistent with results from 2011, indicating TCE decreasing in the shallow aquifer. Degradation products were plotted alongside the TCE concentrations plot and show concentrations increasing in the deeper wells as expected because of downward flow and anaerobic deredation of TCE in bedrock. PAHs were similar to previous years results. PHCs were similar with the exception of OW22S, OW23D, and OW30D, which had an increase in concentrations.

Notes:

[a] Historical data from previous reports have been summarized in Sections 4.1.5.2 for Soil and Section 4.1.5.3 for Groundwater; Data is also presented on Figures 4-2a through 4-2f for soil, and 4-3a through 4-3f for groundwater.

µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
ACM = asbestos-containing material
APEC = area of potential environmental concern
BTEX = benzene, toluene, ethylbenzene, and xylene
cm = centimetre(s)
COC = contaminant of concern
DCE = dichloroethylene
ESA = environmental site assessment
FIP = fire insurance plan
IMICO = International Malleable Iron Company
LNAPL = light nonaqueous phase liquid
m = metre(s)
m^3 = cubic metre(s)
m/yr = metre(s) per year
mbgs = metre(s) below ground surface
MGRA = modified generic risk assessment
MOECC = Ministry of the Environment and Climate Change, formerly the Ministry of the Environment
NAPL = non-aqueous phase liquid
P&R = Proctor & Redfern
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbons
PTTW = permit to take water
RA = risk assessment
TCA = trichloroethane
TCE = trichloroethylene
TPH = total petroleum hydrocarbons
UST = underground storage tank
VC = vinyl chloride
VOC = volatile organic compound

Table 7.1-1. Current and Past Land Uses for Phase One Property

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Year	Name of Owner	Name of Occupant	Inferred Description of Property Use	Inferred Property Use (according to Regulatory Types)	Other Observations (for example, from Aerial Photograph and Fire Insurance Plans) [a]
1997 - present	City of Guelph	No occupant	Vacant	Industrial	Aerials show the Site buildings demolished between 1998 and 2006 and the Site vacant thereafter
1993 - 1997	The Assembly of the Church of the Universe	The Assembly of the Church of the Universe	Unknown	Institutional/ Industrial	Aerials during this time show damage (assumed from fires) to the buildings on Site
1992 - 1993	John H. Long	John H. Long/Unknown	Storage	Industrial	No additional information available for this time period
1913 - 1992	International Malleable Iron Company Limited	International Malleable Iron Company Limited	Iron-jobbing Foundry	Industrial	Aerials, FIPs show industrial use through this time period; previous reports indicate operations ceased in 1989
1834 - 1913	Various	Owner or unknown	Agricultural or Residential	Agricultural or Residential	Private individuals were listed in the Title Search; no aerials were available before 1930, and no FIP coverage was available for the area prior to 1916

[a] Additional information was obtained from the City Directories, Title Search, site observations, interviews and aerial photographs documented in this report.

Notes:

FIP = fire insurance plan

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
APEC-1	Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS, 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main Foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech, 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the north west corner of the building and drained to the truck bay (P&R, 1991).	Central portion of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	VOCs, PHCs, PAHs, ABNs, CPs, metals	Soil and Groundwater
APEC-2	Machine Shop - A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945 and 1960 showed this area changed operations to 'Shipping' and a 'Pattern Shop'.	East end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-3	Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the north wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't'. The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or USTs for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel oil fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the north side of the Annealing Room.	East end of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-4	Sand Storage - The 1916 FIP shows a 'Sand Shed'. The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand'. The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks', and an additional area to the north labeled 'Sand'. No information was identified to if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.	Central portion of the Site	32	Iron and Steel Manufacturing and Processing	Onsite	PAHs, ABNs, CPs, metals	Soil and Groundwater
APEC-5	Galvanizing Building - A small free standing building for 'Galvanizing' was present on the south east portion of the Site as shown on the 1916, 1929 and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.	Southeast end of the Site	33	Metal Treatment, Coating, Plating and Finishing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-6	Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946 and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior west side of the building.	Central portion of the Site	34	Metal Fabrication	Onsite	Metals	Soil and Groundwater
APEC-7	Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil", and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the north building remaining, but is not labeled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R, 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech, 1999).	Central portion of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	BTEX, PHCs	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
APEC-8	Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labeled as a 'time office'), but does not show the UST. The gasoline use is not known, however it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R, 1991).	Southeast end of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	VOC, PHCs, PAHs, metals	Soil and Groundwater
APEC-9	Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil". The building/structure is not on 1916 FIP where the area is shown as exterior yard area, and is not present on the 1960 FIP where the area is occupied.	Southeast end of the Site	28	Gasoline and Associated Products Storage in Fixed Tanks	Onsite	BTEX, PHCs	Soil and Groundwater
APEC-10	Machine Shop - A machine shop is shown on the 1929, 1946 and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop. The north portion of the machine shop was removed during the 1999 excavation based on the excavation footprint (EarthTech, 1999).	East end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-11	Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R, 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS, 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product, but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 ug/L of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25% of the sampling events between 2005 and 2016.	Northeast end of the Site	33	Metal Treatment, Coating, Plating and Finishing	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-12	Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.	Central portion of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-13	Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929 and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.	Central to northeast end of the Site	46	Rail Yards, Tracks and Spurs	Onsite	PAHs, metals	Soil and Groundwater
APEC-14	Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.	South end of the Site	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-15	Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R, 1991; GLL, 1999; Earth Tech 1999) do not have an indication of the buildings use.	Central portion of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PHCs, PAHs, ABNs, CPs, metals	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
APEC-16	Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.	Central portion of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-17	Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigationsite plan, and later remediated as part of the Earth Tech demolition (P&R, 1991; EarthTech, 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 - 1.3 mbgs) to remove concentrations above 5 ug/g. Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 ug/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 ug/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated VOCs and PHCs (mainly F3) above the applicable potable water criteria (Table 6 Standards) (DCS, 2007b, 2014b; AECOM, 2017a and 2017b).	Central portion of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PCBs, PHCs	Soil and Groundwater
APEC-18	Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R, 1991, DCS, 2007a).	Northeast end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-19	Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.	Southeast end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-20	Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the west side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.	West end of the Site	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation Vehicles	Onsite	VOCs, PHCs, PAHs, metals, PCBs	Soil and Groundwater
APEC-21	Coal Storage - The 1960 FIP indicates coal storage south of the garage on the west side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labeled as coal.	West end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	PAHs	Soil and Groundwater
APEC-22	Transformer - A 1200-volt transformer is shown on the 1991 Site Plan (P&R, 1991).	Southwest end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-23	Paint Shop - First shown on the P&R Site plan, a paint shop was located at the north end of the site, between the shipping building and the storage area (P&R, 1991). Drums were stored against the north wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.	Northeast end of the Site	39	Paints Manufacturing, Processing and Bulk Storage	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-24	PCB Storage Area - An area located at the northeast corner of the finishing and annealing room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as 'storage' (P&R, 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech, 1999). Confirmatory samples below the pad were 0.63 and <0.05 ug/g. The soil was later excavated to bedrock as part of the soil remediation in the northeast corner of the property (see APEC-11).	Northeast end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater
APEC-25	Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities which occurred along the north property boundary (P&R, 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.	North end of the Site	8	Chemical Manufacturing, Processing and Bulk Storage	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-26	Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated non-detect concentrations of PCBs. Similarly one location installed during the DCS Phase II ESA (2007) indicated non-detect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.	West end of the Site	55	Transformer Manufacturing, Processing and Use	Onsite	PHCs, PCBs	Soil and Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
APEC-27	Former Electrical Shop - A small electrical shop was noted to be on the southwest corner of the foundry (P&R, 1991). This addition was not shown on the FIPs from previous years, and was shown as the exterior yard area west of the foundry.	Southwest end of the Site	34	Metal Fabrication	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-28	Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site Plan (P&R, 1991).	Southwest end of the Site	28	Gasoline and Associated Products Storage in Fixed	Onsite	VOCs, PHCs, PAHs, metals	Soil and Groundwater
APEC-29	Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag and cinders (up to 1.0 m) was found across the site (P&R, 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS, 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R, 1991).	Entire Site	30	Importation of Fill Material of Unknown Quality	Onsite	BTEX, PHCs, PAHs, ABNs, CPs, metals, PCBs	Soil and Groundwater
APECs from Offsite PCAs to the North							
APEC-30 (Offsite North)	Rail Lines - Bordering the north side of the Site, rail lines are present (owned by Guelph Rail Line) and have existed since at least the early 1900s. Has historically been indicated as the Canadian Pacific Railway (1916, 1929, 1946, 1960 FIPs and P&R [1991]), Guelph Junction Railway (EarthTech, 1999; DCS, 2007a).	Along Northern Property Boundary	46	Rail Yards, Tracks and Spurs	Offsite	VOCs, PHCs, PAHs, ABNs, CPs, metals	Groundwater
	Paper Manufacturing - Companies at 309 Elizabeth Street have been listed in the Scott's Manufacturing Directory for paper related manufacturing: Trinity Graphics was established in 1977 and 1978 with a plant sizes of 3,000 and 50,000 m^3 for paper bag and coated and treated paper manufacturing, all other converted paper product manufacturing, platemaking and related services; Independent Paper Converters was established in 1978 with a plant size of 56,000 m^3 for manufacturing including paper bag, coated and treated paper, plastic film and sheet. The 1960 FIP indicated gummed paper manufacturing (Top Paper Products).	309 Elizabeth Street	45	Pulp, Paper and Paperboard Manufacturing and Processing	Offsite		Groundwater
	Auto Body Repair Shop - An automobile wrecking and recycling record was listed in the ERIS report for Sutton Auto Collision at 349 Elizabeth Street, which is an autobody repair facility. Additionally Top Gun Auto Painting & Collision is listed at this address from the City Directory.	349 Elizabeth Street	10	Commercial Autobody Shops	Offsite		Groundwater
	Automobile Repair - Two automotive repair shops are listed in the City Directory at 349 Elizabeth Street from approximately 2005.	349 Elizabeth Street	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation	Offsite		Groundwater
	Gasoline Station - A private fuel outlet with a 2,250 L liquid fuel double walled AST for gasoline is listed in the ERIS report for Oaks Precast Ind. Div. Standard Ind. at 351 Elizabeth Street with a license issue date of 1990. An additional record indicates a tank capacity of 36,500 L.	351 Elizabeth Street	28	Gasoline and Associated Products Storage in Fixed Tanks	Offsite		Groundwater
	Trucking Company - A general freight trucking company (Polymer Distribution Inc.) is listed at 351 Elizabeth Street.	351 Elizabeth Street	11	Commercial Trucking and Container Terminals	Offsite		Groundwater
	Concrete Products Manufacturing - Lafarge Canada Inc. is listed at 351 Elizabeth Street, with a Scott's Manufacturing directory listing indicating an established date of 1933 and plant size of 50,000 ft^3.	351 Elizabeth Street	12	Concrete, Cement and Lime Manufacturing	Offsite		Groundwater
	Plastic Products Manufacturing - ERIS and the City Directory searches indicate plastic products manufacturing at 53 Victoria Rd S. Scott's Manufacturing directory listings indicate Sterling Creations was established in 1983 with a 5,000 ft^2 plant size, as well as Clear Choice Window Manufacturing established in 1990 with a 1,600 ft^2 plant size.	53 Victoria Rd S	43	Plastics (including Fibreglass) Manufacturing and Processing	Offsite		Groundwater
	Wire/Spring Manufacturing - ERIS searches list records for Guelph Wire Products which was established in 1974, plant size of 4,000 ft^2 and manufactures steel springs, wire springs and miscellaneous fabricated wire products.	53 Victoria Rd S	34	Metal Fabrication	Offsite		Groundwater
	Metal Valve Manufacturing - ERIS searches list records for DeNardis Industrial Sales Ltd. at 61 Victoria Rd S Unit C for metal valve manufacturing, established in 1985, plant size 4000 ft^2.	61 Victoria Rd S	34	Metal Fabrication	Offsite		Groundwater
	Former Spill - Spill records from ERIS indicated a release of diesel fuel in 2005 at 65 Victoria South.	65 Victoria Rd S			Offsite		Groundwater
	Electro-plating company - Holody Electro-Plating Limited is listed at 66 Victoria associated with metal product coating, iron and steel mills and ferro-alloy manufacturing since at 1955, with a plant size of 40,000 ft^2 according to available records from ERIS. The 1960 FIP showed labeled buildings for plating, polishing, and an office.	66 Victoria Rd S	33	Metal Treatment, Coating, Plating and Finishing	Offsite		Groundwater
	Window and Door Manufacturing - Clear Choice Window Manufacturing Inc. and Richview Doors Ltd are listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size. A spill at 75 Victoria Road South of a polymer emulsion (100lbs) in 2016 was reported.	75 Victoria Rd S	43	Plastics (including Fibreglass) Manufacturing and Processing	Offsite		Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
	Scrap Yard - B&F Scrap Dealers are listed at 100 Victoria Road South, with an automobile wrecking and recycling record in ERIS and listings in the city directory search from 1970 to 2011. A spill was reported at the property of a gasoline and water mixture (quantity not specified) in 2006 from cargo leaking to the ground.	100 Victoria Rd S	49	Salvage Yard, including automobile wrecking	Offsite		Groundwater
APECs from Offsite PCAs to the East							
APEC-31 (Offsite East)	Steel Valve Manufacturing - Guelph Engineering Co. was shown located at 10 Kingsmill Avenue, buildings on the 1960 FIP indicate steel valve manufacturing with a machine shop, pattern shop and oil house. Previous FIPs (1916, 1929 and 1946) show residences in this area.	10 Kingsmill Avenue	32	Iron and Steel Manufacturing and Processing	Offsite	VOCs, PHCs, PAHs, ABNs, CPs, metals, PCBs	Groundwater
	Former Stove Manufacturer/Foundry - Guelph Stove Company was shown at 490 York Road on the 1916, 1929, 1946 and 1960 FIPs. Buildings included a foundry, storage (coke, coal, sand), milling room, pattern shops, plating and buffing, offices, warehouses, steel mounting room & blacksmith, crating, stove mounting, and oil. Transformers are shown on the enamel building. Operations existed until approximately the mid-1960s where the city directory listings indicate Franklin Manufacturing Co (Canada) LTD and then Resco Refrigeration Supplies Co LTD from approximately 1970. The facility became a multi-tenant commercial companies from the 1990s to present.	490 York Road	32	Iron and Steel Manufacturing and Processing	Offsite		Groundwater
	Box Manufacturing - Packing manufacturers are listed at 136 Victoria Road South: Ellis Packing West Inc. listed as a corrugated and solid fibre box manufacturer; and ABCO Box and Carton Ltd. listed as a folding paperboard box manufacturer, established in 1946 with a plant size of 40,000 ft^2. The 1960 FIP shows ABCO Box and Carton Co. Ltd with buildings labeled for office, pattern making, cutting, raw stock, stripping, gluing and finished stock. ABCO was present until approx. 2000 when Ellis Packing West replaced them as listed in the city directory.	136 Victoria Rd S	45	Pulp, Paper and Paperboard Manufacturing and Processing	Offsite		Groundwater
	Potential USTs - On the 1960 FIP, McGregor Sportswear of Canada was shown to have 2 fuel oil USTs (2,500 gal each) on the property at 136 Victoria Rd S.	136 Victoria Rd S	28	Gasoline and Associated Products Storage in Fixed	Offsite		Groundwater
	Scrap Yard - Joe Brown & Son Ltd, a junk yard, is shown on the 1960 FIP at 150 Victoria; ERIS records include Hendersons Disposal Systems Ltd as the owner, and list the facility as a transfer service from 2000 to 2004, and 2005 as an Ontario numbered company.	150 Victoria Rd S	49	Salvage Yard, including automobile wrecking	Offsite		Groundwater
	Former Fuel Storage Facility - Multiple companies have been listed at 154 Victoria Rd S (Shell Canada Products, Doug Pollock Fuels Ltd, Granger Fuels) as an expired TSSA fuel storage facility with gasoline and diesel. A spill was reported in 1988 due to container overflow of 150 L of gasoline to the gravel surface. The 1946 FIP shows 6 gasoline USTs, and the 1960 FIP shows 13 gasoline USTs and an oil warehouse; both listed as Canadian Oil Companies Ltd.	154 Victoria Rd S	28	Gasoline and Associated Products Storage in Fixed Tanks	Offsite		Groundwater
	Former Paint Application - A cabinet manufacturer was shown on the 1960 FIP, Gilson Manufacturing Co. Ltd. Cabinet Division at 57 Victoria Rd S with buildings labeled for steel storage, tubing room, steel room, washer, dryer, office, paint spray, transformer.	53 Victoria Rd S	39	Paints Manufacturing, Processing and Bulk Storage	Offsite		Groundwater
	Chemical Manufacturer or Distributor - Robert On Guard Products was listed in the chemical facilities records.	490 York Road	8	Chemical Manufacturing, Processing and Bulk Storage	Offsite		Groundwater
	Transformers - The National PCB records list up to 7 transformers on 490 York Road associated with Sherwood Forest Investments (formerly Hamril Investments). The volumes listed total approximately 1,600 L. Transformers (7 total) are shown on the 1960 FIP on the enameling building of Guelph Stove Co. Ltd.	490 York Road	55	Transformer Manufacturing, Processing and Use	Offsite		Groundwater
APECs from Offsite PCAs to the South							
APEC-32 (Offsite South)	Screw Manufacturing - Linread Canada Ltd. is shown on the 1960 FIP as a screw manufacturer, and is listed in ERIS reports as a industrial fastener at 24 Hayes with records until 1998. "Jet" is listed as a manufacturer of metal dies at this location with records between 1993 and 1998. Multiple Scott's Directory listings are reported for this address for machinery/equipment/ industrial fan and fabricated metal tools/product manufacturing (Daltec Industries, Allen Simpson Marketing and Design) with established dates of 1984 and 1975, and records up to 2006. A spill was reported of slurry to the road in 2014.	24 Hayes	34	Metal Fabrication	OffSite	VOCs, PHCs, PAHs, metals	Groundwater
	Former USTs - One gasoline UST is shown on the 1960 FIP on the south side of the building at Traders' Plumbing and Heating Supplies Limited at 150 Stevenson Street South.	150 Stevenson St S	28	Gasoline and Associated Products Storage in Fixed	OffSite		Groundwater
	Former Transportation Company - The 1960 FIP indicates a transportation company (Direct Winter's Transport) at 101 Beverley and city directories the company was present from the early 1950s to 1960s.	101 Beverley Street	11	Commercial Trucking and Container Terminals	Offsite		Groundwater

Table 7.3-1. Areas of Potential Concern

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC) ID		Location of APEC	Potentially Contaminating Activity (PCA)[a]		Location of PCA [b]	Contaminants of Potential Concern (based on AP method groups) [c]	Media Potentially Impacted (groundwater and/or soil)
APECs from Offsite PCAs to the West							
APEC-33 (Offsite West)	Window Manufacturing - Clear Choice Window Manufacturing Inc. is listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600 ft plant size.	145 Stevenson St S	43	Plastics (including Fibreglass) Manufacturing and	Offsite	VOCs, PHCs, PAHs, metals	Groundwater
	Metal Treatment - Choice Enterprises is listed in the Scott's Manufacturing Directory; as coating, engraving, heat treating, and allied activities; established in 1998.	147 Stevenson St S	33	Metal Treatment, Coating, Plating and Finishing	Offsite		Groundwater
	Spring Manufacturing - ERIS records indicate heavy gauge spring manufacturing at 60 Johnston Street as Steele Bros. Ltd., the Scott's manufacturing directory record indicates the company was established in 1986 with a plant size of 6,500 ft^2. The 1960 FIP shows the H.I. Thompson Co. of Canada Limited (Aircraft Insulation) with a factory, spring room, spray room, transformer, and cement storage.	60 Johnston Street	34	Metal Fabrication	Offsite		Groundwater
	Former Refractory Facility - Former Foundry Services of Canada (FOSECO) facility operated at 201 Alice Street until approximately the late 1990s, had a known contaminated plume in the shallow groundwater occurring at the bedrock/overburden interface, migrating northward and a groundwater treatment system for toluene (P&R, 1991). A certificate of approval record was issued in 1989 to Foseco for the toluene stripper for groundwater. The 1960 FIP indicates the following buildings: tablet making, lab, shipping, mixing, warehouse, ball mill, elevator, transformer, oil storage, blending, mouldable exothermic feeding compound, incinerator.	201 Alice Street	34	Metal Fabrication	Offsite		Groundwater
	Motor Vehicle Parts Manufacturing - BP Canada Energy Company is listed in ERIS operating at 201 Alice Street.	201 Alice Street	57	Vehicles and Associated Parts Manufacturing	Offsite		Groundwater
	Former Spill - A spill was reported at the corner of Alice and Stevensons Street of 15 L of windshield washer fluid and antifreeze to a catch basin a motor vehicle accident in 2016.	Stevenson and Alice Street	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles and Aviation	Offsite		Groundwater

Notes:

[a] PCA – potentially contaminating activity (as defined by O.Reg. 153/04)

[b] Refer to Figure 7-1 for PCA locations

[c] As noted in the "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act*" March 9, 2004, amended as of July 1, 2011.

% = percent
"-" = Unknown or data not readily available for review
< = less than
ug/g = microgram per gram
ug/L = microgram per litre
% = percent
APN = Acid Base Neutral compounds
APEC = Area of Potential Environmental Concern
AST = Aboveground storage tank
BTEX = Benzene, toluene, ethylbenzene, and xylenes
CDL = City Directory Listings
CP = Chlorophenols
ELE = EcoLog ERIS Database Search
FIP = Fire insurance plan
ft = foot
ft^2 = square foot
ft^3 = cubic foot
HER = Historical Environmental Reports
ID = Identification
ground surface
kg = kilogram
L = litre
lb = pound
m = metre
m^3 = cubic metres

MOECC = Ontario Ministry of the Environment and Climate Change
offsite = Within Phase One Study area, outside the Phase One Property
onsite = Phase One Property
P&R = Proctor & Redfern

PAH = Polycyclic aromatic hydrocarbon
PCA = Potentially contaminating activity
PCB = Polychlorinated biphenyl
PHC = Petroleum hydrocarbon
UST = Underground storage tank
VOC = Volatile organic compound

Table 7.4-1. Phase One Conceptual Site Model

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Phase One CSM Element	Summary
Existing Buildings and Structures	No buildings or structures.
Identify Water Bodies in the Phase One Study Area	Waterbodies within the Phase One Study area include a portion of the Hanlon Creek and Mill Creek Swamp located off Site, but in the southern/central portion of the Phase One Study Area as shown on Figure 2-1.
Areas of Natural Significance	No identified areas of natural significance are located wholly or partly within the Phase One Study Area.
Presence of Drinking Water Wells	No drinking water wells were identified on the Phase One Property. Thirty water wells are located within the Phase One Study Area as shown on Figure 4-1.
Identify Roads within the Phase One Study Area	Figure 6-1 presents the roadways and land use within the Phase One Study Area.
Adjacent Property Uses	Figure 6-1 presents the adjacent property use based on City of Guelph Zoning plan. The adjacent use based on this and observations from the site reconnaissance are: • To the north: residential, industrial, and commercial • To the east: residential, industrial, and commercial • To the south: residential, industrial, and commercial • To the west: residential and commercial
Identify PCAs in the Phase One Study Area	The following PCA types were found in the Phase One Study Area: • 8 – Chemical Manufacturing, Processing, and Bulk Storage • 10 – Commercial Autobody Shops • 11 – Commercial Trucking and Container Terminals • 12 – Concrete, Cement, and Lime Manufacturing • 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles • 28 – Gasoline and Associated Products Storage in Fixed Tanks • 30 – Importation of Fill Material of Unknown Quality • 32 – Iron and Steel Manufacturing and Processing • 33 – Metal Treatment, Coating, Plating, and Finishing • 34 – Metal Fabrication • 37 – Operation of Dry Cleaning Equipment (where chemicals are used) • 39 – Paints Manufacturing, Processing, and Bulk Storage • 45 – Pulp, Paper, and Paperboard Manufacturing and Processing • 46 – Rail Yard, Tracks, and Spurs • 47 – Rubber Manufacturing and Processing • 49 – Salvage Yard, including automobile wrecking • 54 – Textile Manufacturing and Processing • 55 – Transformer Manufacturing, Processing, and Use • 57 – Vehicles and Associated Parts Manufacturing Table 7.2-1 summarizes the details of the PCAs identified in the Phase One Study area; locations are shown on Figure 6-1.
Identify APECs	Thirty-three (33) APECs are identified for the Phase One Property.

Table 7.4-1. Phase One Conceptual Site Model

Phase One Environmental Site Assessment, 200 Beverley Street, Guelph, ON

Phase One CSM Element	Summary
COPs	The COPCs identified within the Phase One Study Area include metals and inorganics, VOCs, PHCs, PAHs, PCBs, ABNs, and CPs. This list includes COPCs that are confirmed to be present based on historical investigations. Based on previous reports and contaminant concentrations, there is a potential for free phase product to exist on the Site.
Presence of Underground Utilities	Although utilities have been disconnected on Site, piping and bedding have not been removed, and therefore, there is potential for utility corridors to be providing a preferential route of contaminant migration.
Regional/Local Geology	The Site topography varies from approximately 315 and 316.5 masl based on topographic information and previous investigations completed at the Site. The Site and surrounding lands generally slope southeastward to the Eramosa River. Geology from previous investigations indicate subsurface materials consisting of fill (varying from 0.3 to 3.2 m deep), underlain by native silty fine sand. The approximate bedrock depth based on past investigations on the Site was 2.0 mbgs (elevation of 313.5 masl) and ranged from approximately 0.7 m to 3.4 mbgs (elevation of 312.7 to 315.0 masl). The bedrock was described as dolostone, grey, porous and highly fractured with a rock quality index indicating it is highly weathered and fractured (GLL 1999). The regional geology indicates the Phase One Study Area consists of "silt to sandy silt matrix, becoming silt to silty clay near Lake Erie, strongly calcareous, moderate to low clast content decreasing southward" (OGS 2000) and bedrock of the Guelph Formation, consisting of sandstone, shale, dolostone, siltstone (OGS 1991). The bedrock elevation is approximately 305 masl based on *OGS Preliminary Map P.224, Guelph Area, Southern Ontario, Bedrock Topography Series* (Karrow 1979).
Regional/Local Hydrogeology	Groundwater levels at the Site have been measured during previous investigations between 2.02 and 4.13 mbgs (310.84 to 316.40 masl), with an inferred groundwater flow direction to the south towards the Eramosa River.
Uncertainties Affecting the Validity of Phase One CSM	On the basis of the uncertainties presented within the Phase One ESA report, it is possible that a PCA/APEC or land use has not been identified within the individual components of the Phase One ESA. Information was gathered from numerous sources (that is, aerial photographs, City Directories, database searches, historical reports, interviews, and site reconnaissance), which decreases the chance that a major PCA or land use was not identified in this Phase One ESA. Many aspects of the CSM have been previously studied and verified through subsurface investigations (for example, groundwater flow direction); these aspects are not directly affected by the noted uncertainties: • Quality of aerial photographs may not allow some features to be clearly identified, and professional judgment was used to relate the historical features identified in the aerial photographs to present day locations. • Municipal addresses are known to change. • Information provided by interviewed individuals could be based on hearsay or personal opinion.

Notes:

ABN = acid base neutral compound
APEC = area of potential environmental concern
COPC = contaminant of potential concern
CP = chlorophenol
CSM = conceptual site model
ESA = Environmental Site Assessment
m = metre(s)
masl = metre(s) above sea level
mbgs = metre(s) below ground surface
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PCA = potentially contaminating activity
PHC = petroleum hydrocarbon
VOC = volatile organic compound

Figures

N

0 100 200 300
Metres

Water Supply Well Location (Within 1km of Property Boundary)
Railway
Former IMICO Property Boundary
Lands within 250m of Phase One Property
Phase One Study Area

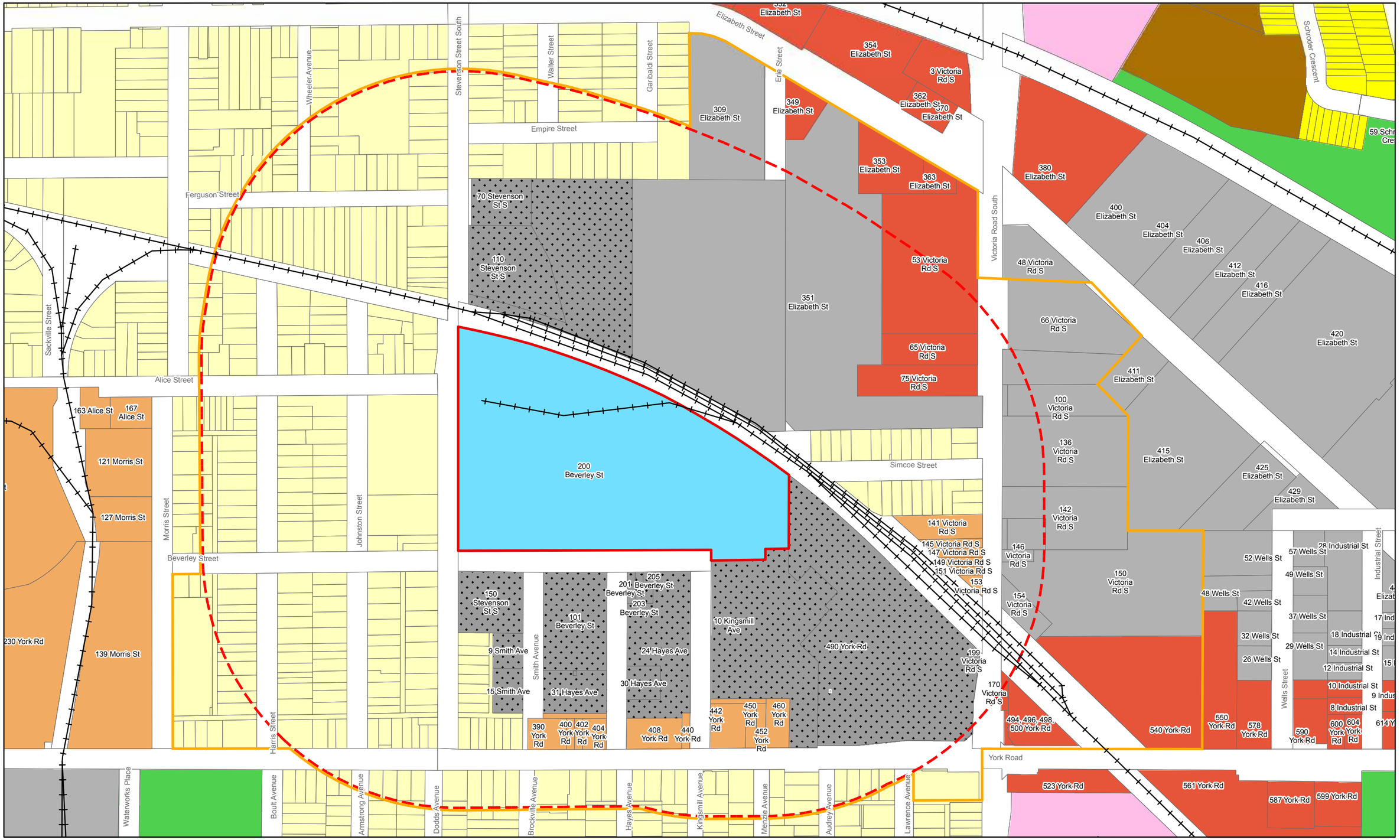
Notes:
1. Source of Imagery: Esri, 2016
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 4-4
Water Wells

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

ch2m

\\KWOFSP01\GIS\PROJECTS\GUELPHCITYOF\GIS\MAPFILES\IMICO\PHASEONE\DRAFT_JULY2017\MOEWATERWELLS.MXD ABATES1 8/3/2017 3:32:24 PM



N

0 25 50 75

Metres

Railway
Former IMICO Property Boundary
Lands within 250m of Phase One Property
Phase One Study Area

LandUse

- High Density Residential
- Medium Density Residential
- Low Density Residential
- Industrial
- Mixed Business
- Mixed Office Commerical
- Neighbourhood Commercial Centre
- Open Space and Park
- Service Commericial
- Special Study Area

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Source of Land use: City of Guelph Official Plan, Schedule 2.
3. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-1
Land Use

Former IMICO Foundry Facility
200 Beverly Street, Guelph, Ontario

ch2m

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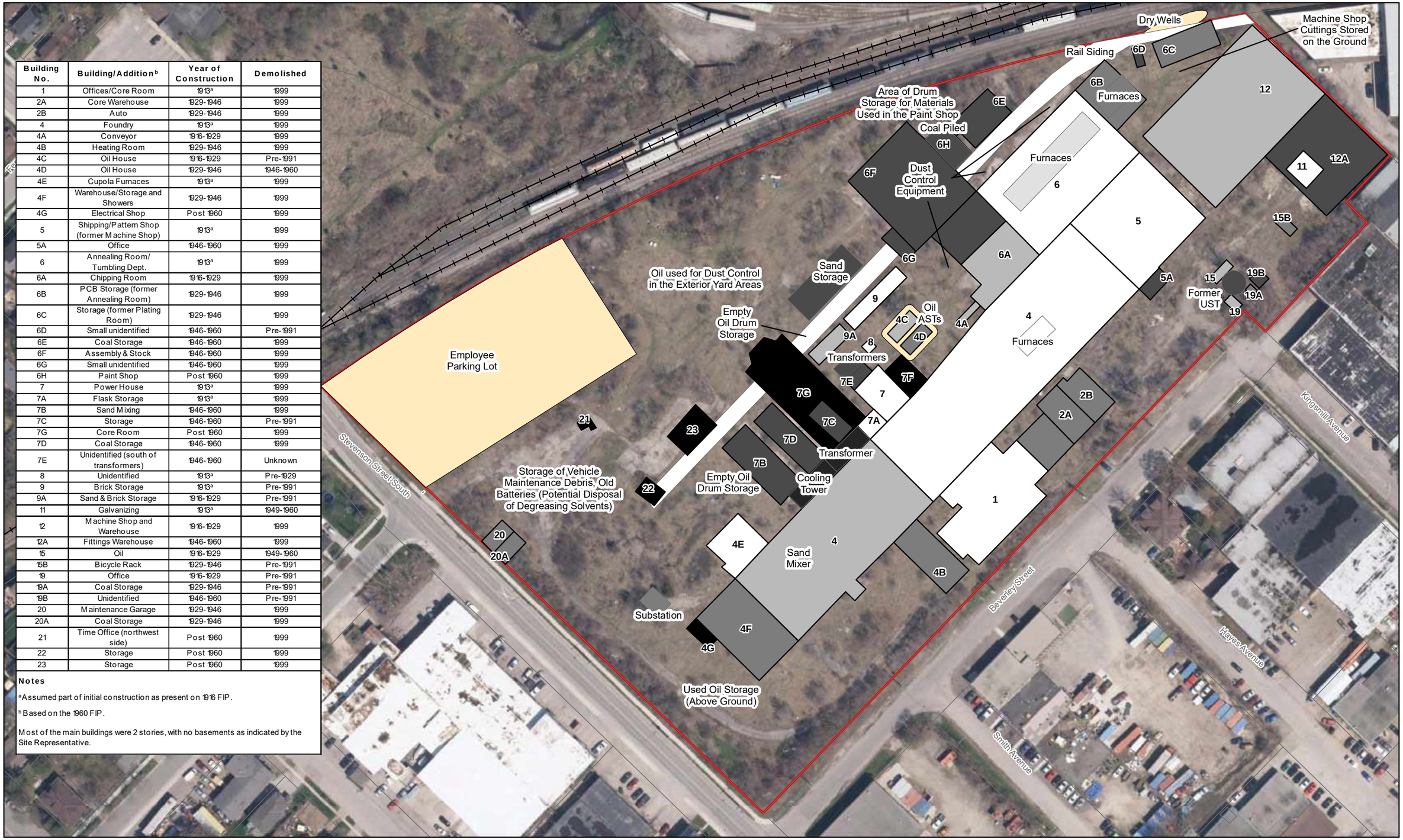
Building No.	Building/Addition[b]	Year of Construction	Demolished
1	Offices/Core Room	1913[a]	1999
2A	Core Warehouse	1929-1946	1999
2B	Auto	1929-1946	1999
4	Foundry	1913[a]	1999
4A	Conveyor	1916-1929	1999
4B	Heating Room	1929-1946	1999
4C	Oil House	1916-1929	Pre-1991
4D	Oil House	1929-1946	1946-1960
4E	Cupola Furnaces	1913[a]	1999
4F	Warehouse/Storage and Showers	1929-1946	1999
4G	Electrical Shop	Post 1960	1999
5	Shipping/Pattern Shop (former Machine Shop)	1913[a]	1999
5A	Office	1946-1960	1999
6	Annealing Room/ Tumbling Dept.	1913[a]	1999
6A	Chipping Room	1916-1929	1999
6B	PCB Storage (former Annealing Room)	1929-1946	1999
6C	Storage (former Plating Room)	1929-1946	1999
6D	Small unidentified	1946-1960	Pre-1991
6E	Coal Storage	1946-1960	1999
6F	Assembly & Stock	1946-1960	1999
6G	Small unidentified	1946-1960	1999
6H	Paint Shop	Post 1960	1999
7	Power House	1913[a]	1999
7A	Flask Storage	1913[a]	1999
7B	Sand Mixing	1946-1960	1999
7C	Storage	1946-1960	Pre-1991
7G	Core Room	Post 1960	1999
7D	Coal Storage	1946-1960	1999
7E	Unidentified (south of transformers)	1946-1960	Unknown
8	Unidentified	1913[a]	Pre-1929
9	Brick Storage	1913[a]	Pre-1991
9A	Sand & Brick Storage	1916-1929	Pre-1991
11	Galvanizing	1913[a]	1949-1960
12	Machine Shop and Warehouse	1916-1929	1999
12A	Fittings Warehouse	1946-1960	1999
15	Oil	1916-1929	1949-1960
15B	Bicycle Rack	1929-1946	Pre-1991
19	Office	1916-1929	Pre-1991
19A	Coal Storage	1929-1946	Pre-1991
19B	Unidentified	1946-1960	Pre-1991
20	Maintenance Garage	1929-1946	1999
20A	Coal Storage	1929-1946	1999
21	Time Office (northwest side)	Post 1960	1999
22	Storage	Post 1960	1999
23	Storage	Post 1960	1999

Notes

[a] Assumed part of initial construction as present on 1916 FIP.

[b] Based on the 1960 FIP.

Most of the main buildings were 2 stories, with no basements as indicated by the Site Representative.



N

0 10 20 30

Metres

Railway
Former IMICO Property Boundary

Reference to Date Building Built

Fire Insurance Plan, 1916
Fire Insurance Plan, Maar. 1922, Reprinted Oct 1929
Fire Insurance Plan, Mar. 1922, Reprinted 1946
Fire Insurance Plan, June 1960
From Procter & Redfern Draft Report, June 10, 1991
Post 1960
Unknown Date
Unknown Date, Extent

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 6-2
Site Operations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Appendix D2
Phase II ESA Summary

Appendix D2. Phase Two Environmental Site Assessment Summary

This appendix provides an overview of the Site investigation for the CH2M HILL Canada Limited (CH2M), now a wholly own subsidiary of Jacobs Engineering Group Inc. (Jacobs), draft Phase Two Environmental Site Assessment (ESA) document for the property identified as the former International Malleable Iron Company (IMICO) foundry facility in Guelph, Ontario. The Phase Two ESA is based on the recent Jacobs subsurface environmental investigations, which occurred from September 2017 to March 2020, and historical investigations conducted by the following companies:

- Proctor & Redfern Limited (P&R) (1991)
- Gartner Lee Limited (GLL) (1999, 2004)
- Earth Tech (Canada) Inc. (Earth Tech) (1999)
- Decommissioning Consulting Services Limited (DCS) (2007, 2014)
- AECOM Canada Limited (AECOM) (2012; 2013; 2014; 2015; 2016; 2017a,b)
- WSP Canada Inc. (WSP) (2016)

This Phase Two Summary provides an overview for the scope of work and results of the current investigations, which concluded in March 2020. Appendix D3 provides the Phase Two Conceptual Site Model (CSM), as documented in the draft Phase Two ESA.

The City of Guelph (City) retained Jacobs to provide environmental services for the property located at 200 Beverley Street in Guelph, Ontario, hereafter referred to as the "Phase Two Property" or "Site" (Figure 2-1 [Appendix D3]). The Site is approximately 5.2 hectares (ha) in size and is located east of downtown Guelph. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place.

The Site has undergone several subsurface environmental investigations between 1999 and 2020. Jacobs has conducted field work to support and update these previous investigations at the Site; to meet current Ontario Regulation (O. Reg.) 153/04 (MECP 2011a), regulatory requirements; and to investigate or further investigate areas of potential environmental concern (APECs) identified during the Phase One ESA (CH2M 2017). The Phase Two ESA is also being completed to support the filing of a Record of Site Condition (RSC) for the Site to facilitate potential redevelopment of the Site.

Proposed Future Land Use

It is Jacobs' understanding that the City is considering the property for potential redevelopment of the Site from industrial to one or more of residential, parkland, community, or commercial land use purposes.

Overview of Site Investigation

The Site has undergone several subsurface environmental investigations between 1999 and 2020. The current Phase Two ESA activities on the Site were completed between September 2017 and March 2020 and consisted of soil borings, test pits, and installation of groundwater monitoring wells. Analytical data from a total of 147 investigative locations advanced previously across the Site as part of historical Phase Two ESA investigations were considered reliable for use in the current Phase Two ESA. An additional 104 investigative locations (21 boreholes, 25 test pits, and 58 monitoring wells) were advanced as part of the Phase Two ESA investigation between 2017 and 2020. Analytical data from a total of 173 soil sampling locations and 94 groundwater sampling locations were used for the evaluation of contaminants of concern (COCs) as part of the Phase Two ESA.

The purpose of the Phase Two investigations were to:

- Support and update previous studies
- Meet current O. Reg. 153/04 (MECP 2011a) regulatory requirements

- Investigate or further investigate APECs identified during the Phase One ESA (CH2M 2017)
- Provide data to support future remedial activities, a Risk Assessment (RA), or both, that will need to be conducted prior to Site redevelopment

In addition, the report is intended to support the filing of an RSC for the Site to allow for future redevelopment of the Phase Two Property.

During the Phase One ESA, CH2M identified areas where potentially contaminating activities (PCAs) have occurred on the Phase Two Property and on lands within 250 metres (m) of the Phase Two Property. PCAs occurring on the Phase Two Property were subsequently carried through the investigation as APECs, as required by O. Reg. 153/04. When offsite PCAs were identified as having the potential to impact the Phase Two Property, they were also carried through the investigation as APECs.

As summarized in the Phase One ESA (CH2M 2017), 33 APECs were identified on the Phase Two Property; of which, 29 were attributable to onsite PCAs, and 4 were attributable to offsite PCAs (located within 250 m of the Phase Two Property). Figures 4-1a and 4-1b (Appendix D3) show the onsite and offsite PCAs and their associated APECs, respectively. These APECs and PCAs were the focus of the Phase Two ESA activities. Figure 4-2 (Appendix D3) shows the APECs identified in the Phase One ESA for the Phase Two Property, as well as the historical and recent Phase Two ESA borehole and monitoring well locations.

The principal objective of the Phase Two ESA is to enable the assessment and update of current Site conditions (considering previous findings and Site work), to identify general and current subsurface impacts that will need to be managed during Site redevelopment. The Phase Two ESA included multiple soil and groundwater Site investigations, as follows:

- Review of historical reports for previous subsurface investigations. A total of 111 boreholes, test pits, and confirmatory samples, and 36 monitoring wells were advanced or installed as a part of the historical investigations, resulting in 184 historical soil samples considered reliable for use in the Phase Two ESA. Groundwater samples were collected in 2007 by DCS, 2010 to 2016 by AECOM as part of an annual groundwater monitoring program, and 2016 by WSP, resulting in 186 historical groundwater samples that were considered reliable for use in the Phase Two ESA.
- Drilling of 42 boreholes and advancement of 25 test pits for the collection of selected soil samples analyzed for COCs to address data gaps identified while reviewing the current and historical data, and to assess and determine subsurface stratigraphy. Boreholes and test pits were advanced as follows:
  - October 2017: 17 boreholes were advanced (BH17-200 through BH17-204, and MW17-100S, MW17-101D, MW17-102D, MW17-103D, MW17-104D, MW17-105D, MW17-106D, MW17-107S, MW17-108S, MW17-109S, MW17-110S, and MW17-111S) to depths of 0.89 to 3.2 metres below ground surface (mbgs).
  - October 2017: 9 test pits were advanced (TP17-300 through TP17-308) to depths of 1.22 to 2.59 mbgs.
  - June-July 2018: 14 boreholes were advanced (BH18-204 through BH18-208, and MW18-117S, MW18-120D, MW18-121S, MW18-122D, MW18-123D, MW18-124S, MW18-125S, MW18-126D, and MW18-129D) to depths of 2.29 to 3.66 mbgs.
  - July 2018: 11 test pits were advanced (TP18-309 through TP18-319) to depths of 1.22 to 2.90 mbgs.
  - April 2019: 7 boreholes were advanced (BH19-100i, BH19-100ii, BH19-102i, BH19-102ii, BH19-209 through BH19-211) to depths of 0.30 to 3.05 mbgs, which included locations to confirm pH at MW17-100 and volatile organic compounds (VOCs) at MW17-102D.
  - February 2020: 4 boreholes were advanced (BH18-207i, BH20-212 through BH20-214) to depths of 1.83 to 3.66 mbgs.
  - February 2020: 5 test pits were advanced (TP20-320 through TP20-324) to depths of 1.52 to 2.39 mbgs.

- Installation of 58 groundwater monitoring wells, and sampling from an additional 36 historical monitoring well locations, as follows:
  - September 2017: 26 existing monitoring wells were sampled (OW02, OW03-I, OW03-II, OW07-31, OW07-32, OW07-33, OW07-34D, OW07-34S, OW-07-37, OW07-38S, OW11-I, OW11-II, OW12, OW13-39D, OW13-39S, OW15, OW16, OW17, OW19, OW22D, OW22S, OW23D, OW24D, OW24S, OW25, and OW31).
  - October 2017: 17 monitoring wells were installed to depths ranging from 3.66 to 15.29 mbgs. 13 wells were installed in the overburden and bedrock contact zone: MW17-100S, MW17-101S, MW17-103S, MW17-104S, MW17-104D, MW17-105S, MW17-106S, MW17-106D, MW17-107S, MW17-108S, MW17-109S, MW17-110S, and MW17-111S. Screen depths ranged from 1.22 to 3.66 mbgs and 7.01 to 8.53 mbgs. 4 wells were installed in the Eramosa Formation bedrock unit: MW17-101D, MW17-102D, MW17-103D, and MW17-105D. Screen depths ranged from 6.3 to 7.82 mbgs and 13.76 to 15.29 mbgs. Groundwater samples were collected in October and November 2017.
  - March 2018: 12 existing monitoring wells were sampled (MW17-101D, MW17-108S, OW07-31, OW07-33, OW09-II, OW11-II, OW12, OW13, OW14, OW19, OW22S, and OW23S).
  - April 2018: 5 existing monitoring wells were sampled (MW17-101D, OW07-33, OW09-II, OW11-II, and OW22S).
  - July 2018: 2 existing monitoring wells were sampled (MW17-100S, MW17-104D).
  - July 2018: 27 monitoring wells were installed to depths ranging from 4.04 to 20.32 mbgs. 14 wells were installed in the overburden and bedrock contact zone: MW18-112S, MW18-113S, MW18-114S, MW18-115S, MW18-116S, MW18-117S, MW18-118S, MW18-119S, MW18-123S, MW18-124S, MW18-125S, MW18-121S, MW18-127S, and MW18-131S. Screen depths ranged from 2.51 to 4.03 mbgs and 4.26 to5.79 mbgs. 13 wells were installed in the Eramosa Formation bedrock unit: MW18-107D, MW18-112D, MW19-116D, MW18-120D, MW18-121D, MW18-122D, MW18-123D, MW18-126D, MW18-128D, MW18-129D, MW18-130D, MW18-132D, and MW18-133D. Screen depths ranged from 6.4 to 9.49 mbgs and 12.44 to 20.32 mbgs. Groundwater samples were collected in July and August 2018.
  - October 2018: 7 existing monitoring wells were sampled (MW18-128D, MW18-130D, MW18-131S, MW18-132D, MW18-133D, OW25, and OW31).
  - November-December 2018: 13 monitoring wells were installed to depths ranging from 4.27 to 25.32 mbgs. 2 wells were installed in the overburden and bedrock contact zone (MW18-134S and MW18-135S). Screen depths ranged from 2.74 to 4.27 mbgs and 9.75 to 11.28 mbgs. 11 wells were screened in the Eramosa Formation (MW18-105G, MW18-112G, MW18-113D, MW18-114D, MW18-115D, MW18-119D, MW18-122G, MW18-134D, MW18-135D, MW18-136D, and MW18-136G). Screen depths ranged from 4.27 to 5.79 and 23.8 to 25.32. Groundwater samples were collected from all newly installed wells, and two existing wells were resampled (MW17-102D and MW18-112D).
  - March-April 2019: 5 existing monitoring wells were sampled (MW18-114D, OW03-I, OW07-32, OW07-37, and OW25). OW25 was also sampled again in April 2019. 1 monitoring well, MW19-137, was installed in April 2019 in the overburden and contact zone for potential light nonaqueous phase liquid (LNAPL) monitoring.
  - February-March 2020: 90 monitoring wells were sampled. The 3 wells with measured NAPL were not sampled.
- Collection of groundwater levels using an oil/water interface probe from the recently installed wells to determine groundwater elevations and whether free phase product was present.

- Performance of single-well response tests on 15 monitoring wells screened in the various hydrostratigraphic units onsite to improve the understanding of hydraulic properties of the units beneath the Phase Two Property.
- Determination of the applicable Site Condition Standard (SCS).
- Survey of newly installed boreholes, test pits, and new and existing monitoring wells, to a geodetic benchmark.

These investigation activities were considered adequate and justified to meet the general objectives of a Phase Two ESA under O. Reg. 153/04, Site-specific investigation objectives, and to support an RA.

Figure 4-2 (Appendix D3) shows the locations of test pits, borings, and wells, advanced as part of this Phase Two ESA, as well as during historical investigations. Environmental studies were conducted at the Site in the past, and the historical results were used as a screening method to focus the current Phase Two ESA work. Where reliable, as evaluated through a data quality evaluation (DQE), the historical results were used to supplement the Phase Two ESA results. In general, the historical data used are considered valid for inclusion in this Phase Two ESA.

Quality Assurance and Quality Control

Soil and groundwater sampling was performed by Jacobs staff with experience in intrusive field investigation techniques and with the COCs encountered at the Phase Two Property, under the guidance of the Qualified Person for ESAs according to the Ontario Ministry of the Environment, Conservation and Parks (MECP) (O. Reg. 153/04) (QP_{ESA}). Jacobs collected soil and groundwater samples in accordance with the standard operating procedures (SOPs) and field forms, which were developed in accordance with O. Reg. 153/04 (MECP, 2011a).

The following sample packaging, storage, and transportation procedures were followed during the investigation:

1. Reviewed the project sampling plan to verify that samples for the required chemical parameters were collected and submitted for analysis.
2. Verified that the samples listed in the chain-of-custody (CoC) form were included in the sample shipment, and that the correct analysis was requested.
3. Included one laboratory-prepared trip blank in each cooler containing volatile organics (VOCs; benzene, toluene, ethylbenzene, and xylene [BTEX] ; and petroleum hydrocarbon [PHC] fraction [F]1) samples.
4. Dispersed ice throughout the cooler to surround the sample bottles and to maintain a proper temperature of less than 10 degrees Celsius (°C) throughout the trip to the laboratory. Sample containers were packed upright, never lying on their sides, and at least one-third of the cooler space was taken up by ice.
5. Placed a copy of the original CoC form in a resealable plastic bag in the cooler.
6. Kept a copy of the CoC form for the project records.
7. Analyzed samples marked “HOLD” within the required holding time and holding temperature, if analyzed.

Quality assurance (QA) and quality control (QC) samples were collected as required by O. Reg. 153/04 (MECP, 2011a).

Duplicate soil and groundwater samples were collected at a frequency of 1 duplicate for each 10 samples submitted. Duplicate soil samples were collected by vertically splitting core samples into two equal volumes prior to placing them in the appropriate sample containers. Duplicate groundwater samples were submitted ‘blind’ to the laboratory, and field staff documented in the field books each duplicate sample location.

Trip blanks were collected for coolers containing samples being submitted for volatile analysis at a frequency of one per day, regardless of the number of samples. Dedicated sampling equipment was used for groundwater sampling.

Samples were analyzed by ALS Laboratory Group (ALS), a laboratory accredited by the Canadian Association for Laboratory Accreditation Inc. ALS, and subcontractor laboratories overseen by ALS, performed the chemical

analysis in compliance with the MECP, Laboratory Services Branch, *Protocol for Analytical Methods Used in the Assessment of Properties under Past XV.1 of the Environmental Protection Act* (MECP, 2011b).

Jacobs received soil and groundwater certificates of analysis from ALS electronically to reduce the possibility of transcription errors. The analyses were compiled into a database. The automation of data transfers from laboratory instruments to laboratory information management systems also reduced the possibility of transcription errors. The results reported by ALS were quality-checked internally by a project chemist before being uploaded to the database. Analytical results were reviewed and validated by the project chemist.

The data review and validation performed by the project chemist are documented in the DQE reports provided in the Phase Two ESA. The DQE assessed the quality of the analytical results for the samples submitted in batches with the Phase Two Property investigation samples.

The goals of the DQE were to demonstrate that a sufficient number of representative samples were collected, and that the resulting analytical data can be used to support the decision-making process. Based on the data validation findings, all Jacobs data are valid and can be used for making project decisions with the limitations described in the DQE.

In consultation with the project chemist, the QP_{ESA} concluded that the data met the data quality objectives, the decision-making was not affected, and the overall objectives of the investigation and assessment were met.

Applicable Site Condition Standards

O. Reg. 153/04 (MECP, 2011a) under Part XV.1 of the *Environmental Protection Act* addresses the assessment, cleanup, and filing of an RSC for brownfield sites in Ontario and is applicable to the Phase Two Property. Jacobs evaluated the Site based on several criteria to decide which of the generic SCSs provided in the *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act* (MECP, 2011c) were applicable for a comparison of soil and groundwater results from the Phase Two ESA investigation.

The items in Table 2-3 were considered during the selection of the SCS, as outlined in O. Reg. 153/04 (MECP, 2011a).

The special conditions for environmentally sensitive areas under Section 41 of O. Reg. 153/04 were considered for applicability to the Phase Two Property, as soil pH results ranged from 6.6 to 10.64 based on 103 soil samples. With the exception of two samples, the remainder of the soil samples were found to have a pH value within the MECP's acceptable range (that is, a pH value in surface soil between 5 and 9, or a pH value in subsurface soil between 5 and 11). A review of the borehole logs from the two locations (BH17-204 and MW17-100S) indicated that concrete rubble or dust was likely present in the submitted samples that reported pH values of 10.64 and 9.45, respectively.

The soil from the first location (BH17-204) was determined to be "isolated fill," as concrete foundations were encountered both above and below the soil layer, isolating it from the overburden soils at the Site. For this reason, the soil pH from this sample was not considered representative of Site soils and was removed from consideration in determining soil pH at the Site.

An additional sample was collected at MW17-100S to address the second location with a high pH value. The sample was collected from within 2 m of the original sampling location, at the same sampling depth. The result was a pH concentration of 7.71. Using the average of the two samples as outlined in Section 48 of O. Reg. 153/04, it was confirmed that pH concentrations were within the acceptable range.

The special conditions for land within 30 m of a water body under Section 43.1 of O. Reg. 153/04 do not apply to the Phase Two Property; however, as bedrock has been encountered at less than 2 mbgs, the special condition for shallow soil properties cited under Section 43.1 of O. Reg. 153/04 applies to the Phase Two Property.

The Phase Two Property, and adjacent properties within 100 m, are serviced by a municipal water source. As the groundwater in the vicinity of the Property does and will serve as a raw water supply for a drinking water system, the potable groundwater condition was applied. Based on this information, the Table 6: Generic Site Condition

Standards for Shallow Soils in a Potable Groundwater Condition for coarse-grained soil and residential/parkland/institutional property use (Table 6 SCS) was applied to the Site.

Description of Hydrogeological and Geological Interpretations which Differ from the Generic Standards

The known hydrogeological and geological interpretations of the Site that differ from the MECP assumptions used in the derivation of the generic SCS (MECP, 2011d) include the distance to the nearest downgradient surface water body, minimum depth to groundwater, horizontal hydraulic gradient, and hydraulic conductivity. These Site-specific differences are summarized below and have been considered in the RA report, as required and where appropriate.

Parameter	MECP Value (2011d)	Site-Specific Value	Rationale
Distance to Surface Water Body	36.5 m	500 m	Distance to the Eramosa River
Minimum Depth to Groundwater	3 m	0.93	Site-specific value based on groundwater measurements
Horizontal Hydraulic Gradient	0.003 m/m	0.002 m/m	Site-specific value based on groundwater measurements
Hydraulic Conductivity	3.0×10^{-5} m/s	3.9×10^{-5}	Site-specific values from slug tests conducted in monitoring wells screened in the upper hydrostratigraphic unit (overburden and bedrock contact zone)

Jacobs also notes that the source size of 340 cubic metres for some contaminant groups may be larger than that assumed by the MECP in the derivation of the generic standards; this difference may affect specific component values where source depletion or groundwater transport was assumed. However, the nature of the RA is generally conservative, which may minimize the specific impact that the aforementioned differences may have on the assessment. The use of the MECP SCS and associated component values were considered appropriate for use in the RA for the selection of contaminants of concern and for secondary screening purposes.

Additional Data Screening

As part of the Phase Two ESA, a thorough review of the soil and groundwater results was conducted as part of the screening and identification of COCs. Select soil and groundwater results, such as elevated laboratory reporting limits and parameters with no available criteria, were further evaluated and considered for their ability to accurately represent contaminants of potential concern (COPCs) and the Site conditions. At the discretion of the QP_{ESA} for the Site, some data were excluded from being carried through to the analytical database for the RA. The rationale for the removal the data points is presented in Table 6-7b (soil) and Table 6-10b (groundwater).

Phase Two Environmental Site Assessment Results and Conclusions

Soil environmental conditions were characterized based on evaluation of historical samples, in addition to the recent investigations conducted for the Phase Two ESA.

Soil conditions were characterized using the Phase Two ESA sampling and reliable historical data, comprising 353 soil samples from 183 locations across the Phase Two Property. Figure 4-1 (Appendix D3) shows the sample locations.

Soils on the Phase Two Property were found to be generally impacted with elevated concentrations of metals and PHCs. Localized soil impacts from polycyclic aromatic hydrocarbons (PAHs), BTEX, VOCs, other regulated parameters (ORPs), and polychlorinated biphenyls (PCBs) were also identified in limited areas at the Phase Two Property. The presence of these parameters is consistent with the historical and industrial land use of the Site.

Groundwater across the Phase Two Property was evaluated using data (448 samples) from 100 permanent monitoring wells screened in the overburden and bedrock contact zone, the competent Eramosa Formation bedrock unit, or the Goat Island Formation bedrock unit. Groundwater within the overburden and contact zone aquifer unit was identified to be generally impacted with VOCs, with localized impacts of metals (arsenic, lead, and zinc), BTEX, PAHs, and PHCs. Groundwater within the competent Eramosa Formation bedrock unit was identified to be generally impacted with VOCs, with localized impacts of metals (arsenic, lead, and zinc), benzene, and PHCs (F2 and F3). One well is installed in the deep Goat Island Formation aquifer unit and was found to be impacted with cis-1,2-dichloroethene.

Soil Exceedances of the Table 6 Site Condition Standards

The following soil quality summary is provided for the soil samples that exceeded the Table 6 SCS:

- Concentrations of metals in soil greater than the Table 6 SCS soil were identified in 151 samples (of 235) from 100 locations to a depth of 2.9 mbgs. Soil exceedances for metals were widespread across the Phase Two Property and are interpreted to occur throughout most of the fill, extending to the bedrock surface.
- ORPs (that is, sodium absorption ratio [SAR], electrical conductivity [EC], and cyanide) were analyzed in 105 samples from 75 locations. Three samples from two locations exceeded Table 6 SCS for EC in the former excavation area in the northeastern corner of the Phase Two Property.
- Concentrations of PAHs in soil greater than the Table 6 SCS were identified in 30 samples (of 125) from 22 locations, and were found along the western border, in the south-central area, and the eastern third of the Site. PAH exceedances were identified to a depth of 2.13 mbgs.
- Concentration of PHCs in soil greater than the Table 6 SCS were identified in a total of 27 samples (of 130) from 21 locations. Exceedances were found to be localized to three areas: along the western border, in the south-central area, and the northeastern and eastern portion of the Site. PHC exceedances were identified to a depth of 3.2 mbgs.
- Concentrations of BTEX in soil greater than the Table 6 SCS were identified in a total of 3 soil samples (of 146) from 2 locations in the central and western areas of the Site. BTEX exceedances were identified to a depth of 1.22 mbgs.
- Concentrations of PCBs in soil greater than the Table 6 SCS were identified in 6 samples (of 72) from 5 locations in three different areas to a depth of 1.3 mbgs.
- Concentrations of VOCs (specifically, trichloroethylene [TCE]) in soil greater than the Table 6 SCS were identified in a total of 12 samples (of 126) from 7 locations within 2 areas along the southern and eastern borders of the Site. VOC exceedances were identified to a depth of 3.05 mbgs.
- Acid, base, and neutrals (ABNs) and chlorophenols (CPs) were not detected at concentrations greater than the Table 6 SCS; however, reporting limits (RLs) were raised for some parameters, resulting in RL exceedances of the Table 6 SCS.

The CSM provides additional details (Appendix D3) regarding soil quality and delineation.

Groundwater Exceedances of the Table 6 Site Condition Standards

The following groundwater quality summary is provided for the groundwater samples exceeding the Table 6 SCS:

- Concentrations of VOCs in groundwater were greater than the Table 6 SCS in 187 samples (of 344) in 53 locations. Exceedances of chloroethenes (specifically, 1,1-dichloroethene [1-1-DCE]; cis-1,2-dichloroethene; tetrachloroethene; trans-1,2-dichloroethene; trichloroethylene; and vinyl chloride) were found to be widespread throughout the Site (mainly to the south and east) at all depth intervals. A total of 183 samples (of 344) from 51 locations had exceedances of the Table 6 SCS for chloroethenes. Exceedances of chloroethanes (specifically, 1,1,1-trichloroethane and 1,1-dichloroethane) were found to be localized to the southwestern area of the Phase Two Property, primarily in the overburden and bedrock contact zone. One well screened within the competent Eramosa Formation aquifer (MW18-122D) had an exceedance of 1,1-dichloroethane.
- Concentrations of metals (primarily arsenic, lead, and zinc) in groundwater were greater than the Table 6 SCS in 71 samples (of 252) from 22 locations. Arsenic exceedances were localized to one location at the north-central area of the Site in the upper overburden and bedrock contact zone. Lead exceedances were localized to OW09-II (screened in the Eramosa) and OW07-33; however, OW07-33 has had subsequent sampling results less than the Table 6 SCS. Many of the zinc exceedances were located on the eastern third of the Phase Two Property, and generally limited to the upper overburden and bedrock contact zone.
- Concentrations of BTEX in groundwater were greater than the Table 6 SCS in 70 samples (of 378) from 17 locations. Of these samples, concentrations of benzene were elevated in 68 samples from 17 locations, and exceedances of ethylbenzene were identified in 4 samples from 3 locations. Exceedances were localized to the eastern third of the Site and the south-central area along the southern boundary.
- Concentrations of PAHs in groundwater were greater than the Table 6 SCS in 24 samples (of 197) from 8 locations. Exceedances were localized to the eastern third, the north-central, and south-central portions of the Phase Two Property. All exceedances were found in wells screened in the overburden and contact zone aquifer; no PAHs impacts were reported in wells screened in the Eramosa Formation bedrock unit or the Goat Island bedrock unit.
- Concentrations of PHCs in groundwater were greater than the Table 6 SCS in 26 samples (of 211) from 8 locations. LNAPL was observed at OW23S, MW17-108S, and MW18-135S. Exceedances were localized to the eastern-third and the south-central areas of the Phase Two Property, which are limited to the overburden and contact zone aquifer. Two locations screened in the Eramosa Formation bedrock unit (OW18-II and OW23D) have generally have PHC concentrations less than the Table 6 SCS, with isolated exceedances occurring in 2015 and 2016. PHC concentrations have meet the Table 6 SCS in the most recent sampling events at these locations.
- Of the 27 samples analyzed in groundwater for PCBs, one location, OW26S, had an exceedance of the Table 6 SCS in 2010. Subsequent samples collected in 2011 and 2017 met the Table 6 SCS for PCBs; therefore, PCBs are not considered a groundwater COC for the Site.
- ORPs (that is, sodium, chloride, and cyanide), ABNs, and CPs were not detected at concentrations greater than the Table 6 SCS; however, RLs were raised for 1,1'-biphenyl at OW23S, resulting in an RL exceedance of the Table 6 SCS.

Refer to the CSM for additional details (Appendix D3) regarding groundwater quality and delineation.

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Tables

Table 2-3. Items Considered for Site Condition Standards Selection

Phase Two Environmental Site Assessment, 200 Beverly Street, Guelph, ON

Condition	Evaluation
Land use	The current land use is industrial, and the proposed future land use may include residential/parkland and commercial uses, provided an RSC acknowledged by the MECP is obtained.
Potable or nonpotable groundwater	The Site and adjacent properties within 100 m are serviced by a municipal water source. Because the groundwater near the Property does and will serve as a raw water supply for a drinking water system, the potable groundwater condition applies.
Proximity to surface water body	The Site is not located within 30 m of a water body.
Proximity to areas of natural significance or environmentally sensitive areas	The Site is not considered to be within proximity of an environmentally sensitive area based on the information reviewed as part of the Phase One ESA (CH2M HILL 2017).
Depth to bedrock	A property is considered a shallow soil property if one-third or more of the area consists of soil depths of 2 mbgs or less, excluding nonsoil surface treatment (that is, asphalt, concrete, or aggregate) (MOE 2011a).The depth to bedrock is considered to be less than 2 m, because shallow soil was observed on one-third or more of the Phase Two Property.
pH of soil	Based on the results of the Jacobs investigations, soil pH was found to range from 6.6 to 9.0, with the exception of two samples. Samples collected at BH17-204 and MW17-100S were measured with a pH value outside of MECP's acceptable upper limit of 9.0 for surface soils. A review of the borehole logs from these locations indicated that concrete rubble or dust was likely present in the submitted samples, which had pH values of 9.45 and 10.64. The other pH values collected during the CH2M investigation were within the MECP's acceptable range. The soil from BH17-204 was determined to be "isolated fill," because concrete foundations were encountered both above and below the soil layer, isolating it from the overburden soils at the Site. An additional sample was collected at MW17-100S, which reported a pH value of 7.71. Using the average of the two samples as outlined in Section 48 of O. Reg. 153/04, it was confirmed that pH concentrations were within the acceptable range.
Soil texture	For this evaluation, because of the extensive presence of heterogeneous fill materials across the Site, the standards for coarse-grained soils were used to be conservative.

Notes:

ESA = Environmental Site Assessment

m = metre(s)

mbgs = metre(s) below ground surface

MECP = Ministry of Environment, Conservation and Parks

O. Reg. = Ontario Regulation

RSC = record of site condition

Table 6-7b. Rationale for the Removal of Soil COCs
Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Comment/Rationale
ABN	1,1'-Biphenyl 1,2,4-Trichlorobenzene 2,2'-oxybis(1-chloropropane) 2,4 & 2,6-Dinitrotoluene 3,3'-Dichlorobenzidine 4-Chloroaniline Bis (2-chloroethyl) ether Diethylphthalate	Parameters with existing SCS but RL exceedances only	Two surface samples (original and field duplicate) collected at TP17-300 in 2017 (Lab report L2003037)	The laboratory report indicates adjusted detection limits because of sample matrix effects (i.e., chemical interference, colour, and turbidity), preventing the determination of the presence or absence of the parameters (greater or less than regular detection limits), which may be due to the nature of the fill materials. Concentrations of these ABNs have not been detected elsewhere on the Site, including the remaining 21 samples from 12 locations where these parameters were analyzed as COPCs and RLs met the SCS. Additionally, a sample collected from a deeper interval at TP17-300 did not have raised RLs and met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Site.
ABN	2,4 & 2,6-Dinitrotoluene 3,3'-Dichlorobenzidine Dimethylphthalate	Parameters with existing SCS but RL exceedances only	Six surface samples from 1991 (lab report 91-4281/P&R_E.O.90K2)	Parameters were run as part of older BNA laboratory scans alongside VOCs and PAHs and were not targeted COCs. Historical laboratory RLs may not have had capabilities to meet current SCS. Concentrations of these ABNs have not been detected elsewhere on the Site, including the 11 locations where ABNs were analyzed as a COPC, and RLs met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Site.
ABN	2,4-Dinitrophenol	Parameters with existing SCS but RL exceedances only	Seven surface samples from three locations (MW17-105D, TP17-300 and TP17-301) in 2017, including 2 duplicates (lab report L2003037).	Lab indicated matrix effects as the reason for an RL increase, which may be due to the nature of the fill materials. No detected concentrations of 2,4-dinitrophenol have been reported at the Site, including 10 other locations where ABNs were analyzed as a COPC, and RLs met the SCS. Additionally, a sample collected from a deeper interval at MW17-105D did not have raised RLs and met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.
CP	2,4-Dichlorophenol Pentachlorophenol	Parameters with existing SCS but RL exceedances only	Seven surface samples from three locations (MW17-105D, TP17-300 and TP17-301) in 2017, including 2 duplicates (lab report L2003037).	Lab indicated matrix effects as the reason for an RL increase, which may be due to the nature of the fill materials. No detected concentrations of 2,4-dichlorophenol and pentachlorophenol have been reported at the Site, including 10 other locations where ABNs were analyzed as a COPC, and RLs met the SCS. Additionally, a sample collected from a deeper interval at MW17-105D did not have raised RLs and met the SCS. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Site.
CHEMISTRY	Phosphorus	Parameters with no Table 6 SCS but exceeds the OTR value	Two samples from TP13-11 (TP11-6 and DUP2) in 2013 (Lab report B3K9090)	Two of 43 samples analyzed for phosphorus were above the OTR value of 1635 µg/g. The remaining 41 samples had concentrations of phosphorus below the OTR value. Samples were from 1991, 2007, and 2013, as phosphorus was analyzed as part of the historical laboratory metal suites; it was not targeted as a COC. As phosphorus is considered a nutrient and is not a COPC associated with APEC on Site, and at the discretion of the QPESA, phosphorus is not considered to be a COC for the Site.
~~METALS~~	~~Bismuth~~	~~Parameters with no Table 6 SCS and no OTR value~~	~~12 samples from 2013 (Lab report B3K9090)~~	~~Samples collected as part of historical test-pitting activities in 2013 included a full metals scan, including bismuth. The other metals without an SCS had an OTR value to compare concentrations except for bismuth. Concentrations ranged from nondetect values to 150 µg/g. Bismuth was not a targeted COC.~~ ~~Based on the available information, and at the discretion of the QPESA, bismuth is not considered to be a COC for the Site.~~
~~METALS~~	~~Calcium~~	~~Parameters with no Table 6 SCS but detected concentrations above the OTR value~~	~~20 samples from 18 locations collected between 2007 and 2013.~~	~~Twenty of a total of 43 samples from between 2007 and 2013 had results with detected concentrations greater than the OTR value of 53,508 µg/g. Calcium was analyzed as part of the historical laboratory metal suites and was not targeted as a COC.~~ ~~As the bedrock in the region is limestone and dolostone, which are typically abundant with calcium and magnesium, it is likely that soils in the region would also contain naturally elevated calcium concentrations. As calcium is considered a naturally occurring element and not a COPC associated with APECs on Site, and at the discretion of the QPESA, calcium is not considered to be a COC for the Site.~~
METALS	Chromium, Hexavalent (Cr6+)	Parameters with existing SCS but RL exceedances only	24 RL exceedances from 1991 (Lab reports P&R_E.O.90K26, 91-4543/P&R_E.O.90K2, 91-4281/P&R_E.O.90K2, 91-4543/91-4281)	The 24 samples collected in 1991 for hexavalent chromium had RL exceedances. Historical laboratory RLs may not have had capabilities to meet current SCS. Recent sampling conducted in 2007, 2017, and 2018 do not show concentrations detected on the Site above the SCS (65 results with nondetect concentrations below the SCS and 6 samples with detected concentrations below the SCS). Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.

Table 6-7b. Rationale for the Removal of Soil COCs
Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Comment/Rationale
METALS	Cyanide, Free	Parameters with existing SCS but RL exceedances only	All historical samples (five from 1991 and 20 from 2007) (Lab reports 91-281/P&R_E.O.90K2, P&R_E.O.90K26, 91-4281, 07T209831, 07T211735)	Samples analyzed for cyanide in 1991 and 2007 had RL exceedances. Historical laboratory RLs may not have had capabilities to meet current SCS. Recent sampling for cyanide (weak acid dissociable) conducted between 2017 and 2020 have 63 results with nondetect concentrations below the SCS. No concentrations of cyanide have been detected at the Site. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.
~~METALS~~	~~Iron~~	~~Parameters with no Table 6 SCS but detected concentrations above the OTR value~~	~~7 samples from 1991, 1 sample from 2007, and 1 sample from 2013~~	~~Nine of a total of 43 samples had detected concentrations exceeding the OTR value of 37808 µg/g. The remaining 36 samples had detected concentrations below the OTR value. Iron was analyzed as part of the historical laboratory metal suites and was not targeted as a COC.~~ ~~As iron is considered a naturally occurring element and is not a COPC associated with APECs on Site, and at the discretion of the QPESA, iron is not considered to be a COC for the Site.~~
~~METALS~~	~~Magnesium~~	~~Parameters with no Table 6 SCS but detected concentrations above the OTR value~~	~~9 samples from 1991, 4 samples from 2007, and 6 samples from 2013~~	~~Nineteen of a total of 43 samples had results with detected concentrations greater than the OTR value of 17,400 µg/g. The remaining 24 samples had detected concentrations below the OTR value. Magnesium was analyzed as part of the historical laboratory metal suite and was not targeted as a COC.~~ ~~As the bedrock in the region is limestone and dolostone, which are typically abundant with calcium and magnesium, it is likely that soils in the region would also contain naturally elevated magnesium concentrations. As magnesium is considered a naturally occurring element and not a COPC associated with APECs on Site, and at the discretion of the QPESA, magnesium is not considered to be a COC for the Site.~~
METALS	Selenium	Parameters with existing SCS but RL exceedances only	Two samples from BH18-207i collected in 2020 (lab report L2419793).	The laboratory report indicates that dilution was required because of high concentrations of test analytes. No detected concentrations of selenium exceeded the SCS in samples where metals were analyzed as a COPC, and RLs met the SCS in the other samples where selenium was not detected. Additionally, three samples collected at BH18-207 in 2018 located within 2 metres of BH18-207i, did not have raised RLs and met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be COCs for the Site.
METALS	Sodium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	6 samples from 1991, and 4 samples from 2013	Ten of a total of 43 samples had detected concentrations greater than the OTR value of 215 µg/g. Twenty-nine of the remaining 33 samples had detected concentrations of sodium below the OTR value, and 4 samples had nondetected concentrations of sodium. Sodium was analyzed as part of the historical laboratory metal suites, and current methods analyze Sodium risks, using SAR analysis. SAR results are below the SCS. Based on the available information, including SAR results below the SCS, at the discretion of the QPESA, sodium is not considered to be a COC for the Site.
METALS	Strontium	Parameters with no Table 6 SCS but detected concentrations above the OTR value	7 samples, 2 from 1991 and 5 from 2013	Seven of a total of 43 samples had detected concentrations greater than the OTR value of 87.5 µg/g, with a maximum of 190 µg/g. The remaining 36 samples had detected concentrations of strontium below the OTR value. Strontium was analyzed as part of the historical laboratory metal suites and was not targeted as a COC. As strontium is considered a naturally occurring element and is not a COPC associated with APEC on Site, and at the discretion of the QPESA, strontium is not considered to be a COC for the Site.
OCP	Hexachlorobutadiene Hexachloroethane	Parameters with existing SCS but RL exceedances only	6 historical samples from 1991 with RL exceedances in soil.	Samples analyzed for hexachlorobutadiene and hexachloroethane in 1991 had RL above the SCS. Historical laboratory RLs may not have had capabilities to meet current SCS. These individual OCP parameters (including hexachlorobenzene and hexachloropentadiene) were run as part of older BNA laboratory scans alongside VOCs and PAHs and were not targeted COCs. OCPs are not considered to be a COPC on Site, and therefore, they were not analyzed in the 2017/2018 environmental investigations. Based on the available information, at the discretion of the QPESA, these parameters are not considered to be COCs for the Site.
VOC	1,1,2,2-Tetrachloroethane	Parameters with existing SCS but RL exceedances only	One sample from MW17-108S in 2017 (2.74 to 2.9 mbgs) (Lab report L2007635)	One sample of the 126 samples analyzed contained an RL exceedance. Laboratory report indicated adjusted detection limits because of co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 125 samples, including one sample collected at a deeper interval at the same location, had nondetected concentrations of this parameter, which met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.

Table 6-7b. Rationale for the Removal of Soil COCs
Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter(s)	Category	Detail/Sample(s)	Comment/Rationale
VOC	Bromomethane Vinyl Chloride	Parameters with existing SCS but RL exceedances only	One sample from BH07-67 in 2007 (Lab report 07T209831)	One sample of 126 contained RL exceedances for the noted VOCs. Laboratory report indicated adjusted detection limits because of co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 125 samples, including one sample collected at a deeper interval at the same location, had nondetected concentrations of these parameters. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be a COC for the Site.
VOC	Dichloromethane	Parameters with existing SCS but RL exceedances only	One sample from MW17-107S-0.5-2 with an RL exceedance (Lab report L2007635)	One sample of 126 contained RL exceedances for the noted VOC. Laboratory report indicated adjusted detection limits because of co-eluting interferences (i.e., interfering peaks on the VOC method) preventing the determination of the presence or absence of the VOC analytes (greater or less than regular detection limits). The remaining 125 samples had nondetected concentrations of this parameter. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.
VOC	Bromodichloromethane Chloroform	Parameters with existing SCS but RL exceedances only	One sample from BH20-214 with and RL exceedance in soil (Lab report L2419793)	One sample of 126 contained RL exceedances for the noted VOCs. The laboratory report indicated that detection limits were raised because of interference from volatile hydrocarbons on the VOC method; therefore, chromatographic elution of interfering peaks in the same region as the test analytes prevented a determination of whether the analyte was present or absent with respect to the regular detection limits. Concentrations of these VOCs have not been detected elsewhere on the Site. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Site.

Notes:
The rationale for exclusion of COCs listed in this table is based on the data collected as part of the ESA and only applies to this ESA.
µg/g = microgram per gram
ABN = acid, base, and neutral compound
APEC = area of potential environmental concern
COC = contaminant of concern
COPC = contaminant of potential concern
CP = chlorophenol
ESA = Environmental Site Assessment
mbgs = metre(s) below ground surface
RL = laboratory reporting limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
BNA = base, neutral, and acid compound
No. = number
OCP = organochlorine pesticide
PAH = polycyclic aromatic hydrocarbon
PCA = potentially contaminating activity
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
QPESA = MECP Qualified Person for Environmental Site Assessment
RSC = Record of Site Condition
SCS = Site Condition Standards
VOC = volatile organic compound

Table 6-10b. Rationale for the Removal of Groundwater COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
ABN	1,1'-Biphenyl	Parameters with existing SCS but RL exceedances only	OW23S RL exceedance in 2014 (Lab report B4J8984 from Maxxam)	1,1-Biphenyl was run as part of a historical PAH laboratory scan and was not a targeted as a COC for the area. No detected concentrations of 1,1'-biphenyl have been reported at the Site. The raised RL is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. The remaining 44 locations where 1,1-biphenyl was analyzed did not report detected concentrations, and RLs met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.
BTEX	Benzene Ethylbenzene	Parameters with existing SCS and both RL and detected exceedances	OW24D RL exceedances in 2010, 2011, 2012, 2014, and 2015.	The VOC parameters noted had RLs exceeding the SCS at OW24D from samples collected between 2010 and 2015. Laboratory reports indicated that detection limits were adjusted, as the sample required dilution because of high concentrations of other target analytes (review indicated PHC F1 and chlorinated VOCs were up to 5,400 µg/L). Samples collected in 2017 and 2020 from OW24D had nondetect concentrations reported with RLs meeting the SCS. Based on the available information, these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
BTEX	Toluene Xylenes	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances in 2010, 2011, 2012, 2014, and 2015.	Groundwater samples from OW24D had raised RLs for six events between 2010 and 2015. Toluene RLs exceeded the SCS. The raised xylene RLs met the SCS. Laboratory reports indicated that detection limits were adjusted, as the sample required dilution because of high concentrations of other target analytes (review indicated PHC F1 and chlorinated VOCs were up to 5,400 µg/L). Samples from this location taken in 2017 and 2020 did not have raised RLs, which met the SCS. Toluene and xylenes met the SCS at the other locations on the Phase Two Property. Based on the available information these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, these parameters were not considered to be COCs for the Phase Two Property.
CHEMISTRY	Alkalinity, Bicarbonate (as CaCO3), Alkalinity, Total (as CaCO3), Calcium, Fluoride, Iron, Manganese, Potassium	Parameters with no Table 6 SCS but exceeds the PGMIS value	All samples analyzed (range from 2012 to 2016)	Chemistry parameters (pH, conductivity, alkalinity, specific conductance) and major ions (fluoride, chloride, nitrate, nitrite, bromide, phosphate, sulfate, calcium, potassium, manganese, sodium) were introduced into the annual groundwater monitoring program in 2010 and analyzed for until 2016. Iron was included in analytical suites in 2012 to 2014 and 2016. Alkalinity (both bicarbonate and total) exceeded the PGMIS value of 55,000 µg/L in each of the 134 samples and ranged from 250,000 to 550,000 µg/L. Calcium exceeded the PGMIS value of 431,000 µg/L in one of 134 samples, with a concentration of 440,000 µg/L. Fluoride exceeded the PGMIS value of 2,090 µg/L in 11 of 77 samples with concentrations up to 3,900 µg/L. Iron exceeded the PGMIS value of 4,090 µg/L in 7 of 58 samples, with concentrations up to 8,900 µg/L. Manganese exceeded the PGMIS value of 717 µg/L in 4 of 58 samples, with concentrations up to 1,200 µg/L. Potassium exceeded the PGMIS value of 20,700 µg/L in one of 134 samples, with a concentration of 30,600 µg/L. Rationale was not provided for the analyses of these parameters, as they were not required under the MOE Provincial Order that the annual groundwater monitoring was conducted under. Parameters analyzed were those typically collected for monitoring geochemical conditions in groundwater for potential remediation options or the occurrence of degradation or attenuation of contaminants. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.
CHEMISTRY	Ammonia, Electrical Conductivity, Specific conductance, Bromide	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	All samples analyzed (range from 2012 to 2016)	Chemistry parameters (pH, conductivity, alkalinity, specific conductance) and major ions (fluoride, chloride, nitrate, nitrite, bromide, phosphate, sulfate, calcium, potassium, manganese, sodium) were introduced into the annual groundwater monitoring program in 2010 and analyzed for until 2016. Ammonia was included in the analytical suites from 2012 to 2014. Ammonia had detected concentrations in 41 of 57 samples collected, with concentrations up to 1,750 µg/L. Bromide had detected concentrations in one of 77 samples collected, with a concentration of 1,000 µg/L (at the detection limit). Electrical conductivity ranged from 0.5 to 2.0 mS/cm. Specific conductance ranged from 500 to 1,800 µmhos/cm. Rationale was not provided for the analyses of these parameters, as they were not required under the MOE Provincial Order that the annual groundwater monitoring was conducted under. Parameters analyzed were those typically collected for monitoring geochemical conditions in groundwater for potential remediation options or the occurrence of degradation or attenuation of contaminants. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.

Table 6-10b. Rationale for the Removal of Groundwater COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
CHEMISTRY/ METALS	Silica (as SIO2), Sulfur, Cesium (Cs), Lithium, Rubidium (Rd), Silicon, Tin	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	One sample from OW31 from September 2016 (Lab report L1830739)	A full metals suite was run for the groundwater sampling completed in 2016 at OW31. A number of parameters did not have SCS values or PGMIS values to compare concentrations. Detected concentrations can occur naturally; however, background concentrations for these parameters in groundwater have not been documented in Ontario. As these parameters were not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, they were not considered to be COCs.
PAH	Acenaphthylene	Parameters with existing SCS but RL exceedances only	OW23S and OW22S with RL exceedances from 2012 to 2016.	Groundwater samples from OW23S (5 samples) and OW22S (1 sample) had raised RLs for up to five events between 2012 and 2016. Laboratory reports noted that detection limits were adjusted as the sample required dilution due to the nature of the sample matrix. The raised RL at OW23S is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. Samples taken at OW23S (parent and duplicate) in 2018 reported detected concentrations less than the SCS. The other samples collected at OW22S met the SCS (2012 to 2015, and 2017). The remaining 184 samples collected from other locations on the Site had concentrations less than the SCS (7 samples) or nondetected concentrations, with RLs meeting the SCS of 1 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be COCs for the Phase Two Property.
PAH	Benzo(g,h,i)perylene Dibenzo(a,h)anthracene Indeno(1,2,3-Cd)Pyrene	Parameters with existing SCS but RL exceedances only	8 samples from 3 locations (OW22S, OW23S, OW25) with RL exceedances of the SCS from between 2011 to 2016.	Groundwater samples from OW23S (5 samples), OW22S (2 samples) and OW25 (1 sample) had raised RLs for up to five events between 2011 and 2016. Some of the laboratory reports noted that detection limits were adjusted, as the sample required dilution because of the nature of the sample matrix, and it is likely that all eight samples required dilution, causing the detection limits to be adjusted accordingly. The raised RL at OW23S is likely due to LNAPL interference, as there has been consistent measurement of free product in this well. Samples taken at OW23S in 2018 reported detected concentrations less than the SCS. The other samples collected at OW22S (2013 to 2015, and 2017) and OW25 (2010 to 2019) met the SCS. The remaining 169 samples collected from other locations on the Site had concentrations less than the SCS (7 samples) or nondetect concentrations, with RLs meeting the SCS of 0.2 µg/L. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Phase Two Property.
SVOC	Benzo(e)pyrene	Parameters with no Table 6 SCS or PGMIS value, but have detected concentrations	1 sample from OW22S with a detected concentration in 2013	One of 15 samples (only analyzed in 2013) had a detected concentration of 0.065 µg/L of benzo(e)pyrene. Benzo(e)pyrene was run as part of a historical PAH laboratory scan and was not a targeted as a COC for the area. The remaining 14 locations where benzo(e)pyrene was analyzed did not report detected concentrations. As this parameter was not identified as COPCs on the Site or associated with an APEC on the Site, at the discretion of the QPESA, it was not considered to be COCs for the Phase Two Property.
VOC	1,1,1,2-Tetrachloroethane 1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,2-Dibromoethane 1,2-Dichlorobenzene 1,2-Dichloroethane 1,2-Dichloropropane 1,3-Dichloropropene 1,4-Dichlorobenzene Bromoform Bromomethane Carbon tetrachloride Styrene	Parameters with existing SCS but RL exceedances only	All samples with RL exceedances between 2010 and 2015	VOC parameters noted had RL exceedances in a number of samples between 2010 and 2015. These locations were resampled in 2017 and 2018 and had reported nondetect concentrations, with RLs meeting the SCS. No other locations reported exceedances of the SCS for these parameters. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Phase Two Property.
VOC	1,3-Dichlorobenzene 2-Butanone Acetone Chlorobenzene	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances in 2015	One sample collected at OW24D had RL exceedances for each of the noted VOCs in 2015. The other samples collected from this location between 2010 and 2018 (seven events) reported nondetect concentrations with RLs meeting the SCS. Samples collected on the Phase Two Property had nondetected concentrations of the noted VOCs, with the exception of two samples that had detected concentrations of acetone less than the SCS. Laboratory reports indicated that detection limits were adjusted, as the sample required dilution because of high concentrations of other target analytes. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Phase Two Property.

Table 6-10b. Rationale for the Removal of Groundwater COCs

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
VOC	4-Methyl-2-Pentanone Chlorodibromomethane Bromodichloromethane Dichloromethane Methyl tert-butyl ether (MTBE)	Parameters with existing SCS but RL exceedances only	OW24D RL exceedances of the SCS in 2010, 2011, 2012, 2014, and 2015.	Six samples collected from OW24D had RL exceedances for each of the noted VOCs between 2010 and 2015. Samples from 2016 and 2017 reported nondetect concentrations with RLs meeting the SCS. The remaining samples on the Phase Two Property also had nondetected concentrations of the noted VOCs less than the SCS. Laboratory reports indicated that detection limits were adjusted, as the sample required dilution because of high concentrations of other target analytes. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Phase Two Property.
VOC	1,1,1-Trichloroethane 1,1-Dichloroethane	Parameters with existing SCS and both RL and detected exceedances	Samples from OW24D with RL exceedances between 2010 and 2015	VOC parameters noted had RLs exceeding the SCS at OW24D from samples collected between 2010 and 2015. Detected exceedances were noted elsewhere on the property: 1,1,1-trichloroethane exceeded the SCS at OW12; 1,1-dichloroethane exceeded the SCS at OW26S; both more than 200 metres away (downgradient) on the western portion of the property. Samples collected in 2017 and 2018 from OW24D had nondetect concentrations reported with RLs meeting the SCS. Based on the available information, these parameters were determined to likely not be present at OW24D at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, the elevated RLs were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
VOC	n-Hexane Tetrachloroethene	Parameters with existing SCS and both RL and detected exceedances	Samples with RL exceedances between 2010 and 2015	N-hexane had noted RLs exceeding the SCS from several samples collected between 2010 and 2015. Detected exceedances were only noted at MW17-105S for n-hexane and OW19 and MW17-107S for tetrachloroethene. Locations with RLs only exceeding the SCS had samples meeting the SCS in two or more other sampling events. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS at the locations with the elevated RLs; therefore, at the discretion of the QPESA, the elevated RLs were not carried through for the dataset for the Risk Assessment. These parameters were retained as a COC for the Phase Two Property based on other locations exceeding the SCS.
VOC	1,1,2,2-Tetrachloroethane 1,1,2-Trichloroethane 1,2-Dibromoethane	Parameters with existing SCS but RL exceedances only	Two samples from OW22S has RL exceedances of the SCS in 2017 and 2018.	These VOCs had elevated RLs in two samples collected in 2017 and 2018. Both the laboratory reports noted that the detection limits were adjusted because of "to interference from volatile hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits)." The RLs for these VOCs met the SCS in three prior sampling events at this location. Based on the available information, these parameters were determined to likely not be present at OW22S at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not considered to be COCs for the Phase Two Property.
VOC	Chloroform	Parameters with existing SCS but RL exceedances and detected exceedances	14 samples from 5 locations had RL exceedances of the SCS from 2010 to 2015.	Fourteen of 365 samples analyzed for chloroform had RL exceedances of the SCS. Of the remaining samples, 340 had nondetected concentrations below the SCS, and 9 had detected concentrations below the SCS. Some of the laboratory reports noted that detection limits were adjusted, as the sample required dilution because of high concentrations of other target analytes. Because of the presence of high concentrations of VOCs on the Site, it is likely that the samples required dilution, causing the detection limits to be adjusted accordingly. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; however, one location (MW18-112D) reported a detected concentration above the SCS in 2018. See Table 6-10c for further discussion of chloroform as a COC for the Phase Two Property.

Notes:

The rationale for exclusion of COCs listed in this table is based on the data collected as part of the ESA and only applies to this ESA.

µg/L = micrograms per gram
ABN = acid, base, and neutral compound
APEC = area of potential environmental concern
COC = contaminant of concern
COPC = contaminant of potential concern
CP = chlorophenol
ESA = Environmental Site Assessment
mbgs = metre(s) below ground surface
RL = laboratory reporting limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
No. = number
OCP = organochlorine pesticide
PAH = polycyclic aromatic hydrocarbon
PCA = potentially contaminating activity
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
QPESA = MECP Qualified Person for Environmental Site Assessment
RSC = Record of Site Condition
SCS = Site Condition Standards
µmhos/cm = micromho(s) per centimetre
VOC = volatile organic compound

Appendix D3
Phase Two CSM

200 Beverley Street, Guelph, Ontario

Phase Two Conceptual Site Model

| ~~R1~~R2

~~November 16, 2020~~May 18, 2021

City of Guelph

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200 Beverley Street, Guelph, Ontario

Project No:	694757CH
Document Title:	Phase Two Conceptual Site Model
Document No.:	PPS0612200825KWO
Revision:	~~R1~~R2
Date:	~~November 16, 2020~~May 18, 2021
Client Name:	City of Guelph
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Phase Two Conceptual Site Model

Based on recent and historical Phase Two Environmental Site Assessment (ESA) work completed at 200 Beverley Street (Phase Two Property or Site) in Guelph, Ontario, a Phase Two CSM is provided and discussed in this appendix, as required under Ontario Regulation (O. Reg.) 153/04 (MECP 2011a). The Site is located east of downtown Guelph, Ontario, and is approximately 5.2 hectares (ha) in size. The Site currently consists of vacant land historically used for industrial purposes. All onsite buildings have been razed, with concrete floor slabs still in place. The location of the Phase Two Property is shown on Figure 2-1, and a more detailed Site Plan is shown on Figure 2-2.

1.1 Potentially Contaminating Activities

The Phase One ESA (CH2M 2017) identified 77 potentially contaminating activities (PCAs) resulting in 33 areas of potential environmental concern (APECs). The following PCAs were identified during the Phase One ESA (CH2M 2017) on the Phase Two Property, and resulted in an APEC:

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 30 – Importation of Fill Material of Unknown Quality
- 32 – Iron and Steel Manufacturing and Processing
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing or Bulk Storage
- 46 – Rail Yard, Tracks, and Spurs
- 55 – Transformer Manufacturing, Processing and Use

The following PCAs were identified during the Phase One ESA (CH2M 2017) outside the Phase Two Property, but within the Phase One Study Area:

- 8 – Chemical Manufacturing, Processing, and Bulk Storage
- 10 – Commercial Autobody Shops
- 11 – Commercial Trucking and Container Terminals
- 12 – Concrete, Cement and Lime Manufacturing
- 27 – Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles
- 28 – Gasoline and Associated Products Storage in Fixed Tanks
- 33 – Metal Treatment, Coating, Plating and Finishing
- 34 – Metal Fabrication
- 39 – Paints Manufacturing, Processing or Bulk Storage
- 43 – Plastics (including Fiberglass) Manufacturing and Processing
- 45 – Pulp, Paper and Paperboard Manufacturing and Processing
- 46 – Rail Yard, Tracks, and Spurs
- 49 – Salvage Yard, including Automobile Wrecking
- 55 – Transformer Manufacturing, Processing and Use
- 57 – Vehicles and Associated Parts Manufacturing

1.2 Areas of Potential Environmental Concern

As indicated, the Phase One ESA (CH2M 2017) identified several PCAs that resulted in APECs for the Phase Two ESA. As summarized from the Phase One ESA, 33 APECs were identified on the Site, with

29 attributable to onsite PCAs, and 4 APECs attributable to offsite PCAs located within 250 metres (m) of the Phase Two Property.

The following APECs were identified for the Phase Two Property:

1) Foundry - A foundry was operated on the site by IMICO from 1913 to 1989 when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms using malleable and ductile iron (DCS 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main foundry building. Foundry sands, sludge materials, and process waste were removed from the site and buildings were demolished in 1999 (Earth Tech 1999). The Proctor & Redfern (P&R) investigation also reported that moulding sands and dust collector waste was stored at the northwestern corner of the building and drained to the truck bay (P&R 1991).

2) Machine Shop - A machine shop was shown on the 1916 fire insurance plan (FIP), east of the original foundry. The northern one-third of the Machine Shop was identified for 'Tumbling and Cleaning' operations, inferred to be in association with the adjacent 'Annealing Room' to the north. FIPs prepared in 1929, 1945, and 1960 showed this area changed operations to 'Shipping' and a 'Pattern Shop.'

3) Annealing - An 'Annealing Room' with four furnaces is shown on the 1916 FIP. A brick chimney is located on the northern wall. The 1929 FIP shows nine furnaces with the Annealing Room extended westward with an additional chimney on the north wall within the extended area; the southern portion of the Annealing Room is identified as the 'Tumbling Dep't.' The 1946 FIP shows a structural addition on the east side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of aboveground storage tanks (ASTs) or underground storage tanks (USTs) for fuel oil storage on any of the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel oil fired furnace operation is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the northern side of the Annealing Room.

4) Sand Storage - The 1916 FIP shows a 'Sand Shed.' The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled 'Sand.' The 1960 FIP shows the original 'Sand Shed' as 'Bricks' and the second smaller building to the west labelled as 'Sand & Bricks,' and an additional area to the north labeled 'Sand'. No information was identified to indicate if only clean process, spent foundry sands or both were stored in these buildings, therefore the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.

5) Galvanizing Building - A small free-standing building for 'Galvanizing' was present on the south east portion of the Site as shown on the 1916, 1929, and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as 'Fittings Whse' (warehouse). No information was identified regarding process chemical use and storage, or waste management practices, in association with the galvanizing operations conducted.

6) Chipping/Grinding Room - A 'Chipping Room' was shown on the FIPs prepared in 1929, 1946, and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of

the 'Annealing Rm', with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a 'Trimming and Grinding' area; this information inferred to be based on the interview of historical IMICO employees. 'Dust control equipment' is shown on Figure 4 of the 1991 P&R report, on the exterior western side of the building.

7) Oil Houses, Boiler House and ASTs - A building is shown on the 1929 FIP to the north of the Foundry and east of the power house with a label "Oil," and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the northern building remaining but is not labelled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house, and two 45,000-litre (L) (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The removed AST had been located east of the Core Room (Earth Tech 1999).

8) Gasoline UST - As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of 'scales' at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labelled as a 'time office') but does not show the UST. The gasoline use is not known; however, it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 P&R investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City of Guelph due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R 1991).

9) Oil House - A building is shown on the 1929 and 1949 FIP to the south of the Foundry and west of the galvanizing building with a label "Oil." The building/structure is not on 1916 FIP where the area is shown as exterior yard area and is not present on the 1960 FIP where the area is occupied.

10) Machine Shop - A machine shop is shown on the 1929, 1946, and 1960 FIPs, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop. The northern portion of the machine shop was removed during the 1999 excavation based on the excavation footprint (EarthTech 1999).

11) Plating/Galvanizing Building - A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R 1991; Earth Tech 1999), the building was identified as a storage shed and reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R, 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil and grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 metres below ground surface [mbgs] and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation). Testpits and boreholes installed in the area in 2013 by DCS indicated soils

having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS 2007). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 micrograms per litre (µg/L) of fraction (F)3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25 percent of the sampling events between 2005 and 2016.

12) Coal Storage - A coal shed is shown on the 1946 FIP, to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R 1991; GLL 1999, Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.

13) Rail Line - A former rail line was shown onsite north of the buildings on the 1916, 1929, and 1946 FIPs, running east to west, for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed, to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.

14) Possible Automobile Storage, Maintenance and Repair - An addition south of the foundry building, on the east side of the offices, is labeled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.

15) Sand Mixing/Storage - Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R 1991; GLL 1999; Earth Tech 1999) do not have an indication of the buildings' use.

16) Transformers - Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained polychlorinated biphenyls (PCBs).

17) Capacitor Room - PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigation site plan, and later remediated as part of the Earth Tech demolition (P&R 1991; Earth Tech 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor was present in the central section, and a sump located in on the eastern portion of the capacitor room that were all indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 to 1.3 mbgs) to remove concentrations above 5 micrograms per gram (µg/g). Final samples (composite soil, soil, concrete and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. A well (OW25) was installed within the excavation area (the report for this installation was not available and therefore the soil conditions are unknown if analyzed as part of the investigation) and subsequent groundwater monitoring of the area have indicated concentrations of chlorinated volatile organic compounds (VOCs) and petroleum hydrocarbons (PHCs) (mainly F3) exceeding the applicable potable water criteria (Table 6 Standards) (DCS 2007, 2014; AECOM 2017a; 2017b).

18) Coal Storage - A building for coal storage is shown on the 1960 FIP, to the north of the annealing room, with additional 'coal piled' to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R 1991, DCS 2007).

19) Coal Storage - A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.

20) Garage - A garage was shown on the 1946 and 1960 FIP along Stevenson, on the western side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.

21) Coal Storage - The 1960 FIP indicates coal storage south of the garage on the western side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labelled as coal.

22) Transformer - A 1,200-volt transformer is shown on the 1991 Site Plan (P&R 1991).

23) Paint Shop - First shown on the P&R Site plan, a paint shop was located at the northern end of the Site, between the shipping building and the storage area (P&R 1991). Drums were stored against the northern wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.

24) PCB Storage Area - An area located at the northeastern corner of the Finishing and Annealing Room, with a concrete pad was identified in the Earth Tech investigation as a former PCB Storage area. Concentrations exceeding 50 parts per million (ppm) of PCBs were identified. Previous Site maps showed this area as 'storage' (P&R 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kilograms (kg) of PCB-containing ash residue from the top of the concrete pad, and the concrete pad itself was removed and taken for offsite disposal (Earth Tech 1999). Confirmatory samples below the pad were 0.63 and <0.05 µg/g. The soil was later excavated to bedrock as part of the soil remediation in the northeastern corner of the property (see APEC-11).

25) Drum Storage - Interviews with former employees as part of the P&R investigation identified drum storage activities e along the nortrnh property boundary (P&R 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.

26) Former Substation - A former substation is indicated on the P&R (1991) and Earth Tech (1999) Site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated nondetect concentrations of PCBs. Similarly, one location installed during the DCS Phase II ESA (2007) indicated non-detect PCB concentration. Previous Site plans (FIPs) show this area as exterior yard areas.

27) Former Electrical Shop - A small electrical shop was noted to be on the southwestern corner of the foundry (P&R 1991). This addition was not shown on the FIPs from previous years and was shown as the exterior yard area west of the foundry.

28) Waste Oil Storage - Used oil was stored above ground on the southwest end of the foundry as shown on the P&R Site plan (P&R 1991).

29) Fill of Unknown Quality - All areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag, and cinders (extending to 1.0 m) was found across the Site (P&R 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS 2007). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R 1991).

30) Potential Offsite Impacts from the North – Historical and current operations on properties to the north have the potential to impact the Phase Two Property, including the following:

- Rail lines
- Paper manufacturing
- Auto body repair shop
- Automobile repair
- Gasoline station
- Trucking company
- Concrete products manufacturing
- Wire/spring manufacturing
- Metal valve manufacturing
- Former spill
- Electroplating company
- Window and door manufacturing
- Scrap yard

31) Potential Offsite Impacts from the East – Historical and current operations on properties to the east have the potential to impact the Phase Two Property, including the following:

- Steel valve manufacturing
- Former stove manufacturer/foundry
- Box manufacturing
- Potential USTs
- Scrap yard
- Former fuel storage facility
- Former pain application
- Chemical manufacturer or distributor
- Transformers

32) Potential Offsite Impacts from the South – Historical and current operations on properties to the south have the potential to impact the Phase Two Property, including the following:

- Screw manufacturing
- Former USTs
- Former transportation company

33) Potential Offsite Impacts from the West – Historical and current operations on properties to the west have the potential to impact the Phase Two Property, including the following:

- Window manufacturing
- Metal treatment
- Spring manufacturing
- Former refractory facility
- Motor vehicle parts manufacturing
- Former spill

Table 6-4 describes the APECs and associated PCAs. Figures 4-1a and 4-1b present the location of the onsite and offsite APECs and PCAs, respectively, along with the locations of boreholes, test pits, and monitoring wells advanced as part of the Phase Two ESA investigations. Figure 4-2 shows the locations of all identified APECs. As summarized in Table 6-4, the APECs occurring on the Phase Two Property have been thoroughly investigated for all associated contaminants of concern (COCs).

1.3 Subsurface Utilities and Construction Features

Some concrete foundations, slabs and footings from the former buildings are present on Site, below grade, along with associated building demolition debris (for example, crushed concrete, industrial fill). Although utilities have been disconnected on Site, piping and bedding have not been removed and, therefore, there is a potential for utility corridors to act as preferential route of contaminant migration. The specific locations of former utility corridors are not known. Former building outlines are shown on Figure 2-2.

1.4 Physical Setting

The Phase Two Property is located in the City of Guelph, within the Speed River Subwatershed of the Grand River Watershed. Regional topography (Figure 3-1) is characterized by broad and oblong drumlins (hills) with gentle slopes, with poorly drained till plain valley that are part of the Guelph Drumlin Field (Chapman and Putnam 1984). The Site lies at an average elevation of approximately 315.5 masl, with a topographic high of approximately 316.5 masl at OW13, which lies in the southeastern portion of the Site (Figure 6-1).

On a regional scale, groundwater flows from areas north of Guelph to the south towards Cambridge. Within Guelph, groundwater flow is influenced by groundwater pumping from municipal water supply wells, as well as creek and rivers, including the Speed and Eramosa Rivers.

The site lies approximately 0.5 kilometre (km) north of the Eramosa River, and 1.1 km east of the Speed River, and flow in both rivers is supported by groundwater discharge. A review of the Permit to Take Water database identified 9 Permits to Take Water within one kilometer of the Site, which include an industrial water user north of the Site, remediation wells east of the Site, irrigation use to the south (on the opposite side of the Eramosa River), and dewatering and commercial uses located south-southeast of the Site (MECP, 2020a). A review of Ontario Water Well Records found that 86 water wells exist within 250 m of the property; of these, 16 are listed as Test Holes, 44 are listed as Observation Wells, and the remaining are “Abandoned-Other”. No wells were listed as being for potable use (MECP 2020b).

The nearest municipal groundwater supply wells area as follows:

- Park #1/#2 – 2.0 km northwest
- Emma – 2.5 km northwest
- Clythe Creek – 2.4 km northeast
- Water St. – 2.25 km southwest
- Edinburgh – 2.6 km southwest
- Dean – 2.6 km southwest
- Membro – 2.9 km southwest
- University – 3.0 km south (past Eramosa River)
- Carter In/Out – 2.95 km southeast (past Eramosa River)

The City of Guelph categorizes regions of the City within Wellhead Protection Areas (City of Guelph, 2012). The IMICO site is within Wellhead Protection Area B. The City of Guelph is additionally part of the Grand River Source Protection Plan (Lake Erie Region Source Protection Committee, 2019). The Plan assigns Drinking Water Threat Vulnerability Scores across the region based on various risk factors; the IMICO site is

assigned a Vulnerability Score of 10, the highest possible, indicating it is susceptible to contamination. The site is not located within an Intake Protection Zone (GRCA, 2017).

1.4.1 Stratigraphy

The geology at the Phase Two Property was investigated through historical investigations and the 194 sampling locations (that is, boreholes, monitoring wells, and test pits) advanced as part of the Phase Two ESA activities and historical investigations. The geology beneath the Site characterized during the Phase Two field investigations is summarized in Exhibit 1.

Exhibit 1: Site Stratigraphy

Geological Unit	Description/ Bedrock Member	Approximate Thickness (m)	Lithology
Fill		0.15 to 3.1	Dark brown to black silty sands (like foundry sand) with black ash, brick, cinders, metal and wood debris
Silty Fine Sand		0 to 3.0	Silty fine sand
Eramosa Formation	Stone Road Member	1.7 to 5.8	Cream coloured coarsely crystalline dolostone
	Reformatory Quarry Member	6.4 to 9.6	Brown to black, thinly to thickly bedded, fine to coarse crystalline dolostone
	Vinemount Member	6.4 to 9.6	Dark grey to black, thin bedded, finely crystalline dolostone with shaley beds
Goat Island Formation		> 8.5	Medium to ash grey, chert-rich, finely crystalline dolostone

Note:

> = greater than

The Eramosa and Goat Island Formations underlie the Phase Two Property and the top of bedrock surface was encountered at depths ranging from approximately 1.0 m to 3.4 mbgs (approximately 312.6 to 314.6 metres above sea level [masl]). The upper few metres of bedrock in the area are highly weathered and fractured, and the bedrock becomes increasingly more competent and less fractured with depth below surface.

Eight geologic cross sections were generated to illustrate the stratigraphy beneath the Site. The cross-section locations are shown on Figure 6-1 and cross sections A-A' through H-H’ are presented on Figures 6-1a through 6-1h, respectively.

During the Phase Two ESA, the fill, native silty fine sands and all units of the bedrock from the Eramosa Formation to the Goat Island Formation (Exhibit 1) were investigated. Monitoring wells were instrumented in the upper sands and fractured Stone Road Member bedrock to characterize the water table, and monitoring wells were also installed in the Reformatory Quarry and Vinemount Members of the Eramosa Formation, to characterize the lower bedrock beneath the site. The deepest well onsite extends approximately 33 mbgs (OW31) into the Goat Island Formation.

1.4.2 Hydrogeological Characteristics

Hydrostratigraphic Units: To evaluate groundwater flow directions onsite, the geologic units beneath the site were subdivided into the following three hydrostratigraphic units.

- *Overburden and bedrock contact zone*. This unit is characterized by wells completed in the Stone Road Member of the Eramosa Formation. This hydrostratigraphic unit acts as a local and regional groundwater aquifer with groundwater flow in the upper fractured bedrock influenced by secondary porosity features, such as fractures and solution enhanced vugs and cavities.
- *Eramosa Formation.* Reformatory Quarry and Vinemount Members. Based on review of onsite drill core and our regional understanding of the bedrock formations in the area, the Reformatory Quarry and Vinemount Members of the Eramosa Formation are notably less fractured, and more competent than the overlying Guelph Formation and Stone Road Member of the Eramosa Formation, and they act as a regional aquitard.
- *Goat Island Formation*. The Goat Island Formation is interpreted on a regional scale to act as a regional aquifer beneath the City of Guelph; however, in some areas, the upper member of the Goat Island Formation (Ancaster Member) contains low permeability shaley beds that have similar hydrogeologic properties of the overlying Vinemount Member, and acts as a local aquitard. To be conservative, we have assumed the Goat Island Formation bedrock beneath the site behaves as an aquifer and lies in contact with the underlying Gasport Formation aquifer, which is the City of Guelph's primary water supply aquifer.

The characterization of the hydrostratigraphic units was based on data collected from 95 locations across the Site, which included 37 wells installed in previous investigations, and 58 wells drilled and instrumented in the current investigation between August 2017 and April 2019. The current investigation also included drilling of 19 boreholes and digging of 25 test pits, and assessed the nature of the subsurface from ground surface to a maximum depth of approximately 25 mbgs.

Of the 95 monitoring wells onsite, 57 wells are completed in the uppermost hydrostratigraphic unit (Overburden and bedrock contact zone), 36 in the middle hydrostratigraphic unit (Competent Eramosa Formation) and two in the Goat Island Formation.

Water table elevations collected in August 2018, March 2019 and February 2020 were mapped and are illustrated on Figures 6-2a, 6-2b, and 6-2c, respectively. Within the overburden and contact zone aquifer unit, groundwater flows from a high in the northeastern portion of the Site, to lower water level elevations in the southern and southwestern portions of the site (Figures 6-2a, 6-2b, and 6-2c). Horizontal hydraulic conductivity values estimated from slug tests conducted in monitoring wells screened in this upper hydrostratigraphic unit yielded averaged values of 3.9×10^{-5} metres per second (m/s). The average horizontal hydraulic gradients within this unit were estimated to range from 0.002 to 0.019 m/m in the August 2018, March 2019 and February 2020 snapshots; together with the estimated horizontal geometric mean hydraulic conductivity, and a porosity value in the fractured rock of 0.10 yielded a horizontal velocity that ranged from 25 to 230 metres per year (m/yr).

The water level elevations observed in the ***competent Eramosa Formation bedrock unit*** beneath the Site in August 2018, March 2019 and February 2020 were mapped and are illustrated on Figures 6-2d, 6-2e and 6-2f, respectively. In order to isolate monitoring wells at a consistent elevation, only groundwater wells screened in the Vinemount Member were used for the groundwater contour interpretation. Groundwater level elevations in the Vinemount were observed to be highest in the western portions of the site near MW18-120D and decrease slightly (approximately 0.2 m) to the east to a low elevation at OW13-39D (Figures 6-2d, 6-2e and 6-2f). The geomean horizontal hydraulic conductivity value from two slug tests completed in this layer was 5.7×10^{-7} m/s. This estimate is consistent with the understanding that the Vinemount Member of the Eramosa Formation is a regional aquitard.

Assuming a horizontal hydraulic gradient between 0.0004 and 0.002 m/m, based on the groundwater contours for August 2018, March 2019 and February 2020, a porosity value of 0.01 and a geometric mean hydraulic conductivity value of 5.7×10^{-7} m/s, groundwater in this lower bedrock unit was calculated to move horizontally at a velocity of 0.7-3.5 m/yr through this aquitard unit.

Within the Goat Island Formation bedrock unit, horizontal hydraulic conductivity values estimated from hydraulic tests conducted in June 2018 in OW31, screened across this unit, was estimated to be 3.7×10^{-5} m/s. As only two wells are screened across the Goat Island Formation, groundwater flow directions and gradients were not characterized for this unit.

Vertical gradients were calculated onsite using eighteen monitoring well nests present on the Site. Downward gradients were noted at most wells across the Site on multiple occasions, ranging in magnitude from 0.001 to 0.17 m/m. MW18-112S and MW18-112D and MW18-122D and MW18-122G showed consistent upwards gradients, however. The range of upwards gradients at MW18-112S/D over the monitoring period ranged from 0.010 to 0.015 m/m, while MW18-122D/G exhibited upwards gradients of 0.003 to 0.004 m/m.

Within the upper aquifer, groundwater flow onsite is conceptualized to flow from the north to the southeast and southwest towards the Eramosa River, a groundwater discharge location. Drill cores collected from the Site also showed that horizontal fractures were most common in the upper portions of the bedrock and decreased with depth. The combination of the predominant horizontal fracturing onsite, and the nearby (500 m) Eramosa River groundwater discharge location lead to the horizontal gradients beneath the Site.

Approximate Depth to Bedrock

Depth to bedrock onsite ranges from 1.0 to 3.4 mbgs. The elevation at the top of bedrock is deepest onsite at MW18-127S (312.6 masl) in the central portion of the site and rises to a high of 314.6 masl at OW23D in the eastern portion of the site where the bedrock rises slightly (less than 2 m) in comparison to the bedrock surface observed in the surrounding wells.

Approximate Depth to Water Table

The measured depth to water table collected in August 2018, representing the lowest groundwater elevations observed during the monitoring period, ranged from 1.9 to 4.0 mbgs (312.5 to 313.3 masl) for wells screened in the overburden and contact zone unit. Depth to water in March 2019, representing the highest groundwater elevations at the site, ranged from 1.1 to 3.5 mbgs (312.9 to 314.1 masl). Depths to water table in most recent sampling event (February 2020) ranged from 1.4 to 3.7 mbgs (312.77 to 313.79), which is interpreted to be an approximate average condition for the site.

Water level measurements have been collected in onsite monitoring wells since 2010, and aside from seasonal variability, the depth to water table elevation has remained consistent across the site throughout this period. Considering all 27 water level events (2010 to 2020), the depth to groundwater ranged from 0.93 to 4.97 mbgs, with an average of 2.78 mbgs.

1.5 Applicable Site Condition Standards

O. Reg. 153/04 (MECP, 2011a) under Part XV.1 of the Environmental Protection Act addresses the assessment, cleanup, and filing of an RSC for brownfield sites in Ontario and is applicable to the Phase Two Property. Jacobs evaluated the Site based on a number of criteria to decide which of the generic SCS provided in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (MECP, 2011b), were applicable for a comparison of soil and groundwater results from the Phase Two ESA investigation.

The items in Table 2-3 were considered during the selection of the SCS, as outlined in O. Reg. 153/04 (MECP, 2011a), and are discussed below.

The special conditions for environmentally sensitive areas under Section 41 of O. Reg. 153/04 are not applicable to the Phase Two Property. The RA Property is not considered an area of natural significance or to be within the proximity of an area of natural significance, based on the information reviewed as part of the Phase One ESA (CH2M, 2017). Soil at the Site (based on 106 samples) was found to have pH values between 6.6 and 8.86, within the Ministry's acceptable range (that is, a pH value in surface soil between 5 and 9, or a pH value in subsurface soil between 5 and 11) with the exception of two samples. One of these soil samples with elevated pH was classified as "isolated fill" and is not considered to be representative of soil conditions at the Site. At this location, concrete foundations were noted to be present both above and below the sample, essentially isolating this fill from other overburden soils. As such, this pH result was not considered further for the determination of pH at the Phase Two Property. The second sample (MW17-100S, collected between 0.3 to 0.46 mbgs) where a pH concentration of 9.45 was found was further investigated with BH19-100i, where a sample was collected from within 2 m of the original sampling location, at the same sampling depth as the original sample. The sample reported a pH of 7.71, which when averaged with the original sample, confirms pH at the Site is within the Ministry's acceptable range with a result of 8.0 (sample averaging as per Section 48(2) of the O. Reg. 153/04).

The special conditions for land within 30 metres of a water body under Section 43.1 of O. Reg. 153/04 do not apply to the Phase Two Property; however, as bedrock has been encountered at less than 2 metres below ground surface (DCS, 2014), the special condition for shallow soil properties cited under Section 43.1 of O. Reg. 153/04 applies to the Phase Two Property.

The Phase Two Property, and adjacent properties within 250 m are serviced by a municipal water source. However, as the groundwater in the vicinity of the Property does and will serve as a raw water supply for a drinking water system (understood to be the Gasport Formation as the primary reservoir), a potable groundwater condition was applied.

The current land use is industrial, and the proposed future land use may include residential/parkland and commercial uses, provided an RSC acknowledged by the MECP is obtained. Due to the extensive presence of heterogeneous fill materials across the Site, the standards for coarse-grained soils were considered applicable.

Based on this information, the Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition for coarse-grained soil and residential/parkland/institutional property use (Table 6 SCS) was applied to the Site.

1.6 Imported Soil

Fill was found to be present across the Phase Two Property and extending from ground surface to a depth of approximately 0.1 to 3.1 mbgs (typically 316.3 to 313.4 masl). The fill materials were defined as coarse, and predominantly comprised of dark brown to black silty sands (like foundry sand) with black ash, brick, cinders, metal and wood debris. The depth of the fill materials ranged from 0.15 m at MW17-105D to 3.1 m at OW31 in the eastern portion of the Site. As discussed in the Phase One ESA (CH2M, 2017), two remedial excavations historically occurred at the Phase Two Property: an area in the northeast corner of the Site (associated with the former galvanizing/plating building) was excavated to bedrock in 1999 (Earth Tech, 1999) and a former capacitator room area in the south-central potion of the Site was also remediated for polychlorinated biphenyls (PCBs) as part of the Earth Tech (1999) demolition activities. Granular "B" material was used to backfill these excavation areas (shown on Figure 6-1) along with former pits and sumps across the Site.

1.7 Locations of Proposed Buildings and Structures

All buildings onsite have been razed; however, the majority of the concrete floors, foundations and footings of historical buildings remain in place. The approximate locations of the former buildings are show on Figure 2-2. Historically, approximately 23 buildings were present onsite.

The Site is proposed to be redeveloped for a combination of one or more of residential, parkland, commercial, and community land uses. The configuration of the buildings associated with the proposed redevelopment is not known at this time.

1.8 Contaminants Exceeding Applicable Site Condition Standards in Soil

Soil environmental conditions were characterized based on evaluation of historical samples, and the recent investigations conducted for the Phase Two ESA. A total of 173 soil sampling locations and 349 soil samples were used to characterize the soil and identify COCs. A summary of the soil analytical results is provided in Table 6-5.

Soils on the Phase Two Property were found to be generally impacted with elevated concentrations of metals and petroleum hydrocarbons (PHCs). Localized soil impacts from polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, and xylenes (BTEX), volatile organic compounds (VOCs), other regulated parameters (ORPs) and polychlorinated biphenyls (PCBs) were also identified in limited areas of the Phase Two Property. The presence of these parameters is consistent with the historical and industrial land use of the Site.

The analytical results of the investigation are summarized in Table 6-5 along with a comparison to the Table 6 SCS (MECP, 2011b). Figures 6-3 through 6-11 present the soil concentrations exceeding the Table 6 SCS by analytical group. Where there are exceedances of the Table 6 SCS, at least one cross-section presenting the inferred vertical extent of soil impacts by analytical group, has been prepared and follow the plan view figure. Maximum concentrations of each detected parameter have been provided in Table 6-6 and are shown in red text on the respective plan view and cross-sectional figures. COCs in soil have been identified in Table 6-7c.

The following subsections present a description of the soil conditions for each analytical group investigated.

1.8.1 Metals, Hydride-Forming Metals, Mercury and Hexavalent Chromium

Exceedances of the Table 6 SCS in soil for metals were widespread across the Site, and are consistent with the historical use of the Site as a foundry (APEC-1), with associated machine shop uses (APECs 2 and 10), annealing uses (APEC-3), and galvanizing activities (APECs 4 and 11). The main parameters exceeding the Table 6 SCS are lead and zinc. Maximum lead concentrations were greater than 5,000 µg/g, which occurred in a localized area surrounding BH07-65, near the western boundary of the Site. Exceedances of zinc were up to 67,200 µg/g occurring at MW17-108S, along with 6 other samples with concentrations greater than 10,000 µg/g. These locations were localized to areas on the southeastern corner of the Site, within or in the area of the former galvanizing building (APEC-5). Outside of these highly impacted areas, zinc was generally seen to increase in concentration with increasing depth, indicating that elevated zinc concentrations may also be attributable to naturally occurring zinc levels in the till or the bedrock below.

Other maximum concentrations of metals (including antimony, arsenic, cobalt, copper, mercury, and molybdenum) were mostly found in the surficial fill at various locations across the Site and are likely associated with the historical operations associated with the former foundry, as well as unknown fill quality (APEC-29). The northwestern portion of the Site showed the least impacts as known historical use was limited to an employee parking area. Other than this area, metals impacts extend to the property

boundaries, and are present in both the upper fill and deeper native silt overburden units, extending to the contact with the shallow bedrock surface.

The detected exceedances for metals, hydride-forming metals, mercury (Hg) and hexavalent chromium (CrVI) for soil, including their horizontal and vertical extents, are shown in plan view on Figure 6-3 (Part 1 and 2) and in cross-section view on Figures 6-3a through 6-3f.

1.8.2 Other Regulated Parameters (Hot Water Soluble-Boron, Cyanide, Electrical Conductivity, Sodium Adsorption Ratio)

Other regulated parameters (ORPs), including hot water soluble boron (HWS-Boron), cyanide, electrical conductivity (EC), and sodium adsorption ratio (SAR) were not detected at concentrations greater than the Table 6 SCS with the exception of EC. Three samples, from two locations, including one duplicate sample, exceeded the Table 6 SCS with a maximum concentration of 2.19 mS/cm at TP20-320. The impacted samples were collected from within the historical excavation area in the northeast portion of the Site. Borehole logs note the material as grey-brown sand and gravel. All other samples collected and analyzed for EC from the Phase Two Property met the Table 6 SCS. It is likely that the EC impacts are associated with the imported backfill materials used following the 1999 excavations.

The locations and exceedances for the ORPs in soil are shown in plan view and cross section on Figure 6-4 and 6-4a, respectively.

1.8.3 Benzene, Toluene, Ethylbenzene, Xylenes

Concentrations of BTEX (specifically, benzene, ethylbenzene, and xylenes) detected in soil greater than the Table 6 SCS were localized to two areas of the Site. The first location (BH07-66) is along the western boundary in the area of a former garage (APEC-20), with low level exceedances. A test pit (TP18-317) was excavated at this location (within 2 m) with a sample collected at the bedrock interface where concentrations of BTEX were not detected and met the SCS. The second location (TP13-11), also with low level exceedances, is in the south-central portion of the Site potentially associated with the former foundry (APEC-1) and/or unknown fill quality (APEC-29).

The detected BTEX exceedances in soil are shown in plan view on Figure 6-5 and in cross-section view on Figures 6-5a and 6-5b.

1.8.4 Petroleum Hydrocarbons

PHCs (specifically F2 to F4 fractions) in soil detected at concentrations greater than the Table 6 SCS were localized to three general areas: (1) a western portion, near the boundary of the Site at the area of the former garage (APEC-20) extending east to the general open areas of the Site which may have been "oiled" for dust control (APEC-29); (2) a central southern area of the Site, in the areas of the former oil house (APEC-7), transformers (APEC-16, APEC-22) and PCB capacitors (APEC-17); and (3) the northeastern and eastern portion of the Site surrounding the former 1999 excavation where a former machine shop (APEC-2, APEC-10), oil house (APEC-9), annealing room (APEC-3), galvanizing building (APEC-5), and plating operations (APEC-11) were located. PHC F1 concentrations met the Table 6 SCS.

The maximum concentrations for F2 of 3,600 µg/g at BH07-46 and for F3 of 23,000 µg/g at BH07-40 are both located in the northeastern portion of the Site, within and downgradient of the area historically remediated (for metals and PHC impacts). The maximum concentration for F4 was 7,300 µg/g at BH07-67, on the western portion of the Site, near the former garage (APEC-20).

Five samples from four locations analyzed for PHCs exhibited concentrations greater than the MECP Free Phase Threshold values (MECP, 2011b) for F2 (BH07-46), F3 (BH07-40, BH07-46, BH07-67, and MW17-108S), and F4 (BH07-67). PHC impacts were found in both the upper fill and deeper native silt

overburden units, including at the contact with the shallow bedrock surface, a depth at where the groundwater table is present on the east portion of the Site. Light nonaqueous phased liquids (LNAPL) has been found in wells in the area of BH07-40 and MW17-108S and are further discussed in Section 1.9.4.

The PHC exceedances detected in soil are shown in plan view on Figure 6-6 and in cross-section view on Figures 6-6a through 6-6e.

1.8.5 Polycyclic Aromatic Hydrocarbons

Concentrations of PAHs detected in soil greater than the Table 6 SCS were localized to four general areas: (1) at the western boundary of the Site, in the area of the former garage and coal storage (APECs 20 and 21); (2) in the south-central area of the Site where the former foundry (APEC-1), sand storage (APEC-4, APEC-15), coal storage (APEC-12), rail lines (APEC-13) were located; (3) along the northern boundary of the Site, west of the former excavation in areas formerly used for coal storage (APEC-18), paint shop (APEC-23), former rail line (APEC-13), and former drum storage (APEC-25); and (4) the eastern portion of the Site, south of the former excavation in areas where the former machine shop (APEC-2, APEC-10), UST (APEC-8) and coal storage (APEC-19) were located. PAH concentrations in all areas could also be attributable to the unknown fill quality (APEC-29).

Maximum PAH concentrations were located at OW07-34D, extending to a depth of 1.22 mbgs, located within the south-central area of the Site. Concentrations of PAHs at this location were consistently one or two orders of magnitude greater than other detected exceedances on the Phase Two Property. Borehole logs indicate that the material sampled at this location for PAHs was the upper fill materials. Deeper samples (that is, greater than 1.22 mbgs) collected just above the bedrock surface at nearby TP18-315 and MW17-102D also had concentrations of PAHs greater than the Table 6 SCS, however fewer analytes had exceedances and the reported concentrations were significantly lower than at OW07-34D. Vertically, the PAHs impacts were primarily located in the fill, with decreasing concentrations in the deeper native silt overburden unit.

The PAH exceedances detected in soil are shown in plan view on Figure 6-7 and in cross-section view on Figures 6-7a through 6-7c.

1.8.6 Volatile Organic Compounds

VOC concentrations detected in soil exceeding the Table 6 SCS, were limited to trichloroethylene (TCE), and occurred at 7 locations on the Site. The maximum TCE concentration of 35.4 µg/g was found at BH18-207i, a location likely within the footprint former galvanizing building, at a depth of 0.15 to 0.76 mbgs. Deeper samples collected at this location, showed concentrations reducing with depth, including a sample collected from just above the bedrock (2.9 mbgs) that met the Table 6 SCS.

The remaining 6 locations where detected TCE concentrations were greater than the Table 6 SCS of 0.061 µg/g, were found to be significantly lower, at concentrations of 1 µg /g or less. 5 locations were within the eastern corner of the Site, where the former galvanizing building (APEC-5) and machine shop (APEC-10) were located. The last location was MW17-102D, in the southwest area of the Site which had a TCE exceedance of 0.082 ug/g at a depth of 0.15 to 0.3 mbgs. MW17-102D was reinvestigated with two samples taken within 2 m of the original location, at the same depth of the previous exceedance, and both results met the Table 6 SCS. The combined average of the three samples (0.041 ug/g) confirmed that concentrations of TCE met the SCS (using averaging as per Section 48(2) of O. Reg. 153/04) for this location. The deeper sample collected at MW17-102D from 1.83 to 2.13 mbgs also met Table 6 SCS.

The results of the soil investigation for VOCs are shown in plan view on Figure 6-8 and in cross-section view on Figures 6-8a through 6-8c.

1.8.7 Chlorophenols

No detectable concentrations of CPs were reported at the Site, and reporting limits (RLs) met the Table 6 SCS. The assessment of CPs on Site was associated with the potential presence in spent foundry sand, which could be related with the former foundry (APEC-1), sand storage and mixing areas (APEC-4; APEC-15), and random areas of foundry operation waste fill across the Site of unknown quality (APEC-29).

As CPs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The locations investigated for CP in soil are shown in plan view on Figure 6-9.

1.8.8 Polychlorinated Biphenyls

Concentrations of PCBs in soil greater than the Table 6 SCS were localized to three general areas: (1) near the western boundary within APECs for a former garage (APEC-20) and unknown fill quality (APEC-29); (2) to the east within APECs for a former machine shop (APEC-2, APEC-10) and unknown fill quality (APEC-29); and (3) in the south-central area of the Site with APECs for former PCB capacitors (APEC-17) and unknown fill quality (APEC-29). The maximum PCB concentration of 1.65 µg/g occurred in the western area at the surface in TP17-300. An adjacent location, BH07-67 had a sample from 0.05 to 0.91 mbgs with a concentration of 1.5 µg/g for total PCBs. The maximum concentration at TP17-300 was vertically delineated by a deeper sample from 0.3 to 0.61 mbgs that meets the Table 6 SCS. The exceedance at BH07-67 was delineated by a deeper sample at 1.22 to 1.37 mbgs with concentrations of PCBs less than the SCS. Other areas of PCB contamination at SS-41 and TP17-306 in the south-central portion of the Site did not have deeper samples as they were collected right above the bedrock. Shallow PCB impacts at TP13-08 in the eastern area were vertically delineated by deeper samples collected from TP18-316 and BH07-52.

The results of the soil investigation for PCBs are shown in plan view on Figure 6-10 and in cross-section view on Figures 6-10a and 6-10b.

1.8.9 Acid, Base, and Neutral Compounds

No detectable concentrations of ABNs were reported at the Site from the current investigation and RLs met the Table 6 SCS. The assessment of ABNs on Site was associated with the potential presence of foundry sand, which could be related with the former foundry (APEC-1), sand storage and mixing areas (APEC-4; APEC-15), and random areas of foundry operation waste fill across the Site of unknown quality (APEC-29).

As ABNs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The locations investigated for ABNs in soil are shown in plan view on Figure 6-11.

1.8.10 Parameters without MECP Standards

Parameters without MECP Standards were screened against available Ontario Typical Ranges (OTR) calculated from the 98th percentile of the data distribution (OTR98) and coefficient of variation about the OTR98 (CV) values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the "Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario" (MECP 2011d). Soil analytical results were compared to OTR values, found in Table 6-5.

Based on the concentration of these parameters and COPCs from historical activities, four were identified as COCs on Site: bismuth, calcium, iron and magnesium. Calcium and magnesium concentrations above the OTR were found widespread across the Site. Maximum concentrations of these parameters (222,000 ug/g at TP20-320 for calcium and 120,000 ug/g at TP13-06 for magnesium) were associated with the fill within the historical excavation area in the northeast portion of the Site. In addition to historical activities, the shallow bedrock and natural soil conditions of the area likely play a factor in

elevated concentrations as increases with depth are seen in some areas outside of the general foundry. Iron is found sporadically across the property, with a maximum concentration in a historical surficial soil sample (128,000 ug/g at I). Bismuth (which has no MECP Standard or OTR value) was also found sporadically across the property with a maximum concentration in the south-central area of the foundry (concentrations of 36 ug/g and 150 ug/g from a parent and duplicate at TP13-11).

All four parameters are likely associated with the distribution of metals at the Site, which are present from the former foundry operations (APEC-1) as well as unknown fill quality (APEC-29). Impacts extend to the property boundaries and are present in both the upper fill and deeper native silt overburden units, extending to the contact with the shallow bedrock surface.

Detected concentrations of bismuth in soil and detected concentration exceeding the OTRs of calcium, iron and magnesium in soil, including their horizontal and vertical extents, are shown in plan view on Figure 6-12 and in cross-section view on Figures 6-12a through 6-12c.

1.9 Contaminants Exceeding Applicable Site Condition Standards in Groundwater

Groundwater quality across the Phase Two Property was evaluated through 448 groundwater samples collected from 94 groundwater monitoring wells screened in the overburden and bedrock contact zone, the Eramosa Formation, or the Goat Island Formation. A summary table of groundwater analytical results is provided in this attachment as Table 6-8.

Groundwater was generally found to be impacted with chlorinated VOCs (specifically, chloroethenes), with localized impacts of chloroethanes, BTEX, metals, PAHs, and PHCs.

The analytical results of the investigation are summarized on Table 6-8 along with a comparison to the Table 6 SCS (MECP, 2011). Figures 6-12 through 6-20 present the groundwater concentrations exceeding the Table 6 SCS by analytical group. Where there are exceedances of the Table 6 SCS, at least one cross-section presenting the inferred vertical extent of groundwater impacts by analytical group, has been prepared and follow the plan view figure. Maximum concentrations of each detected parameter have been provided in Table 6-9 and are shown in red text on the respective plan view and cross-sectional figures. COCs in groundwater are identified in Table 6-10d.

The following subsections present a description of the groundwater conditions for each analytical group investigated.

1.9.1 Metals, Hydride-Forming Metals, Mercury and Hexavalent Chromium

Concentrations of metals in groundwater greater than the Table 6 SCS were reported for arsenic, lead, and zinc. Isolated exceedances of antimony, arsenic, cobalt, and uranium occurred in single sampling events, but the results were not reproduced in subsequent sampling events. Therefore, these analytes (other than arsenic occurred elsewhere on the Site) were not considered groundwater COCs. The distribution of metals impacts in groundwater is smaller in area than the distribution of impacts in soil, but the impacts generally correspond geographically and are consistent with the wide-spread historical use of the Site as a foundry (APEC-1).

Arsenic exceedances in groundwater occurred at one location at the north-central area of the Site, just within for the area historically used for drum storage (APEC-25) and may be associated with this or the unknown fill quality (APEC-29). The impacts (arsenic reported up to 45.7 ug/L) are more likely to be associated with offsite sources such as PCAs to the north (APEC-30), as the soil conditions in this immediate area did not exhibit elevated arsenic (or other metal and hydride-forming metal) concentrations. Exceedances of the Table 6 SCS for arsenic occurred in the upper overburden and bedrock contact zone (MW18-112S, OW07-31) and Eramosa Formation (Reformatory Quarry Member) (MW18-

112D). Impacts at this location were vertically delineated by MW18-112G, which was installed deeper than OW07-31/MW18-112S/MW18-112D within the lower Vinemount Member of the Eramosa Formation.

Lead exceedances were localized to one location (OW09-II) in the eastern portion of the Site, with concentrations up to 17 ug/L over the Table 6 SCS of 10 ig/L. The area is associated with historical coal storage (APEC-19), a former UST (APEC-8), and unknown fill quality (APEC-29), and may see potential impacts from offsite PCAs to the south (APEC-31). OW09-II is screened within the Eramosa Formation (Reformatory Quarry) unit and the lead impacts were vertically delineated by OW09-I and MW18-129D, which are installed shallower (overburden and bedrock contact zone) and deeper within the same unit, respectively, at the same location.

Zinc exceedances were localized to the eastern portion of the Site and a single central location at the Site (OW07-32). The eastern impacts were found at 10 locations and are likely attributable to the former plating and galvanizing buildings (APECs 11 and 5) as well as associated operations including a former machine shop (APEC-10), unknown fill quality (APEC-29), and offsite PCAs to the east (APEC-31). Impacts of zinc were generally limited to the upper overburden and bedrock contact zone with the exception of three samples from one location (OW18-II) that is screened in the Eramosa Formation (Reformatory Quarry). Zinc exceedances in the central portion of the Site at OW07-32 (overburden and bedrock contact zone) are vertically delineated with MW18-116D, screened in the Eramosa Formation (Reformatory Quarry). In the eastern portion of the Site, several wells provide vertical delineation for the shallow groundwater impacts, including MW18-130D, MW18-132D, OW13-39D, OW22D, MW18-133D, MW18-129D, and OW31.

Concentrations of antimony (MW18-114D), arsenic (MW17-101D), cobalt (OW11-II), lead (OW07-33), uranium (OW22S), and zinc (OW36S) were greater than the Table 6 SCS in one sampling event but met the SCS in at least two subsequent sampling events at the same location. Therefore, these exceedances were considered anomalous and not representative of current Site conditions. These results are detailed in Table 6-10c and were not treated as exceedances for the purpose of the Phase Two ESA.

The groundwater metals results are shown in plan view on Figure 6-12 and in cross-section view on Figures 6-12a through 6-12d.

1.9.2 Other Regulated Parameters (Chloride, Sodium and Cyanide)

Inorganic parameters, including chloride, cyanide, sodium were not detected at concentrations greater than the Table 6 SCS. The locations of these ORP parameters investigated in groundwater are shown in plan view on Figure 6-13.

1.9.3 Benzene, Toluene, Ethylbenzene, and Xylenes

Concentrations of BTEX (specifically, benzene and ethylbenzene) in groundwater greater than the Table 6 SCS occurred in two areas of the Site: (1) the eastern third and (2) the south-central area along the southern boundary of the Phase Two Property. These areas had APECs related to a former foundry (APEC-1) and unknown fill quality (APEC-29) in the south-central area, and former machine shops (APEC-2, APEC-10), annealing room (APEC-3), former UST (APEC-8), oil house (APEC-9), plating (APEC-11), and offsite PCAs to the east (APEC-31) for the eastern third of the Site. The distribution of BTEX impacts in groundwater is larger in area than the distribution of impacts in soil and generally do not overlap. This pattern may indicate migration away from historical remediated soil sources (for example, in the northeast corner of the Site) with groundwater flow, the presence of offsite sources, or both.

Maximum detected concentrations for benzene and ethylbenzene both occurred at MW17-105S, in the upper overburden and bedrock contact unit in the eastern portion of the Site. MW17-105D, nested with

MW17-105S but screened within the Eramosa Formation (Reformatory Quarry/ Vinemount) unit also had exceedances of the Table 6 SCS for benzene, but had non-detected results for ethylbenzene. The benzene concentrations were an order-of-magnitude lower in the deeper unit compared the upper unit. Monitoring well MW18-105G was installed deeper than MW17-105D for vertical delineation, with no detected concentrations of BTEX reported. The BTEX impacts in the eastern area were vertically delineated by several monitoring wells including MW18-105G, MW18-128D, MW18-133D, and OW31.

In the south-central area of the Site, benzene exceedances were noted in MW17-102D at a screened depth of 13.76-15.29 mbgs. The APECs in this area (general foundry use [APEC-1} and unknown fill quality [APEC-29]) do not suggest that a point or diffuse source of BTEX was historically located in this area as there are no overlying BTEX impacts in soil identified. BTEX concentrations met the Table 6 SCS in nearby shallower upgradient monitoring wells (OW07-34S/D, MW18-125S, OW25, or MW18-126D), shallower cross-gradient monitoring wells (MW17-107S and OW26S/D), and deeper cross-gradient/ downgradient monitoring wells (MW18-107D, MW18-121D). Based on this evaluation, additional efforts to delineate the benzene impacts in MW17-102D were not deemed warranted due to the relatively low concentrations (1.44 µg/L compared to the maximum concentration onsite of 66.8 µg/L in the eastern portion of the Site), the depth of the impacts, and the lack of evidence linking these impacts to an onsite source.

Concentrations of benzene and ethylbenzene at OW22S were greater than the Table 6 SCS in one sampling event but met the SCS in two subsequent sampling events at the same location. Therefore, these exceedances were considered anomalous and not representative of current Site conditions. These results are detailed in Table 6-10c and were not treated as exceedances for the purpose of the Phase Two ESA.

The groundwater locations investigated for BTEX are shown in plan view on Figure 6-14 and in cross-section view on Figures 6-14a through 6-14d.

1.9.4 Petroleum Hydrocarbons

Concentrations of PHCs (PHC F1 to F4) in groundwater were greater than the Table 6 SCS in two areas of the Phase Two Property: (1) the eastern third of the Site with APECs for a former annealing room (APEC-3), machine shops (APEC-2, APEC-10), unknown fill quality (APEC-29), and offsite PCAs to the east (APEC-31), and (2) the south-central area of the Site with APECs for a former foundry (APEC-1), PCB capacitors (APEC-17), and unknown fill quality (APEC-29). The locations of PHC impacts in groundwater are geographically similar to two of the three areas where PHCs in soil were identified. This pattern suggests that the groundwater impacts are a result of onsite soil sources (with the exception of F1 PHCs which did not exceed the Table 6 SCS in soil), with some dispersion away from soil sources via groundwater flow. Maximum concentrations of F2, F3, and F4 occurred at OW22S, located near the northeastern corner of the Phase Two Property within the footprint of the area historically remediated (for metals and PHC impacts). The maximum concentration of PHC F1 occurred at OW24D, located in the southeast corner of the Site, potentially attributable to an offsite source to the east. PHC impacts in groundwater in the eastern portion of the Site were vertically delineated by several monitoring wells including OW22D, OW13-39D, MW17-104D, MW18-128D, MW18-135D, and OW31. LNAPL has been measured within OW23S, MW17-108S, and MW18-135S (all screened within the overburden and bedrock contact zone aquifer unit) on various occasions. The shallow PHC impacts in the south-central portion of the Site at OW25 were vertically delineated by MW18-126D.

The LNAPL has been observed over the years to have stayed within the property boundaries, and prior to advancing additional wells in the vicinity, has only been measured in the one well (OW23). The release of contaminants would have occurred sometime prior to the 1998 excavation, indicating that in over 20 years, potential migration has been limited. The removal of the LNAPL is considered infeasible due to its

presence being largely within the highly fractured bedrock, as remediation efforts would be inefficient, slow and costly.

The concentration of F2 PHCs at OW18-II was greater than the Table 6 SCS in one sampling event but met the SCS in two subsequent sampling events at the same location. Therefore, the exceedance was considered anomalous and not representative of current Site conditions. This result is detailed in Table 6-10c and was not treated as an exceedance for the purpose of the Phase Two ESA.

The PHC exceedances in groundwater, and locations of LNAPL are shown in plan view on Figure 6-15 and in cross-section view on Figures 6-15a through 6-15e.

1.9.5 Polycyclic Aromatic Hydrocarbons

Concentrations of PAHs in groundwater were greater than the Table 6 SCS were generally localized to one area of the Property: the eastern third with APECs for former annealing room (APEC-3), plating (APEC-11), machine shop (APEC-10), unknown fill quality (APEC-29), and offsite PCAs to the north (APEC-30). The distribution of PAHs impacts in groundwater is comparable in area to the distribution of impacts in soil, but the impacts do not overlap in all cases. The historical remedial activities in the northeast corner of the Site (for metals and PHCs) may have removed a soil source of PAHs, as PAHs are absent in soil in this area, but the largest region of PAHs impacts in groundwater are located within and adjacent to the excavation footprint.

The majority of detected exceedances and maximum concentrations for PAHs occurred at OW22S and OW23S, both screened in the upper overburden and bedrock contact. Both of these locations have nested deeper wells installed in the Eramosa Formation (Reformatory Quarry) unit that have samples meeting the SCS for the parameters that exceeded in the shallow aquifer unit (OW22D for OW22S and OW23D for OW23S). Additional vertical delineation in the eastern portion of the Site is provided by OW13-39D and MW18-135D.

Concentrations of PAHs in the centre and south-central areas of the Site at OW03-I and OW25 were greater than the Table 6 SCS in one sampling event, but met the SCS in at least two subsequent sampling events at the same location. Therefore, these exceedances were considered anomalous and not representative of current Site conditions. These results are detailed in Table 6-10c and were not treated as exceedances for the purpose of the Phase Two ESA.

The groundwater results for PAHs are shown in plan view on Figure 6-16 and in cross-section view on Figures 6-16a through 6-16d.

1.9.6 Volatile Organic Compounds

VOCs were found at concentrations greater than the Table 6 SCS across the entire Site. The distribution of VOC impacts in groundwater is larger in area than the distribution of VOC impacts in soil, indicating migration away from soil sources with groundwater flow. One area of soil VOC concentrations suggestive of an on-site chlorinated VOC source area was identified at BH18-207, however the decreasing concentrations in soil to Table 6 SCS at a depth above the groundwater table, and magnitude of concentrations present in groundwater suggests an alternate source or sources. Chlorinated VOC impacted groundwater may originate or be amplified by the presence of offsite sources (for example, offsite manufacturing activities [APEC-31, APEC-32, APEC-33]). While onsite APECs associated with historical VOC use have been identified, for example, the operation of a foundry (APEC-1), machine/electrical shops (APEC-2, APEC-10, APEC-27), galvanizing activities (APEC-5, APEC-11), most of the VOC impacts in groundwater in the Eramosa Formation or deeper are believed to originate from regional sources.

The following subsections discuss the distribution of chloroethenes (specifically, 1,1-dichloroethene; cis-1,2-dichloroethene [cis-1,2-DCE]; tetrachloroethene; trans-1,2-dichloroethene; trichloroethylene [TCE];

and vinyl chloride) and chloroethanes (1,1,1-trichloroethane and 1,1-dichloroethane) in groundwater. The results of the groundwater investigation for VOCs are shown in plan view on Figure 6-17 (Part 1 and 2) and in cross-section view on Figures 6-17a through 6-17e.

Chloroethenes

Chloroethenes in groundwater were found at various depths throughout the Site. The shallower impacts (in the upper overburden and bedrock contact zone) are generally located in the southwestern portion and eastern corner of the Site. Deeper impacts (Eramosa Formation [Reformatory Quarry/ Vinemount members]) extend across the entire Site, including the northwestern portion of the site where shallow groundwater impacts were not observed. Both wells screened in the Goat Island Formation (OW31 and MW18-136G) had low-level detections of cis-1,2-dichloroethene (1.88 µg/L to 3.14 µg/L compared to a SCS of 1.6 µg/L), with all other chloroethenes reported as nondetect. The maximum concentrations of the majority of the chloroethenes were found in OW24D, which is located in the extreme southeastern corner of the property, adjacent to an area of known increasing groundwater concentrations off Site, therefore implying a source area off Site in an easterly direction. Vertical delineation of impacts has been achieved for 1,1-dichloroethene and trans-1,2-dichloroethene (MW18-128D and OW31), TCE (MW17-103D, OW07-34D, MW18-123D, and OW31), and vinyl chloride (MW18-128D, MW18-133D, MW18-136D, MW18-105G, and OW31). Concentrations of these COCs are generally highest adjacent to the eastern property boundary (near OW13-39S/D and OW24D) and decrease with both depth and distance from this area. Vertical delineation was not achieved for cis-1,2-dichloroethene, as uniform concentrations were encountered in almost every monitoring well installed with screens between 10.28 and 25.32 mbgs. cis-1,2-Dichloroethene concentrations in 15 monitoring wells in this zone ranged from 1.23 to 5.36 µg/L (average of 2.4 µg/L), which is similar to the concentrations measured in OW31, screened from 28.9 to 33.32 mbgs in the Goat Island Formation. Further efforts to vertically delineate cis-1,2-DCE, deeper into the Goat Island formation were not considered warranted as:

- The concentration of cis-1,2-DCE in the deepest hydrostratigraphic unit, the Goat Island Formation, does not appear to be the result of chlorinated VOC impacts derived from the upper hydrostratigraphic unit. That is, where maximum chlorinated VOC parent compounds were identified, elevated concentrations of cis-1,2-DCE were not observed. This is evident in the area near OW31 where elevated concentrations of TCE were identified in the Stone Road and Reformatory Quarry Members of the Eramosa Formation. At this location TCE was not identified in the lower Goat Island Formation in OW31; however, approximately 2 µg/L of cis-1,2-DCE was identified;
- The concentration of cis-1,2-DCE at OW31 could be the result of downward migration in that area, however as previously noted, cis-1,2-DCE was identified from 1.23 to 5.36 µg/L in the lower hydrostratigraphic units (Vinemount Member and Goat Island Formation), across the area of the Site, including areas that are hydraulically up and cross-gradient of the shallow groundwater flow paths where elevated chlorinated VOCs in higher hydrostratigraphic units are observed. The concentration of cis-1,2-DCE at OW31 ranged from 1.88 to 2.01 µg/L (in the Goat Island Formation) was consistent with the concentration of cis-1,2-DCE, noted in other wells screened across the Goat Island and Vinemount Member across the site where concentrations ranged from 1.23 to 5.36 µg/L;
- The consistent concentration of cis-1,2-DCE identified in the Goat Island Formation and the Vinemount Member, a regional aquitard, implies that impact to the Goat Island Formation may be widespread, and is interpreted to be sourced from an area upgradient of the Site.
- It is also noted that the Site lies within the two-year travel time Wellhead Protection Area (WHPA-B) for several of the City of Guelph's municipal water supply wells. Phase Two activities included characterization of the COCs to a depth of approximately 25 to 30 mbgs, but characterization did not extend into the underlying municipal production aquifer (Gasport Formation) that is estimated to lie approximately 40 to 50 mbgs. As previously discussed, the Goat Island and Gasport Formation are

understood to be hydraulically connected to one another, with the Gasport Formation serving as the principal municipal aquifer. Water quality data in the City's Membro, Park, and Emma Wells were observed to have low concentrations of TCE and cis 1,2-DCE in 2017 (City of Guelph, 2018). The average detected concentrations of cis-1,2 DCE in the City's water supply in 2017 was 1.8 µg/L (0.00178 mg/L), similar to the observed concentrations on Site (City of Guelph, 2018).

These factors suggest there is a broad area of low concentration cis-1,2-DCE just greater than the Table 6 SCS beneath the Vinemount Member of the Eramosa Formation, a regional aquitard, including on Site. The data does not support the conclusion that chlorinated VOC impacts identified on Site are materially contributing to the observed elevated concentrations of cis-1,2-DCE.

This information also provides confidence that the concentration of cis-1,2-DCE identified in OW24D (in the northeastern corner of the Site, downgradient of the inferred offsite source area) represents the maximum concentration onsite. No significant VOC sources in soil were identified onsite and aside from the northeastern corner of the Site where the maximum was identified, concentrations of cis-1,2-DCE were observed to be consistently lower measuring between approximately 1 and 6 µg/L.

Chloroethanes

Chlorethanes were found at concentrations greater than the Table 6 SCS in 13 samples from 8 locations. These impacts appear to be localized to the southwestern area of the Phase Two Property, within areas formerly used as a foundry (APEC-1), electrical shop (APEC-27), and waste oil storage (APEC-28). Based on the distribution and groundwater flow direction, the impacts are likely from an on-Site source, though no concentrations of chloroethanes have been found in soil. The chloroethane impacts are primarily located in the upper overburden and bedrock contact zone in this area, with deeper impacts only observed in two monitoring wells (MW18-122D and OW07-34D) within the Eramosa Formation (Reformatory Quarry). Vertical delineation of chloroethane impacts are provided by the following monitoring wells which have concentrations of chloroethanes less than the Table 6 SCS: MW18-122G, MW18-120D, MW18-119D, MW18-116D, MW18-123D, MW18-126D, MW17-102D, and OW26D.

1.9.7 Chlorophenols

No detectable concentrations of CPs were reported from the wells analyzed and concentrations were also reported as non-detect in soil. The assessment of CPs on Site is associated with the potential presence in spent foundry sand, which could be associated with the former foundry (APEC-1), sand storage and mixing areas (APEC-4; APEC-15), and random areas of foundry operation waste fill across the Site of unknown quality (APEC-29).

As CPs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The locations investigated for CPs in groundwater are shown in plan view on Figure 6-18.

1.9.8 Polychlorinated Biphenyls

PCBs were reported with concentrations greater than the Table 6 SCS at one location, OW26S, in 2010. Subsequent sampling events in 2011 and 2017 at this location reported nondetect concentrations and RLs below the SCS of 0.20 µg/L. The exceedance is considered anomalous and not representative of Site conditions, and these results are detailed in Table 6-10c. All other samples for PCBs in groundwater on the Phase Two Property were nondetect with RLs which met the Table 6 SCS.

Previous remediation for PCBs occurred in the late 1990s for the former capacitor room (APEC-17) where concentrations of PCBs in soil less than 5 µg/g were left in place. These residual soil impacts do not appear to be having an impact on groundwater, based on nondetect results of PCBs in the monitoring wells immediately downgradient of this APEC.

As PCB concentrations were considered anomalous and were not reproduced in subsequent sampling events at the Phase Two Property, they are not considered COCs for the Site. The locations where groundwater was investigated for PCBs are shown in plan view on Figure 6-19.

1.9.9 Acid, Base, and Neutral Compounds

ABNs were not detected in concentrations greater than the Table 6 SCS at the Phase Two Property. The assessment of ABNs on Site was associated with the potential presence of foundry sand, which could be associated with the former foundry (APEC-1), sand storage and mixing areas (APEC-4; APEC-15), and random areas of foundry operation waste fill across the Site of unknown quality (APEC-29).

As ABNs did not have any detected concentrations at the Phase Two Property, they are not considered COCs for the Site. The locations investigated for ABNs in soil are shown in plan view on Figure 6-20.

1.10 Climatic or Meteorological Conditions Affecting Contaminant Distribution

Climatic or meteorological conditions that may have influenced the distribution and migration of COCs at the Phase Two Property include temporal fluctuations in groundwater levels. No atypical weather events that would be expected to influence COC transport are known to have occurred during the investigation of the Phase Two Property.

1.11 Soil Vapour Intrusion

Vapour intrusion was not evaluated as part of the Phase Two ESA because there are currently no existing buildings on the Phase Two Property. Details regarding the location or construction details of future buildings, or where subsurface utilities will be installed are not known at this time. Based on the results of the Phase Two ESA, volatile COCs are present in soil and groundwater at concentrations greater than the Table 6 SCS. Therefore, an assessment of the potential for vapour intrusion into future buildings should be further investigated as part of a Risk Assessment for the Phase Two Property or when detailed redevelopment plans become available.

1.12 Contaminant Pathways and Receptors

Figures 6-21 to 6-24 present the human health and ecological contaminant pathway and receptor models, respectively, based on current and potential future Site conditions. The Site could be redeveloped for a mix of one or more of residential, commercial, parkland or community land use in the future. The models present preliminary assessments of the exposure pathways that should be further investigated, should a Risk Assessment be conducted for the Phase Two Property.

These figures identify the following:

1. **Release mechanisms** – The Phase Two Property became impacted as a result of historical operations at the Site (refer to the discussion on PCAs and APECs) where COCs were released to the ground (for example, via a spill or leak) or where impacted soil was imported to the Site and placed as fill.
2. **Contaminant transport pathways** – COCs released to soil may adsorb to soil or infiltrate deeper into the soil column. COCs in soil may also desorb and leach to groundwater or migrate vertically to the water table. COCs in soil can also be transported in the following ways: they can become airborne via wind or traffic erosion, eroded by overland water flow, be taken up by vegetation planted in the soil, or volatilize to outdoor air or indoor enclosed spaces. COCs in groundwater can be transported via vertical or horizontal groundwater flow, volatilization to outdoor air or indoor enclosed spaces, and uptake by vegetation.

3. **Human and ecological receptors located on, in, or under the Phase Two Property** – Receptors currently present or expected to be present in the future at the Phase Two Property include:
   - Human Receptors – residents, visitors, indoor workers, outdoor workers, construction workers, and utility workers.
   - Ecological Receptors - soil organisms, terrestrial plants, birds, and mammals
4. **Receptor exposure points** – COCs can be contacted directly in soil or groundwater and indirectly in outdoor and indoor air.
5. **Routes of exposure** – The primary routes of exposure by receptor type include:
   - Human Receptors
     - Direct contact with either soil or groundwater (incidental ingestion and dermal contact)
     - Inhalation of particulates (dust)
     - Inhalation of volatiles originating from a soil or groundwater source (indoor and outdoor air)
     - Ingestion of garden produce
   - Ecological Receptors
     - Direct contact with either soil or groundwater (ingestion and dermal)
     - Terrestrial plant root uptake from either soil or groundwater
     - Ingestion via terrestrial biota and prey

1.13 Non-Standard Delineation

Under the assumption that the Risk Assessment (RA) will be accepted by the MECP, non-standard delineation per O. Reg. 153/04 Schedule E, Section 7.1 was conducted for the following COCs:

- cis-1,2-dichloroethylene (cis-1,2-DCE) in groundwater at OW31 (refer to Figures 6-17, 6-17c and 6-17d).

Delineation was conducted to the requirements of O. Reg. 153/04 Schedule E, Section 7 for all other COCs identified at the RA Property in soil and groundwater.

There is confidence that the maximum concentration of cis-1,2-DCE onsite has been located (OW24D) given its proximity to the known offsite source of chloroethenes and the consistently lower concentrations found across the remainder of the Site, decreasing both horizontally and vertically. Low levels of cis-1,2-DCE are present at depths on Site greater than the depth of OW24D, however the low level cis-1,2-DCE is present across the entire Site in the Goat Island Formation and the Vinemount Member, interpreted to be from an upgradient offsite source based on regional data. Additional vertical or lateral delineation of cis-1,2-DCE at the Site would not materially change Phase Two ESA Conceptual Site Model (CSM), or the Risk Management measures (RMM) to be developed as part of the RA based on the existing dataset. We understand that the MECP concurs with this interpretation, as well as agrees on the importance to avoid drilling deeper into the City's municipal drinking water aquifer, the Gasport Formation. Based on this information, the QP is satisfied that the current dataset provides adequate information to support the RA and additional vertical delineation is not required.

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Tables

Table 2-3. Items Considered for Site Condition Standards Selection

Phase Two Environmental Site Assessment, 200 Beverly Street, Guelph, ON

Condition	Evaluation
Land use	The current land use is industrial, and the proposed future land use may include residential/parkland and commercial uses, provided an RSC acknowledged by the MECP is obtained.
Potable or nonpotable groundwater	The Site and adjacent properties within 100 m are serviced by a municipal water source. Because the groundwater near the Property does and will serve as a raw water supply for a drinking water system, the potable groundwater condition applies.
Proximity to surface water body	The Site is not located within 30 m of a water body.
Proximity to areas of natural significance or environmentally sensitive areas	The Site is not considered to be within proximity of an environmentally sensitive area based on the information reviewed as part of the Phase One ESA (CH2M HILL 2017).
Depth to bedrock	A property is considered a shallow soil property if one-third or more of the area consists of soil depths of 2 mbgs or less, excluding nonsoil surface treatment (that is, asphalt, concrete, or aggregate) (MOE 2011a).The depth to bedrock is considered to be less than 2 m, because shallow soil was observed on one-third or more of the Phase Two Property.
pH of soil	Based on the results of the Jacobs investigations, soil pH was found to range from 6.6 to 9.0, with the exception of two samples. Samples collected at BH17-204 and MW17-100S were measured with a pH value outside of MECP's acceptable upper limit of 9.0 for surface soils. A review of the borehole logs from these locations indicated that concrete rubble or dust was likely present in the submitted samples, which had pH values of 9.45 and 10.64. The other pH values collected during the CH2M investigation were within the MECP's acceptable range. The soil from BH17-204 was determined to be "isolated fill," because concrete foundations were encountered both above and below the soil layer, isolating it from the overburden soils at the Site. An additional sample was collected at MW17-100S, which reported a pH value of 7.71. Using the average of the two samples as outlined in Section 48 of O. Reg. 153/04, it was confirmed that pH concentrations were within the acceptable range.
Soil texture	For this evaluation, because of the extensive presence of heterogeneous fill materials across the Site, the standards for coarse-grained soils were used to be conservative.

Notes:

ESA = Environmental Site Assessment

m = metre(s)

mbgs = metre(s) below ground surface

MECP = Ministry of Environment, Conservation and Parks

O. Reg. = Ontario Regulation

RSC = record of site condition

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-1	Foundry – A foundry was operated on the site by IMICO from 1913 to 1989, when the plant closed and was abandoned. The foundry operated as an iron-jobbing facility for the production of various metallic forms, using malleable and ductile iron (DCS 2014). Foundry sands were predominantly located in the concrete pits and sumps of the main foundry building. Foundry sands, sludge materials, and process waste were removed from the site, and buildings were demolished in 1999 (Earth Tech 1999). The P&R investigation also reported that moulding sands and dust collector waste was stored at the northwestern corner of the building and drained to the truck bay (P&R 1991).	32	Iron and Steel Manufacturing and Processing	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, Metals	7	TP	PAHs, Metals*, CN-, CrVI, Hg, EC, pH	--
					BH07-49	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-50	BH	PCBs, PHCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-57	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH17-201	BH	PAHs, PCBs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					BH18-206	BH	PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					BH19-102i	BH	BTEX, VOCs, THMs	--
					BH19-102ii	BH	BTEX, VOCs, THMs	--
					C11	CH	PCBs, Metals*	--
					C2	CH	Metals*	--
					CS-58	SS	PCBs	--
					CS-60	SS	PCBs	--
					MW17-102D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs
					MW17-106D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs
					MW17-106S	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-107S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-107D	MW	--	BTEX, VOCs, THMs
					MW18-125S	MW	PAHs, PCBs, PHCs, Metals, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs
					MW18-126D	MW	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals	BTEX, PHCs, VOCs, THMs
					MW18-127S	MW	--	BTEX, PHCs, VOCs, THMs
					MW18-136D	MW	--	BTEX, VOCs, THMs
					MW18-136G	MW	--	BTEX, VOCs, THMs
					OW07-33	MW	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-34D	MW	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-34S	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW25	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					SS-40	SS	PCBs	--
					SS-41	SS	PCBs	--
					SS-42	SS	PCBs	--
					SS-43	SS	PCBs	--
					SS-44	SS	PCBs	--
					SS-45	SS	PCBs	--
					TP13-11	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP17-306	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP17-307	TP	BTEX, PHCs, VOCs, THMs	--
					TP17-308	TP	Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP18-315	TP	BTEX, PAHs, PHCs	--
APEC-2	Machine Shop – A machine shop was shown on the 1916 FIP, east of the original foundry. The northern one-third of the machine shop was identified for "Tumbling and Cleaning" operations, inferred to be in association with the adjacent "Annealing Room" to the north. FIPs prepared in 1929, 1945, and 1960 showed this area changed operations to "Shipping" and a "Pattern Shop."	34	Metal Fabrication	BTEX, PAHs, PHCs, VOCs, Metals	BH07-47	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-48	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
					BH07-52	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
					BH18-206	BH	PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					ES-14	CS	PAHs	--
					MW17-101D	MW	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-101S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-08	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP18-316	TP	PAHs, PCBs, PHCs	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-3	Annealing – An "Annealing Room" with four furnaces is shown on the 1916 FIP. A brick chimney is located on the northern wall. The 1929 FIP shows nine furnaces, with the Annealing Room extended westward with an additional chimney on the northern wall within the extended area; the southern portion of the Annealing Room is identified as the "Tumbling Dep't." The 1946 FIP shows a structural addition on the eastern side of the Annealing Room, with two additional furnaces. The 1960 FIP shows further eastward expansion and the addition of a third furnace. Tumbling Dep't operations appear consistent in location and footprint, from 1929 through to 1960. The furnaces are inferred to be coal fired from 1916 through to 1960, based on the nearby coal storage areas shown on the 1946 and 1960 FIPs, and the absence of ASTs or USTs for fuel oil storage on the FIPs. The furnace fuel from after 1960 to the end of operations in 1989 is not known, but a period of fuel-oil-fired operation of the furnaces is suspected; see APEC 7. No information was identified to suggest coal or fuel oil storage within the Annealing Room; however, no information regarding temporary furnace fuel storage, transmission, or waste disposal was identified. Dust control equipment is shown on Figure 4 of the 1991 P&R report, on the northern side of the Annealing Room.	32	Iron and Steel Manufacturing and Processing	BTEX, PAHs, PHCs, VOCs, Metals	BH07-46	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH18-208	BH	PAHs, Metals, HF Metals	--
					BH20-212	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					ES-11	CS	PAHs	--
					ES-12	CS	PAHs	--
					ES-15	CS	PAHs	--
					ES-16	CS	PAHs	--
					MW17-104D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-104S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-109S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW22D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW22S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-05	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP20-321	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
APEC-4	Sand Storage – The 1916 FIP shows a "Sand Shed." The 1929 and 1946 FIPs again show the Sand Shed, plus a second smaller building to the west labelled "Sand." The 1960 FIP shows the original "Sand Shed" as "Bricks" and the second smaller building to the west labelled as "Sand & Bricks," and an additional area to the north labelled "Sand." No information was identified as to whether only clean process, spent foundry sands, or both were stored in these buildings; therefore, the potential storage of spent foundry sand in these buildings is considered. The purpose and types of bricks stored was not identified. The potential for new and used refractory brick and associated process materials is considered possible.	32	Iron and Steel Manufacturing and Processing	ABNs, CPs, PAHs, Metals	BH07-58	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					I	TP	PAHs, Metals*, EC, pH	--
					IE15	TP	Metals*, CN-	--
					INE15	TP	Metals*	--
					OW03-I	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW03-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-301	TP	ABNs, BTEX, CPs, PAHs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
APEC-5	Galvanizing Building – A small free-standing building for "Galvanizing" was present on the southeastern portion of the Site as shown on the 1916, 1929, and 1946 FIPs. The Galvanizing building was not shown on the 1960 FIP, with the area occupied by a larger new structure identified as "Fittings Whse" (warehouse). No information was identified regarding process chemical use and storage, or waste management practices in association with the galvanizing operations conducted.	33	Metal Treatment, Coating, Plating, and Finishing	BTEX, PAHs, PHCs, VOCs, Metals	BH18-207	BH	PHCs, Metals, HF Metals	--
					BH18-207i	BH	BTEX, PAHs, VOCs, THMs, Metals, HF Metals	--
					BH19-211	BH	BTEX, VOCs, THMs	--
					MW17-108S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP18-309	TP	PHCs, Metals, HF Metals	--
					TP18-310	TP	PHCs, Metals, HF Metals	--
APEC-6	Chipping/Grinding Room – A "Chipping Room" was shown on the FIPs prepared in 1929, 1946, and 1960, located west of the Annealing area. The 1916 FIP shows this as exterior yard area west of the "Annealing Rm," with a small outbuilding that appears to be connected to the Annealing Room with a linear underground feature. The 1991 P&R report identified this as a "Trimming and Grinding" area; this information is inferred to be based on the interview of historical IMICO employees. "Dust control equipment" is shown on Figure 4 of the 1991 P&R report, on the exterior western side of the building.	34	Metal Fabrication	Metals	BH18-208	BH	PAHs, Metals, HF Metals	--
					BH19-100i	BH	pH	--
					MW17-100S	MW	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-7	Oil Houses, Boiler House and ASTs – A building is shown on the 1929 FIP to the north of the Foundry and east of the power house that is labelled "Oil," and an additional building with the same label is shown to the north of this original building on the 1946 FIP. The 1960 FIP shows the northern building remaining, but it is not labelled as an oil house. The 1916 FIP shows this as empty exterior yard area north of the foundry. The P&R Investigation figures show a boiler house to the east of the power house and two 45,000-L (10,000 gallon) oil tanks to the east of the building with "no history of leaks or spills" (P&R 1991). One 45,000-L AST was reported removed in 1998 during demolition activities and had been used to store Bunker C fuel. The AST removed had been located east of the Core Room (Earth Tech 1999).	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PHCs	BH07-56	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					JS15	TP	PAHs, PCBs, Metals*, CN-, CrVI, Hg	--
					MW17-103D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
					MW17-103S	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-32	MW	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-03	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP13-04	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
APEC-8	Gasoline UST – As indicated on the 1960 FIP, a gasoline UST is shown north of a small office building, and west of "scales" at the corner of Kingsmill Avenue and Beverley Street. The area is empty exterior yard area on the 1916 FIP, and the 1929 and 1946 FIPs show the office (labelled as a "time office"), but it does not show the UST. The gasoline use is not known; however, it is inferred to be for fueling gasoline-powered equipment/vehicles used at the plant. The 1991 Proctor & Redfern investigation reported that an IMICO employee indicated the UST was removed in the mid-1980s in response to a request from the City due to gasoline vapours in the sewers along Beverley and York Streets. No significant contamination was reported (P&R 1991).	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PAHs, PHCs, VOCs, Metals	B	TP	Metals*, CrVI, EC, pH	--
					BW11	TP	Metals*, CrVI	--
					MW17-105D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-105S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-105G	MW	--	BTEX, VOCs, THMs
APEC-9	Oil House – A building is shown on the 1929 and 1949 FIP to the south of the foundry and west of the galvanizing building with a label "Oil." The building/structure is not on 1916 FIP where the area is shown as exterior yard area and is not present on the 1960 FIP where the area is occupied.	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PHCs	B	TP	Metals*, CrVI, EC, pH	--
					BH07-54	BH	BTEX, PAHs, PHCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					MW17-105D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-105S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-105G	MW	--	BTEX, VOCs, THMs
APEC-10	Machine Shop – A machine shop is shown on the 1929, 1946, and 1960 FIP, east of the original foundry building. The floor is indicated as concrete. Machine shop cuttings were stored on the ground north of the building, and two small ceiling-mounted oil tanks were present in the building as noted in the P&R investigation (1991). The area is shown on the 1916 FIP as exterior yard area, with a small unidentified building in the central area of the future machine shop. The northern portion of the machine shop was removed during the 1999 excavation based on the excavation footprint (EarthTech 1999).	34	Metal Fabrication	BTEX, PAHs, PHCs, VOCs, Metals	BH07-40	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-52	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
					BH13-40	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals	--
					BH17-203	BH	BTEX, PHCs, VOCs, THMs	--
					BH18-204	BH	BTEX, VOCs, THMs	--
					BH19-209	BH	BTEX, VOCs, THMs	--
					BH19-210	BH	BTEX, VOCs, THMs	--
					C7	CH	Metals*	--
					C8	CH	Metals*	--
					ES-14	CS	PAHs	--
					ES-17	CS	PAHs	--
					L	TP	Metals*, CrVI, Hg	--
					MW18-128D	MW	--	BTEX, PHCs, VOCs, THMs
					MW18-130D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
					MW18-132D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
					MW18-135D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs
					MW18-135S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
					OW18-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW18-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW19	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW23D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW23S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-08	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP18-316	TP	PAHs, PCBs, PHCs	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-11	Plating/Galvanizing Building – A galvanizing building was present on the Site as shown on the 1946 and 1960 FIP. The previous FIPs (1916 and 1929) show this as exterior yard area. On subsequent site plans (P&R 1991; Earth Tech 1999), the building was identified as a storage shed and was reported as having been used for dip galvanizing before 1975, with rinse water discharged into "dry wells" north of the building (P&R 1991). Investigations by P&R and Gartner Lee indicated high concentrations of zinc, other metals, and oil & grease. Free product was observed wells (OW01-I, OW20, OW21). The area was excavated to bedrock (ranging from 1.3 to 2.0 mbgs and approximately 9,400 tonnes of contaminated soil and 925 tonnes of contaminated concrete were removed. Soil samples were collected from the final limits of the excavation walls and indicated most locations having zinc and TPH concentrations above the Table A Guidelines. The excavation was backfilled with granular "B" materials. A single sample was collected from the backfill and met the guidelines applicable at the time of the report (Earth Tech, 1999). A well nest (OW22S/D) was installed within the excavation area (the report for this installation was not available, and therefore, the soil conditions are unknown if analyzed as part of the investigation). Test pits and boreholes installed in the area in 2013 by DCS indicated soils having high zinc and other metal concentrations. Groundwater conditions at OW22S reported free product, which was highly weathered with a slight oil/diesel odour (as reported in the summary of the Gartner Lee 2000/2001 investigation in DCS 2007a). Borehole logs for OW22S/D indicate the presence of fuel/diesel type odour in the fill which extends to approximately 1.5 mbgs; and hydrocarbon odour extending into the underlying bedrock with black staining on fractures. Groundwater sampled from OW22S has not since reported free product but has had concentrations of PHCs increasing since the annual monitoring at this location began in 2016, up to 850,000 ug/L of F3. Zinc concentrations have widely fluctuated over the years and have exceeded in approximately 25 percent of the sampling events between 2005 and 2016.	33	Metal Treatment, Coating, Plating, and Finishing	BTEX, PAHs, PHCs, VOCs, Metals	BH07-42	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-45	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-46	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-51	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					ES-11	CS	PAHs	--
					ES-12	CS	PAHs	--
					KE13	TP	PCBs	--
					L	TP	Metals*, CrVI, Hg	--
					LN2	TP	PAHs, Metals*, EC, pH	--
					MW17-109S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-131S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
					MW18-133D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
					OW22D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW22S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-05	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP13-06	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
					TP17-304	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP17-305	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP20-320	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					TP20-321	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
APEC-12	Coal Storage – A coal shed is shown on the 1946 FIP to the north of the foundry and west of the powerhouse. A larger coal storage area is shown on the 1960 FIP, and the building is extended south to connect with the foundry on subsequent site plans (P&R 1991; GLL 1999; Earth Tech 1999) without an indication of its use. The previous FIPs (1916 and 1929) show this area as exterior yard area.	8	Chemical Manufacturing, Processing, and Bulk Storage	PAHs	BH20-213	BH	ABNs, CPs, PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					OW07-37	MW	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-13	Rail Line – A former rail line was shown onsite north of the buildings on the 1916, 1929, and 1946 FIPs, running east to west for the full length of the foundry building. On the 1960 FIP, the western portion was shown to have been removed to accommodate the newly constructed shipping/stock room; the rail siding ended at the eastern side of the building. It is inferred that raw materials and finished products were shipped by rail.	46	Rail Yards, Tracks, and Spurs	PAHs, Metals	11	TP	Metals*, CrVI, Hg, EC, pH	--
					BH07-42	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-45	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-51	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					ES-11	CS	PAHs	--
					INE15	TP	Metals*	--
					K	TP	Metals*, EC, pH	--
					KE13	TP	PCBs	--
					LN2	TP	PAHs, Metals*, EC, pH	--
					MW17-110S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-131S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
					OW02	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-37	MW	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-38S	MW	BTEX, PHCs, VOCs, Metals*, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-301	TP	ABNs, BTEX, CPs, PAHs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP20-322	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					TP20-323	TP	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
APEC-14	Possible Automobile Storage, Maintenance and Repair – An addition south of the foundry building on the eastern side of the offices is labelled "Auto" on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles	BTEX, PAHs, PHCs, VOCs, Metals	BH17-202	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					MW18-136D	MW	--	BTEX, VOCs, THMs
					OW10	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-15	Sand Mixing/Storage – Sand mixing is shown in a building north of the foundry as shown on the 1960 FIP. Previous FIPs (1916, 1929, 1946) show this as exterior yard area, north of the foundry. Subsequent site plans (P&R 1991; GLL 1999; Earth Tech 1999) do not have an indication of the buildings use.	8	Chemical Manufacturing, Processing, and Bulk Storage	ABNs, CPs, PAHs, PHCs, Metals	BH17-200	BH	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					OW07-37	MW	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-16	Transformers – Transformers are first shown on the 1960 FIP, north of the powerhouse. Previous FIPS (1916, 1929, 1946) show this as exterior yard area north of the power house. Transformers of this era may have contained PCBs.	55	Transformer Manufacturing, Processing and Use	PCBs, PHCs	OW07-32	MW	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-03	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
APEC-17	Capacitor Room – PCB-containing capacitors were present in the centre of the foundry, as first shown on the P&R investigation site plan, and later remediated as part of the Earth Tech demolition (P&R 1991; EarthTech 1999). Activities included removal of a concrete floor, a utility trench located in the eastern section (concrete walls, granular base) that was heavily stained, a subfloor that was present in the central section, and a sump located in on the eastern portion of the capacitor room that were each indicated as PCB-impacted and excavated and disposed offsite. The area was excavated to bedrock (1.0 – 1.3 mbgs) to remove concentrations above 5 µg/g. Final samples (composite soil, soil, concrete, and bedrock) from the limits of excavation in the capacitor room reported PCB concentrations under 5 µg/g, with the exception of two bedrock samples within the eastern sump area that had concentrations around 10 µg/g. A well (OW25) was installed within the excavation area (the report for this installation was not available, and therefore, the soil conditions are unknown if analyzed as part of the investigation), and subsequent groundwater monitoring of the area has indicated concentrations of chlorinated VOCs and PHCs (mainly F3) above the applicable potable water criteria (Table 6 Standards) (DCS 2007b, 2014b; AECOM 2017a and 2017b).	55	Transformer Manufacturing, Processing, and Use	PCBs, PHCs	C11	CH	PCBs, Metals*	--
					CS-58	SS	PCBs	--
					CS-60	SS	PCBs	--
					MW18-125S	MW	PAHs, PCBs, PHCs, Metals, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs
					MW18-126D	MW	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals	BTEX, PHCs, VOCs, THMs
					OW25	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					SS-40	SS	PCBs	--
					SS-41	SS	PCBs	--
					SS-42	SS	PCBs	--
					SS-43	SS	PCBs	--
					SS-44	SS	PCBs	--
					SS-45	SS	PCBs	--
					TP17-306	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP17-307	TP	BTEX, PHCs, VOCs, THMs	--
					TP17-308	TP	Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-18	Coal Storage – A building for coal storage is shown on the 1960 FIP to the north of the annealing room, with additional "coal piled" to the west of the building. Previous FIPs (1916, 1929, 1946) show this as exterior yard area to the north of the annealing room. The coal is inferred to be used in the furnaces in the annealing room. Subsequent site plans show this as a storage area (P&R 1991, DCS 2007a).	8	Chemical Manufacturing, Processing, and Bulk Storage	PAHs	12SE10	TP	Metals*, HF Metals, CrVI, Hg	--
					BH20-214	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					C14	CH	Metals*	--
					MW17-110S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-38S	MW	BTEX, PHCs, VOCs, Metals*, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-19	Coal Storage – A small building for coal storage is shown on the 1960 FIP, east of the time keepers office at the Beverley Street entrance. The building is not present on previous FIPs (1916, 1929, 1946) and is shown as exterior yard area.	8	Chemical Manufacturing, Processing, and Bulk Storage	PAHs	B	TP	Metals*, CrVI, EC, pH	--
					MW17-105D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW17-105S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					MW18-105G	MW	--	BTEX, VOCs, THMs
					OW09-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW09-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-20	Garage – A garage was shown on the 1946 and 1960 FIP along Stevenson, on the western side of the property. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area. The site investigation by P&R (1991) identified visual impacts to the soils south of the garage. Some elevated PCB concentrations were found in soil during subsequent investigations.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles	BTEX, PAHs, PCBs, PHCs, VOCs, Metals	BH07-67	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					ESW8	TP	PCBs, Metals*, EC, pH	--
					EW8	TP	PCBs, Metals*	--
					OW15	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW16	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-300	TP	ABNs, BTEX, CPs, Dioxins/Furans, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP18-318	TP	BTEX, PAHs, PCBs, PHCs, Metals, HF Metals	--
APEC-21	Coal Storage – The 1960 FIP indicates coal storage south of the garage on the western side of the Site. The building is not present on previous FIPs (1916, 1929) and is shown as exterior yard area, and on the 1946 FIP, the building is not labelled as coal.	8	Chemical Manufacturing, Processing, and Bulk Storage	PAHs	ESW8	TP	PCBs, Metals*, EC, pH	--
					OW15	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW16	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-300	TP	ABNs, BTEX, CPs, Dioxins/Furans, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
APEC-22	Transformer – A 1200-volt transformer is shown on the 1991 Site Plan (P&R 1991).	55	Transformer Manufacturing, Processing, and Use	PCBs, PHCs	BH17-201	BH	PAHs, PCBs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					OW07-33	MW	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-23	Paint Shop – First shown on the P&R Site plan, a paint shop was located at the northern end of the site between the shipping building and the storage area (P&R 1991). Drums were stored against the northern wall for materials used in the paint shop. The FIPs show this area as exterior yard area in the early FIPs (1916, 1929, 1946) and empty space between existing buildings in the 1960 FIP.	39	Paints Manufacturing, Processing, and Bulk Storage	BTEX, PAHs, PHCs, VOCs, Metals	12SE10	TP	Metals*, HF Metals, CrVI, Hg	--
					BH20-214	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
					C14	CH	Metals*	--
					MW17-110S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-38S	MW	BTEX, PHCs, VOCs, Metals*, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
APEC-24	PCB Storage Area – An area located at the northeastern corner of the finishing and annealing room with a concrete pad was identified in the Earth Tech investigation as a former PCB storage area. Concentrations above 50 ppm of PCBs were identified. Previous site maps showed this area as "storage" (P&R 1991) or part of the Annealing Room (1946 and 1960 FIPs). During the demolition activities, approximately 250 kg of PCB-containing ash residue from the top of the concrete pad and the concrete pad itself was removed and taken for offsite disposal (Earth Tech 1999). Confirmatory samples below the pad were 0.63 and <0.05 µg/g. The soil was later excavated to bedrock as part of the soil remediation in the northeastern corner of the property (see APEC-11).	55	Transformer Manufacturing, Processing, and Use	PCBs, PHCs	BH07-46	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					ES-11	CS	PAHs	--
					ES-12	CS	PAHs	--
					MW17-109S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-05	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APEC-25	Drum Storage – Interviews with former employees as part of the P&R investigation identified drum storage activities that occurred along the northern property boundary (P&R 1991). No additional information was provided on the nature of what was stored and whether there was any associated contamination as a result of the materials.	8	Chemical Manufacturing, Processing, and Bulk Storage	BTEX, PAHs, PHCs, VOCs, Metals	10	TP	Metals*, CrVI, Hg, EC, pH	--
					12	TP	PCBs, Metals*, CrVI, Hg	--
					12SE10	TP	Metals*, HF Metals, CrVI, Hg	--
					BH07-51	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					HNE19	TP	Metals*, CrVI	--
					KE13	TP	PCBs	--
					MW18-112D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
					MW18-112G	MW	--	BTEX, VOCs, THMs, HF Metals
					MW18-112S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
					MW18-114D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
					MW18-115D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
					MW18-115S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals
					OW02	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW07-31	MW	BTEX, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW17	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-302	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP18-319	TP	PAHs, Metals, HF Metals	--
					TP20-322	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
APEC-26	Former Substation – A former substation is indicated on the P&R (1991) and Earth Tech (1999) site plans. A sample of transformer oil from the former substation analyzed in the Earth Tech report indicated nondetect concentrations of PCBs. Similarly, one location installed during the DCS Phase II ESA (2007) indicated nondetect PCB concentration. Previous site plans (FIPs) show this area as exterior yard areas.	55	Transformer Manufacturing, Processing, and Use	PCBs, PHCs	BH07-65	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					MW17-111S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP18-311	TP	Metals, HF Metals	--
					TP18-312	TP	Metals, HF Metals	--
					TP18-313	TP	Metals, HF Metals	--
					TP18-314	TP	Metals, HF Metals	--
APEC-27	Former Electrical Shop – A small electrical shop was noted to be on the southwestern corner of the foundry (P&R 1991). This addition was not shown on the FIPs from previous years and was shown as the exterior yard area west of the foundry.	34	Metal Fabrication	BTEX, PAHs, PHCs, VOCs, Metals	6	TP	Metals*, CrVI, Hg, EC, pH	--
					DSW7	TP	Metals*, CN-	--
					MW18-120D	MW	Metals, HF Metals	BTEX, VOCs, THMs, Metals, HF Metals, Na
					OW12	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-303	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
					TP20-324	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
APEC-28	Waste Oil Storage – Used oil was stored above ground on the southwestern end of the foundry as shown on the P&R Site Plan (P&R 1991).	28	Gasoline and Associated Products Storage in Fixed Tanks	BTEX, PAHs, PHCs, VOCs, Metals	6	TP	Metals*, CrVI, Hg, EC, pH	--
					MW18-120D	MW	Metals, HF Metals	BTEX, VOCs, THMs, Metals, HF Metals, Na
					OW12	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP17-303	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
APEC-29	Fill of Unknown Quality – The areas of the Site have a layer of fill above the native silty sands. Previous investigations have indicated a layer of fill consisting of foundry sands, slag, and cinders (up to 1.0 m) was found across the site (P&R 1991) and the fill to be mix of foundry operation waste such as "coal, clinker, ash, metals, and detritus from the former foundry operations" and reworked native from "reworking onsite soils as a result of initial construction and subsequent expansion activities" (DCS 2007b). The yard areas were additionally noted to have been oiled (presumably engine oil) (P&R 1991).	30	Importation of Fill Material of Unknown Quality	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, Metals	1	TP	Metals*, CrVI, Hg, EC, pH	--
					2	TP	Metals*, CrVI, Hg, EC, pH	--
					3	TP	Metals*, CrVI, Hg, EC, pH	--
					4	TP	Metals*, CrVI, Hg, EC, pH	--
					5	TP	Metals*, CrVI, Hg, EC, pH	--
					6	TP	Metals*, CrVI, Hg, EC, pH	--
					7	TP	PAHs, Metals*, CN-, CrVI, Hg, EC, pH	--
					8	TP	Metals*, CN-, CrVI, Hg, EC, pH	--
					9	TP	Metals*, CrVI, Hg, EC, pH	--
					10	TP	Metals*, CrVI, Hg, EC, pH	--
					11	TP	Metals*, CrVI, Hg, EC, pH	--
					12	TP	PCBs, Metals*, CrVI, Hg	--
					12SE10	TP	Metals*, HF Metals, CrVI, Hg	--
					A	TP	Metals*, CrVI, EC, pH	--
					AN21	TP	Metals*	--
					ASW14	TP	Metals*, CrVI	--
					B	TP	Metals*, CrVI, EC, pH	--
					BH07-40	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-41	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg	--
					BH07-42	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-45	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-46	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-47	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-48	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
					BH07-49	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-50	BH	PCBs, PHCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
			BH07-51	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-52	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
			BH07-53	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-54	BH	BTEX, PAHs, PHCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-55	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-56	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-57	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-58	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-59	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-60	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-61	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-62	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-63	BH	BTEX, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-64	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-65	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-66	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
			BH07-67	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals	--
			BH07-68	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals	--
			BH07-69	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-70	BH	BTEX, PAHs, PCBs, PHCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH07-71	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
			BH13-40	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals	--
			BH17-200	BH	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			BH17-201	BH	PAHs, PCBs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			BH17-202	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			BH17-203	BH	BTEX, PHCs, VOCs, THMs	--
			BH18-204	BH	BTEX, VOCs, THMs	--
			BH18-205	BH	BTEX, PHCs, VOCs, THMs	--
			BH18-206	BH	PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			BH18-207	BH	PHCs, Metals, HF Metals	--
			BH18-207i	BH	BTEX, PAHs, VOCs, THMs, Metals, HF Metals	--
			BH18-208	BH	PAHs, Metals, HF Metals	--
			BH19-100i	BH	pH	--
			BH19-100i	BH	pH	--
			BH19-102i	BH	BTEX, VOCs, THMs	--
			BH19-102ii	BH	BTEX, VOCs, THMs	--
			BH19-209	BH	BTEX, VOCs, THMs	--
			BH19-210	BH	BTEX, VOCs, THMs	--
			BH19-211	BH	BTEX, VOCs, THMs	--
			BH20-212	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			BH20-213	BH	ABNs, CPs, PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			BH20-214	BH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			BW11	TP	Metals*, CrVI	--
			C	TP	Metals*, CrVI, EC, pH	--
			C11	CH	PCBs, Metals*	--
			C14	CH	Metals*	--
			C2	CH	Metals*	--
			C7	CH	Metals*	--
			C8	CH	Metals*	--
			CE10	TP	Metals*	--
			CS-58	SS	PCBs	--
			CS-60	SS	PCBs	--
			CW10	TP	PAHs, Metals*	--
			D	TP	PAHs, Metals*, CrVI, EC, pH	--
			DSW7	TP	Metals*, CN-	--
			ES-11	CS	PAHs	--
			ES-12	CS	PAHs	--
			ES-14	CS	PAHs	--
			ES-15	CS	PAHs	--
			ES-16	CS	PAHs	--
			ES-17	CS	PAHs	--
			ESW8	TP	PCBs, Metals*, EC, pH	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
			EW8	TP	PCBs, Metals*	--
			H	TP	Metals*, CrVI	--
			HNE19	TP	Metals*, CrVI	--
			HW16	TP	Metals*	--
			I	TP	PAHs, Metals*, EC, pH	--
			IE15	TP	Metals*, CN-	--
			INE15	TP	Metals*	--
			JE15	TP	Metals*, CrVI, Hg	--
			JS15	TP	PAHs, PCBs, Metals*, CN-, CrVI, Hg	--
			K	TP	Metals*, EC, pH	--
			KE13	TP	PCBs	--
			KNW10	TP	Metals*	--
			KW32	TP	Metals*	--
			L	TP	Metals*, CrVI, Hg	--
			LN2	TP	PAHs, Metals*, EC, pH	--
			MW17-100S	MW	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-101D	MW	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-101S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-102D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs
			MW17-103D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
			MW17-103S	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-104D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-104S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-105D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-105S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-106D	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR,	BTEX, PHCs, VOCs, THMs
			MW17-106S	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-107S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-108S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-109S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-110S	MW	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW17-111S	MW	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			MW18-105G	MW	--	BTEX, VOCs, THMs
			MW18-107D	MW	--	BTEX, VOCs, THMs
			MW18-112D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
			MW18-112G	MW	--	BTEX, VOCs, THMs, HF Metals
			MW18-112S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
			MW18-113D	MW	--	BTEX, VOCs, THMs, HF Metals
			MW18-113S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-114D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
			MW18-114S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
			MW18-115D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-115S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals
			MW18-116D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-116S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-117S	MW	BTEX, PHCs, Metals, HF Metals	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
			MW18-118S	MW	--	BTEX, PAHs, VOCs, THMs, Metals, HF Metals, Na
			MW18-119D	MW	--	BTEX, VOCs, THMs
			MW18-119S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-120D	MW	Metals, HF Metals	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-121D	MW	--	BTEX, VOCs, THMs
			MW18-121S	MW	Metals, HF Metals	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-122D	MW	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
			MW18-122D	MW	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
			MW18-122G	MW	--	BTEX, VOCs, THMs
			MW18-123D	MW	BTEX, PAHs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
			MW18-123S	MW	--	BTEX, VOCs, THMs
			MW18-124S	MW	PAHs, Metals, HF Metals	BTEX, PAHs, VOCs, THMs
			MW18-125S	MW	PAHs, PCBs, PHCs, Metals, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs
			MW18-126D	MW	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals	BTEX, PHCs, VOCs, THMs
			MW18-127S	MW	--	BTEX, PHCs, VOCs, THMs
			MW18-128D	MW	--	BTEX, PHCs, VOCs, THMs
			MW18-129D	MW	PAHs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-130D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
			MW18-131S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
			MW18-132D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
			MW18-133D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
			MW18-134D	MW	--	BTEX, VOCs, THMs
			MW18-134S	MW	--	BTEX, VOCs, THMs
			MW18-135D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs
			MW18-135S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
			MW18-136D	MW	--	BTEX, VOCs, THMs
			MW18-136G	MW	--	BTEX, VOCs, THMs
			MW19-137S	MW	--	BTEX, PHCs, VOCs, THMs
			OW02	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW03-I	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW03-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-31	MW	BTEX, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-32	MW	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-33	MW	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-34D	MW	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-34S	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-37	MW	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW07-38S	MW	BTEX, PHCs, VOCs, Metals*, HF Metals	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW09-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW09-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW10	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW11-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW11-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW12	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW13	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW13-39D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW13-39S	MW	BTEX, VOCs, THMs, Metals, HF Metals	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW14	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW15	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW16	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW17	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW18-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW18-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW19	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW22D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW22S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW23D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW23S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW24D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW24S	MW	--	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW25	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW26D	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW26S	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
			OW31	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CrVI, Hg
			SS-40	SS	PCBs	--
			SS-41	SS	PCBs	--
			SS-42	SS	PCBs	--
			SS-43	SS	PCBs	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]	COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
			SS-44	SS	PCBs	--
			SS-45	SS	PCBs	--
			TP13-01	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-02	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-03	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-04	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-05	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-06	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-08	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-09	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-10	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP13-11	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
			TP17-300	TP	ABNs, BTEX, CPs, Dioxins/Furans, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-301	TP	ABNs, BTEX, CPs, PAHs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-302	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-303	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-304	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-305	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-306	TP	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP17-307	TP	BTEX, PHCs, VOCs, THMs	--
			TP17-308	TP	Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
			TP18-309	TP	PHCs, Metals, HF Metals	--
			TP18-310	TP	PHCs, Metals, HF Metals	--
			TP18-311	TP	Metals, HF Metals	--
			TP18-312	TP	Metals, HF Metals	--
			TP18-313	TP	Metals, HF Metals	--
			TP18-314	TP	Metals, HF Metals	--
			TP18-315	TP	BTEX, PAHs, PHCs	--
			TP18-316	TP	PAHs, PCBs, PHCs	--
			TP18-317	TP	BTEX, PHCs	--
			TP18-318	TP	BTEX, PAHs, PCBs, PHCs, Metals, HF Metals	--
			TP18-319	TP	PAHs, Metals, HF Metals	--
			TP20-320	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			TP20-321	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			TP20-322	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			TP20-323	TP	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
			TP20-324	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APECs from Offsite PCAs to the North								
APEC-30 (Offsite North)	Rail Lines – Bordering the northern side of the Site, rail lines are present (owned by Guelph Rail Line) and have existed since at least the early 1900s. Has historically been indicated as the Canadian Pacific Railway (1916, 1929, 1946, 1960 FIPs and P&R [1991]), Guelph Junction Railway (EarthTech 1999; DCS 2007a).	46	Rail Yards, Tracks, and Spurs	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, Metals	10	TP	Metals*, CrVI, Hg, EC, pH	--
					12	TP	PCBs, Metals*, CrVI, Hg	--
	Paper Manufacturing – Companies at 309 Elizabeth Street have been listed in the Scott's Manufacturing Directory for paper-related manufacturing: Trinity Graphics was established in 1977 and 1978 with plant sizes of 3,000 and 50,000 m^3 for paper bag and coated and treated paper manufacturing, other converted paper product manufacturing, platemaking and related services; Independent Paper Converters was established in 1978 with a plant size of 56,000 m^3 for manufacturing, including paper bag, coated and treated paper, plastic film and sheet. The 1960 FIP indicated gummed paper manufacturing (Top Paper Products).	45	Pulp, Paper, and Paperboard Manufacturing and Processing		12SE10	TP	Metals*, HF Metals, CrVI, Hg	--
					BH07-42	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BH07-45	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-51	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					C7	CH	Metals*	--
	Auto Body Repair Shop – An automobile wrecking and recycling record was listed in the ERIS report for Sutton Auto Collision at 349 Elizabeth Street, which is an autobody repair facility. Additionally Top Gun Auto Painting & Collision is listed at this address from the City Directory.	10	Commercial Autobody Shops		ES-11	CS	PAHs	--
					ES-12	CS	PAHs	--
	Automobile Repair – Two automotive repair shops are listed in the City Directory at 349 Elizabeth Street from approximately 2005.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles, and Aviation Vehicles		K	TP	Metals*, EC, pH	--
					KE13	TP	PCBs	--
	Gasoline Station – A private fuel outlet with a 2,250 L liquid-fuel double-walled AST for gasoline is listed in the ERIS report for Oaks Precast Ind. Div. Standard Ind. at 351 Elizabeth Street, with a licence issue date of 1990. An additional record indicates a tank capacity of 36,500 L.	28	Gasoline and Associated Products Storage in Fixed Tanks		KNW10	TP	Metals*	--
					L	TP	Metals*, CrVI, Hg	--
	Trucking Company – A general freight trucking company (Polymer Distribution Inc.) is listed at 351 Elizabeth Street.	11	Commercial Trucking and Container Terminals		LN2	TP	PAHs, Metals*, EC, pH	--
					MW18-112D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals
	Concrete Products Manufacturing – Lafarge Canada Inc. is listed at 351 Elizabeth Street, with a Scott's Manufacturing directory listing indicating an established date of 1933 and plant size of 50,000 ft^3.	12	Concrete, Cement, and Lime Manufacturing		MW18-112G	MW	--	BTEX, VOCs, THMs, HF Metals
					MW18-112S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)	PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
Plastic Products Manufacturing – ERIS and the City Directory searches indicate plastic products manufacturing at 53 Victoria Rd S. Scott's Manufacturing directory listings indicate Sterling Creations was established in 1983 with a 5,000 ft^2 plant size, as well as Clear Choice Window Manufacturing established in 1990 with a 1,600 ft^2 plant size.	43	Plastics (including Fibreglass) Manufacturing and Processing		MW18-113D	MW	--	BTEX, VOCs, THMs, HF Metals
				MW18-113S	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
				MW18-130D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
Wire/Spring Manufacturing – ERIS searches list records for Guelph Wire Products, which was established in 1974 with a plant size of 4,000 ft^2 and manufactures steel springs, wire springs, and miscellaneous fabricated wire products.	34	Metal Fabrication		MW18-131S	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na
				MW18-133D	MW	--	BTEX, VOCs, THMs, Metals, HF Metals, Na
Metal Valve Manufacturing – ERIS searches list records for DeNardis Industrial Sales Ltd. at 61 Victoria Rd S Unit C for metal valve manufacturing, established in 1985, plant size 4000 ft^2.	34	Metal Fabrication		OW02	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
				OW07-31	MW	BTEX, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
Former Spill – Spill records from ERIS indicated a release of diesel fuel in 2005 at 65 Victoria South.				OW17	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
Electro-plating company – Holody Electro-Plating Limited is listed at 66 Victoria associated with metal product coating, iron and steel mills and ferro-alloy manufacturing since 1955, with a plant size of 40,000 ft^2, according to available records from ERIS. The 1960 FIP showed labelled buildings for plating, polishing, and an office.	33	Metal Treatment, Coating, Plating, and Finishing		OW19	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
				TP13-05	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
				TP13-06	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--
Window and Door Manufacturing – Clear Choice Window Manufacturing Inc. and Richview Doors Ltd. are listed in the Scott's Manufacturing Directory; established in 1990 with a 1,600-ft plant size. A spill at 75 Victoria Road South of a polymer emulsion (100 lbs) in 2016 was reported.	43	Plastics (including Fibreglass) Manufacturing and Processing		TP17-304	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
				TP17-305	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
Scrap Yard – B&F Scrap Dealers is listed at 100 Victoria Road South, with an automobile wrecking and recycling record in ERIS and listings in the city directory search from 1970 to 2011. A spill was reported at the property of a gasoline and water mixture (quantity not specified) in 2006 from cargo leaking to the ground.	49	Salvage Yard, including automobile wrecking		TP18-319	TP	PAHs, Metals, HF Metals	--
				TP20-320	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--
				TP20-322	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APECs from Offsite PCAs to the East								
APEC-31 (Offsite East)	Steel Valve Manufacturing – Guelph Engineering Co. was shown located at 10 Kingsmill Avenue; buildings on the 1960 FIP indicate steel valve manufacturing with a machine shop, pattern shop, and oil house. Previous FIPs (1916, 1929, and 1946) show residences in this area.	32	Iron and Steel Manufacturing and Processing	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, Metals	ASW14	TP	Metals*, CrVI	--
					BH07-53	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
	Former Stove Manufacturer/Foundry – Guelph Stove Company was shown at 490 York Road on the 1916, 1929, 1946, and 1960 FIPs. Buildings included a foundry, storage (coke, coal, sand), milling room, pattern shops, plating and buffing, offices, warehouses, steel mounting room & blacksmith, crating, stove mounting, and oil. Transformers are shown on the enamel building. Operations existed until approximately the mid-1960s where the city directory listings indicate Franklin Manufacturing Co (Canada) Ltd. and then Resco Refrigeration Supplies Co Ltd. from approximately 1970. The facility became multi-tenant commercial companies from the 1990s to present.	32	Iron and Steel Manufacturing and Processing		BH18-205	BH	BTEX, PHCs, VOCs, THMs	--
					BH19-209	BH	BTEX, VOCs, THMs	--
					BH19-211	BH	BTEX, VOCs, THMs	--
					C7	CH	Metals*	--
					L	TP	Metals*, CrVI, Hg	--
	Box Manufacturing – Packing manufacturers are listed at 136 Victoria Road South: Ellis Packing West Inc. listed as a corrugated and solid fibre box manufacturer; and ABCO Box and Carton Ltd. listed as a folding paperboard box manufacturer, established in 1946 with a plant size of 40,000 ft^2. The 1960 FIP shows ABCO Box and Carton Co. Ltd., with buildings labelled for office, pattern making, cutting, raw stock, stripping, gluing, and finished stock. ABCO Box and Carton Ltd. was present until approximately 2000, when Ellis Packing West replaced them as listed in the city directory.	45	Pulp, Paper and Paperboard Manufacturing and Processing		LN2	TP	PAHs, Metals*, EC, pH	--
					MW18-129D	MW	PAHs, PHCs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs, Metals, HF Metals, Na
					MW18-130D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
					MW18-132D	MW	--	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, Na
					MW19-137S	MW	--	BTEX, PHCs, VOCs, THMs
					OW09-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW09-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW13	MW	--	ABNs, BTEX, CPs, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW13-39D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW13-39S	MW	BTEX, VOCs, THMs, Metals, HF Metals	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW14	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Potential USTs – On the 1960 FIP, McGregor Sportswear of Canada was shown to have two fuel oil USTs (2,500 gal each) on the property at 136 Victoria Road South.	28	Gasoline and Associated Products Storage in Fixed Tanks					
	Scrap Yard – Joe Brown & Son Ltd., a junk yard, is shown on the 1960 FIP at 150 Victoria; ERIS records include Henderson's Disposal Systems Ltd. as the owner and list the facility as a transfer service from 2000 to 2004, and 2005 as an Ontario numbered company.	49	Salvage Yard, including automobile wrecking					
	Former Fuel Storage Facility – Multiple companies have been listed at 154 Victoria Road South (Shell Canada Products, Doug Pollock Fuels Ltd., Granger Fuels) as an expired TSSA fuel storage facility with gasoline and diesel. A spill was reported in 1988 caused by container overflow of 150 L of gasoline to the gravel surface. The 1946 FIP shows 6 gasoline USTs, and the 1960 FIP shows 13 gasoline USTs and an oil warehouse; both listed as Canadian Oil Companies Ltd.	28	Gasoline and Associated Products Storage in Fixed Tanks					

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
	Former Paint Application – A cabinet manufacturer was shown on the 1960 FIP, Gilson Manufacturing Co. Ltd. Cabinet Division at 57 Victoria Road South, with buildings labelled for steel storage, tubing room, steel room, washer, dryer, office, paint spray, transformer.	39	Paints Manufacturing, Processing, and Bulk Storage		OW18-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW18-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Chemical Manufacturer or Distributor – Robert On Guard Products was listed in the chemical facilities records.	8	Chemical Manufacturing, Processing, and Bulk Storage		OW19	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW24D	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Transformers – The National PCB records list up to 7 transformers on 490 York Road associated with Sherwood Forest Investments (formerly Hamril Investments). The volumes listed total approximately 1,600 L. Transformers (7 total) are shown on the 1960 FIP on the enameling building of Guelph Stove Co. Ltd.	55	Transformer Manufacturing, Processing, and Use		OW24S	MW	--	ABNs, BTEX, CPs, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW31	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CrVI, Hg
					TP17-305	TP	BTEX, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--
APECs from Offsite PCAs to the South								
APEC-32 (Offsite South)	Screw Manufacturing – Linread Canada Ltd. is shown on the 1960 FIP as a screw manufacturer and is listed in ERIS reports as a industrial fastener at 24 Hayes with records until 1998. "Jet" is listed as a manufacturer of metal dies at this location with records between 1993 and 1998. Multiple Scott's Directory listings are reported for this address for machinery/equipment/ industrial fan and fabricated metal tools/product manufacturing (Daltec Industries, Allen Simpson Marketing and Design) with established dates of 1984 and 1975, and records up to 2006. A spill was reported of slurry to the road in 2014.	34	Metal Fabrication	BTEX, PAHS, PHCs, VOCs, Metals	2	TP	Metals*, CrVI, Hg, EC, pH	--
					3	TP	Metals*, CrVI, Hg, EC, pH	--
					4	TP	Metals*, CrVI, Hg, EC, pH	--
					BH07-55	BH	BTEX, PAHs, PHCs, VOCs, Metals*, HF Metals	--
					BH07-62	BH	BTEX, PAHs, PCBs, PHCs, VOCs, Metals*, HF Metals, CN-, CrVI, Hg, EC, SAR, pH	--
					BW11	TP	Metals*, CrVI	--
					MW18-122D	MW	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
					MW18-122D	MW	PAHs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
					MW18-122G	MW	--	BTEX, VOCs, THMs
	Former USTs – One gasoline UST is shown on the 1960 FIP on the southern side of the building at Traders' Plumbing and Heating Supplies Limited at 150 Stevenson Street South.	28	Gasoline and Associated Products Storage in Fixed Tanks		MW18-123D	MW	BTEX, PAHs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	BTEX, VOCs, THMs
					MW18-123S	MW	--	BTEX, VOCs, THMs
					OW10	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW11-I	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Former Transportation Company – The 1960 FIP indicates a transportation company (Direct Winter's Transport) at 101 Beverley, and city directories show that the company was present from the early 1950s to 1960s.	11	Commercial Trucking and Container Terminals		OW11-II	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW26D	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW26S	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					TP13-10	TP	BTEX, PAHs, PHCs, VOCs, THMs, Metals, HF Metals, Hg	--

Table 6-4. APEC Disposition Table

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Areas of Potential Environmental Concern (APEC)		PCA [a.]		COPCs (based on AP method groups [b,c])	Location Associated with APEC Area	Location Type	List of Parameter Groups Tested (soil) [b.]	List of Parameter Groups Tested (GW) [b.]
APECs from Offsite PCAs to the West								
APEC-33 (Offsite West)	Window Manufacturing – Clear Choice Window Manufacturing Inc. is listed in the Scott's Manufacturing Directory; established in 1990, and a 1,600-ft plant size.	43	Plastics (including Fibreglass) Manufacturing and Processing	BTEX, PAHs, PHCs, VOCs, Metals	4	TP	Metals*, CrVI, Hg, EC, pH	--
	Metal Treatment – Choice Enterprises is listed in the Scott's Manufacturing Directory as carrying out coating, engraving, heat treating, and allied activities; established in 1998.	33	Metal Treatment, Coating, Plating, and Finishing		6	TP	Metals*, CrVI, Hg, EC, pH	--
	Spring Manufacturing – ERIS records indicate heavy gauge spring manufacturing at 60 Johnston Street as Steele Bros. Ltd., the Scott's Manufacturing Directory record indicates the company was established in 1986 with a plant size of 6,500 ft^2. The 1960 FIP shows the H.I. Thompson Co. of Canada Limited (Aircraft Insulation) with a factory, spring room, spray room, transformer, and cement storage.	34	Metal Fabrication		BH07-67	BH	BTEX, PCBs, PHCs, VOCs, Metals*, HF Metals	--
					ESW8	TP	PCBs, Metals*, EC, pH	--
	Former Refractory Facility – Former Foundry Services of Canada (FOSECO) facility operated at 201 Alice Street until approximately the late 1990s and had a known contaminated plume in the shallow groundwater occurring at the bedrock/overburden interface, migrating northward and a groundwater treatment system for toluene (P&R 1991). A certificate of approval record was issued in 1989 to FOSECO for the toluene stripper for groundwater. The 1960 FIP indicates the following buildings: tablet making, lab, shipping, mixing, warehouse, ball mill, elevator, transformer, oil storage, blending, mouldable exothermic feeding compound, incinerator.	34	Metal Fabrication		EW8	TP	PCBs, Metals*	--
					MW18-120D	MW	Metals, HF Metals	BTEX, VOCs, THMs, Metals, HF Metals, Na
					OW12	MW	--	BTEX, PAHs, PHCs, VOCs, THMs, 1,4-dioxane, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
					OW15	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Motor Vehicle Parts Manufacturing FOSECO BP Canada Energy Company is listed in ERIS operating at 201 Alice Street.	57	Vehicles and Associated Parts Manufacturing		OW16	MW	--	BTEX, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, Na, Cl, CN-, CrVI, Hg
	Former Spill – At the corner of Alice and Stevenson Street, a spill was reported of 15 L of windshield washer fluid and antifreeze to a catch basin caused by a motor vehicle accident in 2016.	27	Garages and Maintenance and Repair of Railcars, Marine Vehicles, and		TP17-300	TP	ABNs, BTEX, CPs, Dioxins/Furans, PAHs, PCBs, PHCs, VOCs, THMs, Metals, HF Metals, B-HWS, CN-, CrVI, Hg, EC, SAR, pH	--

Notes:

Information provided in this table is limited to detected parameters exceeding the MECP Standards. MDLs that exceed the MECP Standards can be found in the results tables provided in Section 6.

[a] PCA – Potentially contaminating activity (as defined by O. Reg 153/04, as amended), (*) best fit available where starred.

[b] AP Method groups as defined in the "*Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* " dated July 1, 2011.

*Based on the O. Reg. 153/04 AP method group for metals, boron and uranium are missing from metals analyses from samples collected in the 1990s and 2007; parameters based on historical laboratory parameter groups. Similarly, where arsenic was missing, HF metals was not listed as a parameter tested.

"--" = no data for the specified media

ABNs = acid base neutral compounds
APEC = area of potential environmental concern
AST = aboveground storage tank
BH = borehole
B-HWS = boron - hot water soluble
BTEX = benzene, toluene, ethylbenzene, xylene
CH = corehole
Cl = chloride
CN- = cyanide
COC = contaminant of concern
CPs = chlorophenols
CrVI = hexavalent chromium
CS = confirmatory sample
EC = electrical conductivity
ERIS = environmental risk information services
FIP = fire insurance plan
GW = groundwater
HF Metals = hydride forming metals
Hg = mercury
MDL = method detection limit
MECP = Ontario Ministry of Environment, Conservation and Parks
Metals* = incomplete metals suite missing boron and uranium
MW = monitoring well
PAHs = polyaromatic hydrocarbons
PCA = potentially contaminating activity
PCBs = polychlorinated biphenyls
PHCs = petroleum hydrocarbons
SAR = sodium adsorption ratio
SS = soil sample
TP = test pit
TSSA = technical standards and safety authority
UST = underground storage tank
VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	1	10	11	12	12	12	12SE10	12SE10	2	3	4	5	6	7	7	8	9	9	A	A
		Sample ID	1-1	10-2 (11-2)	11-1 (12-1)	12-1 (OW7 SW7-1)	12-P1 (OWSW7-P1)	12-2 (OW7-SW7-2)	12SE10-1 (OW7-SE10-1)	12SE10-2 (OW7SE10-2)	2-1	3-1	4-1	5-1	6-1	7-2	7-4	8-2	9-1	9-3	A-1	A-2
		Start Depth (m)	0.3	0.2	0.5	0.2	0.2	0.4	0.2	0.4	0.2	0.3	0	0.4	0.2	0.4	1	0.2	0.3	0.8	0.3	1
		End Depth (m)	1	1	0.5	0.4	0.4	1	0.4	1.4	0.5	0.3	0.8	1.1	0.9	0.9	1.2	1	0.6	1.4	1	2
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	10 U	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--
Phenol	9.4	µg/g	0.01 U	--	0.01 U	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	0.01 U	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	1.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, o	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, m & p	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	3.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	6.6	8.7	7.7	--	--	--	--	--	7.7	8.2	7	8.3	8.2	9	--	7.7	8.8	--	--	8.2
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	470	--	--	--	--	--	--	160	--	--	20 U	440	630
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	1.76	0.7	0.32	--	--	0.92	3.56	--	1.14	2.21	0.45	0.22	0.22	0.48	--	1.51	0.44	--	--	--
Arsenic	18	µg/g	--	--	--	--	--	--	--	4.7	--	--	--	--	--	--	--	--	--	--	--	--
Barium	390	µg/g	28	28	24	--	--	50	62	59.7	43	116	34	21	31	23	13	135	42	67.6	56	31
Beryllium	4	µg/g	1	2	2	--	--	4	1	1.3 U	3	3	1	2	3	2	0.4	3	2	0.5 U	0.6	0.5
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.3 U	0.5 U	0.5 U	0.3 U	1.1	0.3 U
Chromium	160	µg/g	7	4.6	5.8	--	--	4.2	18	17.9	3.4	3.9	4.1	5.5	5.9	3.3	16.5	9	6.6	0.3 U	22.7	20.9
Cobalt	22	µg/g	1.4	1.9	1.6	--	--	3.8	3.8	13	2.5	1	1.6	1	2.1	1	2 U	2.9	1 U	2 U	7	4
Copper	140	µg/g	13	22	14	--	--	25	37	322	17	19	10	12	9.2	8.2	11	16	12	8.9	15	34
Lead	120	µg/g	18	31	17	--	--	13	49	48	26	46	9.8	10	12	30	51	15	6.5	51	101	167
Molybdenum	6.9	µg/g	1 U	1 U	1 U	--	--	3	1 U	7	1 U	1 U	1 U	1 U	1 U	1 U	3 U	1 U	1 U	3 U	8	3 U
Nickel	100	µg/g	2.7	3.8	4.5	--	--	8.3	10	27	8.8	4.9	4.1	36	4.5	1.8	2 U	9.4	3.5	2 U	13	10
Selenium	2.4	µg/g	0.22	0.23	0.22	--	--	0.92	0.22	--	0.23	0.23	0.23	0.22 U	0.22 U	0.24	--	0.23	0.22	--	--	--
Silver	20	µg/g	1 U	1 U	1 U	--	--	1 U	1 U	0.2 U	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	--	--	--	--	--	--	--	2 U	--	--	--	--	--	--	2 U	--	--	2 U	2	2 U
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	µg/g	38	20	23	--	--	16	10	38.4	48	21	15	18	27	19	0.3 U	33	18	6.8	26.2	10.9
Zinc	340	µg/g	31	37	47	--	--	21	356	516	45	231	31	30	42	20	496	92	19	652	2660	1920
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	20600	--	--	--	--	--	--	137000	--	--	152000	11000	78300
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	7040	--	--	--	--	--	--	83300	--	--	86100	5710	36500

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			1	10	11	12	12	12	12SE10	12SE10	2	3	4	5	6	7	7	8	9	9	A	A
Sample ID			1-1	10-2 (11-2)	11-1 (12-1)	12-1 (OW7 SW7-1)	12-P1 (OWSW7-P1)	12-2 (OW7-SW7-2)	12SE10-1 (OW7-SE10-1)	12SE10-2 (OW7SE10-2)	2-1	3-1	4-1	5-1	6-1	7-2	7-4	8-2	9-1	9-3	A-1	A-2
Start Depth (m)			0.3	0.2	0.5	0.2	0.2	0.4	0.2	0.4	0.2	0.3	0	0.4	0.2	0.4	1	0.2	0.3	0.8	0.3	1
End Depth (m)			1	1	0.5	0.4	0.4	1	0.4	1.4	0.5	0.3	0.8	1.1	0.9	0.9	1.2	1	0.6	1.4	1	2
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	9520	--	--	--	--	--	--	4340	--	--	5570	16000	8850
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	57600	--	--	--	--	--	--	10100	--	--	22100	24900	18200
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	466	--	--	--	--	--	--	227	--	--	503	952	1680
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	880	--	--	--	--	--	--	430	--	--	440	1020	1260
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	78.1	--	--	--	--	--	--	41.1	--	--	34	21.6	58.9
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	532	--	--	--	--	--	--	29.8	--	--	23.6	139	84.3
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	11	--	--	--	--	--	--	5	--	--	9	8	15
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	10 U	10 U	10 U	--	--	10 U	10 U	--	10 U	10 U	10 U	10 U	10 U	10 U	--	10 U	10 U	--	10 U	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	0.015	0.043	0.034	--	--	--	--	--	0.042	0.047	0.026	0.092	0.055	0.056	--	0.137	0.06	--	--	0.071
Mercury	0.27	µg/g	0.02	0.01 U	0.02	--	--	0.01	0.04	--	0.02	0.06	0.01	0.01 U	0.01	0.03	--	0.02	0.02	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	280	--	--	--	--	--	--	180	--	--	150	300	260
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	2 U	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Chrysene	7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Fluorene	62	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Pyrene	78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			1	10	11	12	12	12	12SE10	12SE10	2	3	4	5	6	7	7	8	9	9	A	A
Sample ID			1-1	10-2 (11-2)	11-1 (12-1)	12-1 (OW7 SW7-1)	12-P1 (OWSW7-P1)	12-2 (OW7-SW7-2)	12SE10-1 (OW7-SE10-1)	12SE10-2 (OW7SE10-2)	2-1	3-1	4-1	5-1	6-1	7-2	7-4	8-2	9-1	9-3	A-1	A-2
Start Depth (m)			0.3	0.2	0.5	0.2	0.2	0.4	0.2	0.4	0.2	0.3	0	0.4	0.2	0.4	1	0.2	0.3	0.8	0.3	1
End Depth (m)			1	1	0.5	0.4	0.4	1	0.4	1.4	0.5	0.3	0.8	1.1	0.9	0.9	1.2	1	0.6	1.4	1	2
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			1	10	11	12	12	12	12SE10	12SE10	2	3	4	5	6	7	7	8	9	9	A	A
Sample ID			1-1	10-2 (11-2)	11-1 (12-1)	12-1 (OW7 SW7-1)	12-P1 (OWSW7-P1)	12-2 (OW7-SW7-2)	12SE10-1 (OW7-SE10-1)	12SE10-2 (OW7SE10-2)	2-1	3-1	4-1	5-1	6-1	7-2	7-4	8-2	9-1	9-3	A-1	A-2
Start Depth (m)			0.3	0.2	0.5	0.2	0.2	0.4	0.2	0.4	0.2	0.3	0	0.4	0.2	0.4	1	0.2	0.3	0.8	0.3	1
End Depth (m)			1	1	0.5	0.4	0.4	1	0.4	1.4	0.5	0.3	0.8	1.1	0.9	0.9	1.2	1	0.6	1.4	1	2
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	AN21	AN21	AN21	ASW14	B	B	BH07	BH07	BH07-40	BH07-40	BH07-41	BH07-41	BH07-41	BH07-41	BH07-42	BH07-42	BH07-42	BH07-45	BH07-45	BH07-45
		Sample ID	AN21-1	AN21-2	AN21-3	ASW14-1	B-2	B-3	BH7-SS1	BH7-SS2	BH07-40SS-1A	BH07-40 SS-2A	BH07-41 SS-1	BH07-41	Dup#4	BH07-41 SS-2	OW07-42SS1	OW07-42SS2	DUP#14	BH07-45 SS-1	BH07-45 SS-1A	BH07-45 SS-2
		Start Depth (m)	0	0.9	1.7	0	0.3	1	0	1	0.3	2.13	0	0	0	1.2	0	1.22	1.22	0	0.05	1.22
		End Depth (m)	0.9	1.7	1.7	0.3	1	1.4	0.15	1.15	1.22	2.39	0.61	2.29	0.61	2.29	0.61	1.68	1.68	0.15	1.22	1.78
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
		Sample Date	22 Jan 1991	22 Jan 1991	22 Jan 1991	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 May 1998	08 May 1998	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	0.007 U	0.007 U	--	--	--	0.007 U	0.007 U	0.007 U	--	--	--	0.007 U
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.003	0.006	0.011	--	--	--	0.006
Ethylbenzene	1.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.004	--	--	--	0.003
Toluene	2.3	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.006	0.007	0.025	--	--	--	0.011
Xylene, o	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.006	--	--	--	0.002
Xylenes, m & p	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.008	--	--	--	0.003
Xylenes, Total	3.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.014	--	--	--	0.005
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	7.3	--	8.29	8.54	7.14	--	--	--	--	--	7.6	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	280	90	460	--	--	--	--	--	--	--	--	482	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	--	--	--	--	--	--	--	0.8 U	0.8 U	0.8 U	--	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Arsenic	18	µg/g	--	--	--	--	--	--	--	--	8.1	2.9	2.2	--	2.9	3.3	8.5	0.9	1.1	2	1.5	1.9
Barium	390	µg/g	74	21	43.9	--	--	--	--	--	81.6	137	17.3	--	24.8	17.5	85.6	7.1	8.3	13	12.2	17.9
Beryllium	4	µg/g	0.5	0.3	0.4 U	--	--	--	--	--	0.7	0.2 U	0.2 U	--	0.2 U	0.2 U	0.6	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	0.3 U	0.4	0.3 U	0.56	0.95	--	--	--	3.4	1.5	0.5	--	0.7	1.4	1.8	0.6	0.6	4	3	4.5
Chromium	160	µg/g	28.6	25.3	0.3 U	7.4	11	--	--	--	16.6	5	7.2	--	8	10.1	15.6	3.3	4.4	5.9	4	6.9
Cobalt	22	µg/g	3	2	2 U	7.6	6	--	--	--	7.7	14.5	2.1	--	2.5	3.5	6.6	1.1	1.4	3.9	3.1	3.7
Copper	140	µg/g	68	11	54.5	34	20	--	--	--	27.8	28.6	17.1	--	22.8	16.6	28.4	5.1	5.8	13.6	10.4	12.2
Lead	120	µg/g	253	18	145	417	162	70	--	--	227	25.2	75.6	--	97.1	68.5	133	25.8	34.7	138	131	147
Molybdenum	6.9	µg/g	4	6	3 U	--	1.23	3 U	--	--	1.2	0.4	0.9	--	1.4	2.1	1	0.3 U	0.3 U	1.3	1.1	1.7
Nickel	100	µg/g	12	4	2 U	15	14	--	--	--	17.8	18.8	7.5	--	11.4	6.9	15.8	2.5	3.8	9.1	7.3	7.9
Selenium	2.4	µg/g	--	--	--	--	--	--	--	--	0.8 U	0.8 U	0.8 U	--	0.8 U	0.8 U	0.7	0.4 U	0.4 U	0.8 U	0.8	0.8 U
Silver	20	µg/g	0.2 U	0.2 U	0.2 U	1 U	1 U	--	--	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	2 U	6	2 U	--	--	--	--	--	0.4	0.6	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.3	0.3
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.5	--	--	--	--	--	--	--	--
Vanadium	86	µg/g	15.6	13	7.5	--	--	--	--	--	30	41.3	18.8	--	17.9	8.8	24.5	5	6.3	10.2	8.4	9.8
Zinc	340	µg/g	948	27	2260	2375	392	882	--	--	1580	2250	180	--	277	572	828	368	416	1520	1560	1820
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	65400	1450	137000	--	--	--	--	--	--	--	--	46900	--	--	--	--	--	--	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	22300	947	30700	--	--	--	--	--	--	--	--	22800	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			AN21	AN21	AN21	ASW14	B	B	BH07	BH07	BH07-40	BH07-40	BH07-41	BH07-41	BH07-41	BH07-41	BH07-42	BH07-42	BH07-42	BH07-45	BH07-45	BH07-45
Sample ID			AN21-1	AN21-2	AN21-3	ASW14-1	B-2	B-3	BH7-SS1	BH7-SS2	BH07-40SS-1A	BH07-40 SS-2A	BH07-41 SS-1	BH07-41	Dup#4	BH07-41 SS-2	OW07-42SS1	OW07-42SS2	DUP#14	BH07-45 SS-1	BH07-45 SS-1A	BH07-45 SS-2
Start Depth (m)			0	0.9	1.7	0	0.3	1	0	1	0.3	2.13	0	0	0	1.2	0	1.22	1.22	0	0.05	1.22
End Depth (m)			0.9	1.7	1.7	0.3	1	1.4	0.15	1.15	1.22	2.39	0.61	2.29	0.61	2.29	0.61	1.68	1.68	0.15	1.22	1.78
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 May 1998	08 May 1998	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b.]	µg/g	9060	11100	6990	--	--	--	--	--	--	--	--	9920	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b.]	µg/g	26900	18200	21000	--	--	--	--	--	--	--	--	37100	--	--	--	--	--	--	--	--
Manganese	~~NV~~ 1800 [b.]	µg/g	1090	28	1430	--	--	--	--	--	--	--	--	596	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b.]	µg/g	810	720	750	--	--	--	--	--	--	--	--	857	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b.]	µg/g	55.6	8.7	114	--	--	--	--	--	--	--	--	41.7	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b.]	µg/g	145	17.7	32.8	--	--	--	--	--	--	--	--	130	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b.]	µg/g	9	7	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b.]	µg/g	--	--	--	--	--	--	--	--	7.72	--	--	--	--	--	9.31	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	10 U	10 U	--	--	--	0.4 U	--	0.4 U	--	--	--	0.4 U	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	0.08 U	--	0.08 U	--	--	--	0.08 U	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	0.024	--	--	--	0.384	--	--	--	--	--	0.248	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	0.125	--	0.013	--	--	--	0.11	--	--	--	--	--
Sodium	~~NV~~ 200 [b.]	µg/g	180	4	110	--	--	--	--	--	--	--	--	133	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	2	--	--	--	--	--	0.067	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	--	--	--	0.08	--	0.3 U	--	--	--	--	--	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	--	--	--	0.04	--	0.2 U	--	--	--	--	--	--	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	--	--	--	0.42	--	0.25	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	--	--	--	0.31	--	0.36	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	--	--	--	0.15	--	0.53	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	0.28	--	0.9	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	--	--	--	0.12	--	0.74	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	0.09	--	0.33	--	--	--	--	--	--	--	--	--
Chrysene	7	µg/g	--	--	--	--	--	--	--	--	1.4	--	0.51	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	--	--	--	0.04	--	0.2 U	--	--	--	--	--	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	--	--	--	0.35	--	1.6	--	--	--	--	--	--	--	--	--
Fluorene	62	µg/g	--	--	--	--	--	--	--	--	0.48	--	0.2 U	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	--	--	--	0.1	--	0.57	--	--	--	--	--	--	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	--	--	--	0.17	--	0.31	--	--	--	--	--	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	--	--	--	3.3	--	1.3	--	--	--	--	--	--	--	--	--
Pyrene	78	µg/g	--	--	--	--	--	--	--	--	1.4	--	1.2	--	--	--	--	--	--	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	--	--	--	0.02 U	--	--	--	--	0.02 U
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	5	--	--	--	--	--	5	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	5	--	--	--	--	--	5	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	400	--	20	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	--	--	--	400	290	20	--	--	10	10	--	--	16	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	23000	--	540	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	--	--	--	23000	14000	550	--	--	79	110	--	--	200	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	--	--	--	380	270	1700	--	--	50	50	--	--	50	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			AN21	AN21	AN21	ASW14	B	B	BH07	BH07	BH07-40	BH07-40	BH07-41	BH07-41	BH07-41	BH07-41	BH07-42	BH07-42	BH07-42	BH07-45	BH07-45	BH07-45
Sample ID			AN21-1	AN21-2	AN21-3	ASW14-1	B-2	B-3	BH7-SS1	BH7-SS2	BH07-40SS-1A	BH07-40 SS-2A	BH07-41 SS-1	BH07-41	Dup#4	BH07-41 SS-2	OW07-42SS1	OW07-42SS2	DUP#14	BH07-45 SS-1	BH07-45 SS-1A	BH07-45 SS-2
Start Depth (m)			0	0.9	1.7	0	0.3	1	0	1	0.3	2.13	0	0	0	1.2	0	1.22	1.22	0	0.05	1.22
End Depth (m)			0.9	1.7	1.7	0.3	1	1.4	0.15	1.15	1.22	2.39	0.61	2.29	0.61	2.29	0.61	1.68	1.68	0.15	1.22	1.78
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 May 1998	08 May 1998	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																				
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	0.47 U	0.47 U	--	--	--	0.47 U	0.47 U	0.47 U	--	--	--	0.47 U
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	0.005 U	0.005 U	--	--	--	0.005 U	0.005 U	0.005 U	--	--	--	0.005 U
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	0.041 U	0.041 U	--	--	--	0.041 U	0.041 U	0.041 U	--	--	--	0.041 U
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	--	--	--	--	--	--	--	0.17	0.33	--	--	--	0.13 U	0.13 U	0.13 U	--	--	--	0.13 U
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	--	--	--	0.003 U	0.003 U	0.003 U	--	--	--	0.003 U
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	--	--	--	0.004 U	0.004 U	0.004 U	--	--	--	0.004 U
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	--	--	--	0.003 U	0.003 U	0.003 U	--	--	--	0.003 U
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	--	--	--	0.003 U	0.003 U	0.003 U	--	--	--	0.003 U
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	--	--	--	0.004 U	0.004 U	0.004 U	--	--	--	0.004 U
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	--	--	--	0.004 U	0.004 U	0.004 U	--	--	--	0.004 U
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	--	--	--	0.002 U	0.002 U	0.002 U	--	--	--	0.002 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	AN21	AN21	AN21	ASW14	B	B	BH07	BH07	BH07-40	BH07-40	BH07-41	BH07-41	BH07-41	BH07-41	BH07-42	BH07-42	BH07-42	BH07-45	BH07-45	BH07-45
		Sample ID	AN21-1	AN21-2	AN21-3	ASW14-1	B-2	B-3	BH7-SS1	BH7-SS2	BH07-40SS-1A	BH07-40 SS-2A	BH07-41 SS-1	BH07-41	Dup#4	BH07-41 SS-2	OW07-42SS1	OW07-42SS2	DUP#14	BH07-45 SS-1	BH07-45 SS-1A	BH07-45 SS-2
		Start Depth (m)	0	0.9	1.7	0	0.3	1	0	1	0.3	2.13	0	0	0	1.2	0	1.22	1.22	0	0.05	1.22
		End Depth (m)	0.9	1.7	1.7	0.3	1	1.4	0.15	1.15	1.22	2.39	0.61	2.29	0.61	2.29	0.61	1.68	1.68	0.15	1.22	1.78
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	FD	N	N	N
		Sample Date	22 Jan 1991	22 Jan 1991	22 Jan 1991	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 May 1998	08 May 1998	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-45	BH07-45	BH07-45	BH07-46	BH07-46	BH07-47	BH07-47	BH07-48	BH07-48	BH07-49	BH07-49	BH07-50	BH07-50	BH07-51	BH07-51	BH07-52	BH07-52	BH07-52	BH07-52
		Sample ID	OW07-45SS2	Dup#2	DUP#2	BH07-46 SS-1A	BH07-46 SS-2	BH07-47 SS-1	BH07-47 SS-2	BH07-48 SS-1	BH07-48 SS-2	BH07-49 SS-1	BH07-49 SS-2	BH07-50 SS-1	BH07-50 SS-2	BH07-51 SS-1	BH07-51 SS-2	BH07-52 SS-1	BH07-52	Dup#3	BH07-52 SS-2A
		Start Depth (m)	1.22	1.22	1.22	0.05	1.22	0.05	1.22	0.1	1.22	0.05	1.22	0.05	1.22	0	1.22	0	0	0	1.22
		End Depth (m)	1.78	1.78	1.78	1.22	1.68	1.22	1.8	1.22	1.42	0.3	1.83	1	1.67	1.22	2.06	1.22	2.01	1.22	1.83
		Sample Type	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
		Sample Date	22 Feb 2007	08 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	0.007 U	--	--	0.007 U	--	0.007 U	--	--	--	0.007 U	--	--	--	0.007 U	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	--	0.007	--	--	0.009	--	0.004	0.1 U	0.1 U	--	0.003	--	--	--	0.002 U	0.1 U	--	--	0.1 U
Ethylbenzene	1.1	µg/g	--	0.002	--	--	0.003	--	0.002 U	0.05 U	0.05 U	--	0.002 U	--	--	--	0.002 U	0.05 U	--	--	0.05 U
Toluene	2.3	µg/g	--	0.011	--	--	0.013	--	0.009	0.08 U	0.08 U	--	0.006	--	--	--	0.005	0.08 U	--	--	0.08 U
Xylene, o	NV	µg/g	--	0.002	--	--	0.004	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Xylenes, m & p	NV	µg/g	--	0.003	--	--	0.004	--	0.003	--	--	--	0.002 U	--	--	--	0.002	--	--	--	--
Xylenes, Total	3.1	µg/g	--	0.005	--	--	0.008	--	0.003	0.07 U	0.07 U	--	0.002 U	--	--	--	0.002	0.07 U	--	--	0.07 U
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	7.85	--	--	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	506	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	--	--	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	2.1	0.8 U	2.9	--	--	0.8 U
Arsenic	18	µg/g	--	--	1.9	1.8	1.8	5.4	3.8	7.6	2.7	6.8	2.5	2.7	1.6	13.4	1.3	11.3	--	--	5.9
Barium	390	µg/g	--	--	24.3	21.2	26.1	60.6	20.2	45.7	21.2	79.9	25.7	28	21.6	92.2	16.9	100	--	--	18.4
Beryllium	4	µg/g	--	--	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.3	0.2	0.6	0.3	0.3	0.3	0.4	0.2	0.3	--	--	0.3
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	--	--	3.6	0.2 U	2.9	1.4	0.9	1.5	0.8	1.2	1.5	0.2 U	0.6	1.4	0.5	1.7	--	--	1.3
Chromium	160	µg/g	--	--	4.9	5.5	7.9	6.1	8.6	8.9	9.1	12.7	8.8	7.1	7.9	59.8	7.5	20.5	--	--	8.9
Cobalt	22	µg/g	--	--	3.6	2.8	3.9	6.2	4.2	5.6	4	6.2	3.4	3.1	4.6	7.8	2.8	6.5	--	--	5.9
Copper	140	µg/g	--	--	12.4	12.9	13.5	24.9	22.9	20.2	25.5	15.1	24	10.9	15	129	13.1	158	--	--	30.1
Lead	120	µg/g	--	--	121	7.3	148	146	51.2	102	80.1	110	105	45.8	59.3	131	68.2	289	--	--	103
Molybdenum	6.9	µg/g	--	--	1.4	0.3 U	1.3	0.6	0.4	0.7	0.3 U	0.6	0.3	0.4	0.3 U	9.9	0.4	2.3	--	--	0.7
Nickel	100	µg/g	--	--	7.3	4.7	8.9	12	12.1	13	11	12.2	12.5	6.4	11.3	117	12.3	33.5	--	--	14.8
Selenium	2.4	µg/g	--	--	0.6	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	--	--	0.8 U
Silver	20	µg/g	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.9	--	--	0.2 U
Thallium	1	µg/g	--	--	0.3	0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	0.2
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.6	--	--
Vanadium	86	µg/g	--	--	9.1	8.5	13.8	10.1	11.6	16.1	14.2	22.1	13.5	12.4	12.1	22.8	11.1	21.4	--	--	13.8
Zinc	340	µg/g	--	--	1480	52.4	1470	481	853	483	669	374	899	56.6	1380	1220	536	1350	--	--	1470
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	147000	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	83100	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-45	BH07-45	BH07-45	BH07-46	BH07-46	BH07-47	BH07-47	BH07-48	BH07-48	BH07-49	BH07-49	BH07-50	BH07-50	BH07-51	BH07-51	BH07-52	BH07-52	BH07-52	BH07-52
Sample ID			OW07-45SS2	Dup#2	DUP#2	BH07-46 SS-1A	BH07-46 SS-2	BH07-47 SS-1	BH07-47 SS-2	BH07-48 SS-1	BH07-48 SS-2	BH07-49 SS-1	BH07-49 SS-2	BH07-50 SS-1	BH07-50 SS-2	BH07-51 SS-1	BH07-51 SS-2	BH07-52 SS-1	BH07-52	Dup#3	BH07-52 SS-2A
Start Depth (m)			1.22	1.22	1.22	0.05	1.22	0.05	1.22	0.1	1.22	0.05	1.22	0.05	1.22	0	1.22	0	0	0	1.22
End Depth (m)			1.78	1.78	1.78	1.22	1.68	1.22	1.8	1.22	1.42	0.3	1.83	1	1.67	1.22	2.06	1.22	2.01	1.22	1.83
Sample Type			N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Date			22 Feb 2007	08 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3760	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13800	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1170	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	656	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	64.7	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45.8	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	16	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.08 U	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	--	--	--	--	0.26	--	--	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.014	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	164	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	0.105	--	--	--	--	--	--	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	0.03 U	0.03 U	--	0.03 U	0.09	--	0.03 U	0.03 U	--	--	0.03 U	--	--	--	0.03	0.09	--	--	--
Acenaphthylene	0.15	µg/g	0.02 U	0.02 U	--	0.02 U	0.02	--	0.02 U	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.02 U	--	--	--
Anthracene	0.67	µg/g	0.02 U	0.02 U	--	0.02 U	0.07	--	0.02	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.16	--	--	--
Benzo(a)anthracene	0.5	µg/g	0.02 U	0.02 U	--	0.05	0.02 U	--	0.03	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.22	--	--	--
Benzo(a)pyrene	0.3	µg/g	0.02 U	0.02 U	--	0.04	0.02 U	--	0.02	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.15	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	0.02 U	0.02 U	--	0.06	0.02 U	--	0.03	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.23	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	0.02 U	0.02 U	--	0.07	0.02 U	--	0.02	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.17	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	0.02 U	0.02 U	--	0.02	0.02 U	--	0.02 U	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.1	--	--	--
Chrysene	7	µg/g	0.03	0.03	--	0.06	0.04	--	0.06	0.02	--	--	0.02 U	--	--	--	0.02 U	0.23	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	0.02 U	0.02 U	--	0.02 U	0.02 U	--	0.02 U	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.02 U	--	--	--
Fluoranthene	0.69	µg/g	0.02 U	0.02 U	--	0.1	0.06	--	0.05	0.03	--	--	0.02 U	--	--	--	0.02	0.69	--	--	--
Fluorene	62	µg/g	0.02 U	0.02 U	--	0.02 U	0.19	--	0.02 U	0.02 U	--	--	0.02 U	--	--	--	0.03	0.12	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	0.02 U	0.02 U	--	0.03	0.02 U	--	0.02 U	0.02 U	--	--	0.02 U	--	--	--	0.02 U	0.09	--	--	--
Naphthalene	0.6	µg/g	0.03 U	0.03 U	--	0.03 U	0.04	--	0.03	0.03 U	--	--	0.03 U	--	--	--	0.73	0.21	--	--	--
Phenanthrene	6.2	µg/g	0.06	0.06	--	0.06	0.5	--	0.07	0.02	--	--	0.02 U	--	--	--	0.02 U	0.77	--	--	--
Pyrene	78	µg/g	0.02	0.02	--	0.08	0.11	--	0.05	0.03	--	--	0.02 U	--	--	--	0.02	0.5	--	--	--
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	0.02 U	--	0.02 U	0.02 U	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	0.02 U	0.05	--	0.02 U	--	0.02 U	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	5	--	--	--	--	5	5	5	--	5	--	--	--	5	5	--	--	5
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	5	--	--	--	--	5	5	5	--	5	--	--	--	5	5	--	--	5
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	19	--	--	3600	--	10	10	--	--	10	--	--	--	10	38	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	19	--	--	3600	--	10	10	10	--	10	10	--	10	10	38	--	--	10
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	130	--	--	6200	--	360	100	--	--	50	--	--	--	75	2400	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	130	--	--	6200	--	360	100	450	--	50	55	--	240	75	2400	--	--	1400
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	50	--	--	50	--	140	50	75	--	50	90	--	260	50	130	--	--	180
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-45	BH07-45	BH07-45	BH07-46	BH07-46	BH07-47	BH07-47	BH07-48	BH07-48	BH07-49	BH07-49	BH07-50	BH07-50	BH07-51	BH07-51	BH07-52	BH07-52	BH07-52	BH07-52
Sample ID			OW07-45SS2	Dup#2	DUP#2	BH07-46 SS-1A	BH07-46 SS-2	BH07-47 SS-1	BH07-47 SS-2	BH07-48 SS-1	BH07-48 SS-2	BH07-49 SS-1	BH07-49 SS-2	BH07-50 SS-1	BH07-50 SS-2	BH07-51 SS-1	BH07-51 SS-2	BH07-52 SS-1	BH07-52	Dup#3	BH07-52 SS-2A
Start Depth (m)			1.22	1.22	1.22	0.05	1.22	0.05	1.22	0.1	1.22	0.05	1.22	0.05	1.22	0	1.22	0	0	0	1.22
End Depth (m)			1.78	1.78	1.78	1.22	1.68	1.22	1.8	1.22	1.42	0.3	1.83	1	1.67	1.22	2.06	1.22	2.01	1.22	1.83
Sample Type			N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Sample Date			22 Feb 2007	08 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	0.47 U	--	--	0.47 U	--	0.47 U	--	--	--	0.47 U	--	--	--	0.47 U	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	0.005 U	--	--	0.005 U	--	0.005 U	--	--	--	0.005 U	--	--	--	0.005 U	--	--	--	--
Chloromethane	NV	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,1-Dichloroethene	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,2-Dibromoethane	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,2-Dichloroethane	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,2-Dichloropropane	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,3-Dichloropropene	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	0.041 U	--	--	0.041 U	--	0.041 U	--	--	--	0.041 U	--	--	--	0.041 U	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	0.13 U	--	--	0.13 U	--	0.13 U	--	--	--	0.13 U	--	--	--	0.13 U	--	--	--	--
Bromodichloromethane	1.5	µg/g	--	0.003 U	--	--	0.003 U	--	0.003 U	--	--	--	0.003 U	--	--	--	0.003 U	--	--	--	--
Bromoform	0.27	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Bromomethane	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Carbon tetrachloride	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Chlorobenzene	2.4	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	0.004 U	--	--	0.004 U	--	0.004 U	--	--	--	0.004 U	--	--	--	0.004 U	--	--	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
Tetrachloroethene	0.28	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	0.003 U	--	--	0.003 U	--	0.003 U	--	--	--	0.003 U	--	--	--	0.003 U	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	0.003 U	--	--	0.003 U	--	0.003 U	--	--	--	0.003 U	--	--	--	0.003 U	--	--	--	--
Trichloroethylene	0.061	µg/g	--	0.004 U	--	--	0.004 U	--	0.004 U	--	--	--	0.004 U	--	--	--	0.004 U	--	--	--	--
Trichlorofluoromethane	4	µg/g	--	0.004 U	--	--	0.004 U	--	0.004 U	--	--	--	0.004 U	--	--	--	0.004 U	--	--	--	--
Vinyl Chloride	0.02	µg/g	--	0.002 U	--	--	0.002 U	--	0.002 U	--	--	--	0.002 U	--	--	--	0.002 U	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	BH07-45	BH07-45	BH07-45	BH07-46	BH07-46	BH07-47	BH07-47	BH07-48	BH07-48	BH07-49	BH07-49	BH07-50	BH07-50	BH07-51	BH07-51	BH07-52	BH07-52	BH07-52	BH07-52
			Sample ID	OW07-45SS2	Dup#2	DUP#2	BH07-46 SS-1A	BH07-46 SS-2	BH07-47 SS-1	BH07-47 SS-2	BH07-48 SS-1	BH07-48 SS-2	BH07-49 SS-1	BH07-49 SS-2	BH07-50 SS-1	BH07-50 SS-2	BH07-51 SS-1	BH07-51 SS-2	BH07-52 SS-1	BH07-52	Dup#3	BH07-52 SS-2A
			Start Depth (m)	1.22	1.22	1.22	0.05	1.22	0.05	1.22	0.1	1.22	0.05	1.22	0.05	1.22	0	1.22	0	0	0	1.22
			End Depth (m)	1.78	1.78	1.78	1.22	1.68	1.22	1.8	1.22	1.42	0.3	1.83	1	1.67	1.22	2.06	1.22	2.01	1.22	1.83
			Sample Type	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
			Sample Date	22 Feb 2007	08 Feb 2007	22 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	07 Mar 2007	08 Feb 2007	08 Feb 2007

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-53	BH07-53	BH07-53	BH07-54	BH07-54	BH07-55	BH07-56	BH07-56	BH07-57	BH07-57	BH07-57	BH07-58	BH07-58	BH07-59	BH07-59	BH07-60	BH07-60	BH07-61	BH07-61
		Sample ID	BH07-53 SS-1	BH07-53 SS-2	Dup#1	BH07-54 SS-1A	BH07-54 SS-2	BH07-55 SS-1B	BH07-56 SS-1A	BH07-56 SS-2	BH07-57 SS-1A	Dup#5	BH07-57 SS-2	BH07-58 SS-1A	BH07-58 SS-2	BH07-59 SS-1A	BH07-59 SS-1B	BH07-60 SS-1	BH07-60 SS-1B	BH07-61 SS-1A	BH07-61 SS-2
		Start Depth (m)	0	1.22	1.22	0.05	1.22	0.91	0.05	1.22	0.05	0.05	1.22	0.05	1.22	0.15	0.3	0	0.76	0.05	1.22
		End Depth (m)	0.15	1.47	1.47	0.61	2	1.22	0.91	1.67	1.22	1.22	1.88	0.61	1.63	0.3	0.69	0.15	1.19	1.22	1.37
		Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	0.007 U	0.007 U	0.007 U	--	--	0.007 U	0.007 U	0.007 U	0.007 U	--	--	0.007 U	--	0.007 U	--	0.007 U	--	0.007 U	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	0.006	0.003	0.003	0.1 U	0.1 U	0.008	0.002 U	0.007	0.003	--	--	0.002 U	--	0.007	--	0.002 U	--	0.003	--
Ethylbenzene	1.1	µg/g	0.003	0.002 U	0.002 U	0.05 U	0.05 U	0.004	0.002 U	0.003	0.002 U	--	--	0.002 U	--	0.003	--	0.002 U	--	0.002 U	--
Toluene	2.3	µg/g	0.016	0.005	0.005	0.08 U	0.08 U	0.017	0.002 U	0.017	0.004	--	--	0.002 U	--	0.016	--	0.002 U	--	0.002 U	--
Xylene, o	NV	µg/g	0.003	0.002 U	0.002 U	--	--	0.004	0.002 U	0.003	0.002 U	--	--	0.002 U	--	0.003	--	0.002 U	--	0.002 U	--
Xylenes, m & p	NV	µg/g	0.005	0.002 U	0.002 U	--	--	0.006	0.002 U	0.005	0.002 U	--	--	0.002 U	--	0.005	--	0.002 U	--	0.002 U	--
Xylenes, Total	3.1	µg/g	0.008	0.002 U	0.002 U	0.07 U	0.07 U	0.01	0.002 U	0.008	0.002 U	--	--	0.002 U	--	0.008	--	0.002 U	--	0.002 U	--
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	8.51	--	8.61	--	8.29	--	--	--	8.02	--	--	--	--	--	--	8.13	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	18.6	0.8 U	2.3	5.6	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.9	0.8 U	3	0.8 U
Arsenic	18	µg/g	2.8	3.9	3.3	7.6	4.9	6.9	9.6	1.6	8.2	7.5	3.5	3.5	0.6	0.7	0.6	3.6	8.1	5.7	6.5
Barium	390	µg/g	19.1	10.6	8.4	100	34.5	29.1	102	23.2	260	277	24	25	19.7	7.9	14.3	24.7	39.5	50.4	137
Beryllium	4	µg/g	0.2 U	0.2 U	0.2 U	0.7	0.2 U	0.3	0.3	0.2	0.6	0.4	0.3	0.2 U	0.3	0.2 U	0.2 U	0.2 U	0.4	0.3	0.6
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	0.6	0.5	0.3	1.3	2.3	0.9	1.8	0.7	2	2.3	0.8	0.8	0.2	0.2 U	0.2	0.3	0.3	0.5	2.9
Chromium	160	µg/g	7.3	5	3.5	16.2	5.9	9.2	23.5	9.3	15.4	14	9.6	8.8	6.1	3.4	5.9	8.5	12.1	7.6	14.4
Cobalt	22	µg/g	2.3	2.2	1.6	7.4	5.1	3.2	6.2	3.2	7.3	6.6	4.3	2.6	1.6	0.7	1.5	1.8	4.6	3.1	6.7
Copper	140	µg/g	9.3	17.2	12.4	25.4	23.8	11.4	283	13.1	33.5	62.1	20.4	54.7	3.3	2.1	2.5	22.9	5.8	31.6	39.9
Lead	120	µg/g	72.4	391	158	150	119	82.2	545	92.4	232	243	176	75.6	33	13	38.7	71.5	132	155	123
Molybdenum	6.9	µg/g	0.7	0.4	0.4	0.9	0.6	0.6	2.5	0.3 U	0.9	0.9	0.3 U	0.7	0.3 U	0.5	0.3 U	0.9	0.5	0.6	0.7
Nickel	100	µg/g	6.5	7.3	5.2	17	18	9.7	31.2	11.5	18.7	16.2	12.1	7.5	5	2.3	4.7	7.8	10	8	22.7
Selenium	2.4	µg/g	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8
Silver	20	µg/g	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3	0.2 U
Thallium	1	µg/g	0.2 U	0.2 U	0.2 U	0.3	0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	µg/g	10.3	6.8	5.3	30.4	9.6	17.7	27.5	13.2	26	21.4	15.7	12.9	8.1	4.5	7.6	8.6	21.4	10.4	21.1
Zinc	340	µg/g	220	248	189	500	613	328	472	664	679	805	628	310	254	79	307	102	483	771	782
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-53	BH07-53	BH07-53	BH07-54	BH07-54	BH07-55	BH07-56	BH07-56	BH07-57	BH07-57	BH07-57	BH07-58	BH07-58	BH07-59	BH07-59	BH07-60	BH07-60	BH07-61	BH07-61
		Sample ID	BH07-53 SS-1	BH07-53 SS-2	Dup#1	BH07-54 SS-1A	BH07-54 SS-2	BH07-55 SS-1B	BH07-56 SS-1A	BH07-56 SS-2	BH07-57 SS-1A	Dup#5	BH07-57 SS-2	BH07-58 SS-1A	BH07-58 SS-2	BH07-59 SS-1A	BH07-59 SS-1B	BH07-60 SS-1	BH07-60 SS-1B	BH07-61 SS-1A	BH07-61 SS-2
		Start Depth (m)	0	1.22	1.22	0.05	1.22	0.91	0.05	1.22	0.05	0.05	1.22	0.05	1.22	0.15	0.3	0	0.76	0.05	1.22
		End Depth (m)	0.15	1.47	1.47	0.61	2	1.22	0.91	1.67	1.22	1.22	1.88	0.61	1.63	0.3	0.69	0.15	1.19	1.22	1.37
		Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	~~NV~~ 1800 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b.]	µg/g	77.4	--	122	--	46.3	--	--	--	9.99	--	--	--	--	--	--	38.1	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	0.4 U	--	0.4 U	--	0.4 U	--	--	--	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--
Cyanide, Free	0.051	µg/g	0.08 U	--	0.08 U	--	0.08 U	--	--	--	0.08 U	--	--	--	--	--	--	0.08 U	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	0.344	--	0.339	--	0.235	--	--	--	0.212	--	--	--	--	--	--	0.226	--	--	--
Mercury	0.27	µg/g	0.027	--	0.011 U	--	0.022	--	--	--	0.319	--	--	--	--	--	--	0.027	--	--	--
Sodium	~~NV~~ 200 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	0.275	--	0.513	--	0.202	--	--	--	0.066	--	--	--	--	--	--	0.182	--	--	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	0.03 U	--	0.03 U	--	0.03 U	0.03 U	0.08	--	0.03 U	--	--	0.03 U	--	0.05	--	0.03 U	--	0.03 U	--
Acenaphthylene	0.15	µg/g	0.02 U	--	0.02 U	--	0.02 U	0.02 U	0.03	--	0.02 U	--	--	0.02 U	--	0.02 U	--	0.08	--	0.02 U	--
Anthracene	0.67	µg/g	0.02	--	0.02 U	--	0.02 U	0.02 U	0.1	--	0.02 U	--	--	0.02 U	--	0.11	--	0.04	--	0.03	--
Benzo(a)anthracene	0.5	µg/g	0.06	--	0.02 U	--	0.05	0.02 U	0.38	--	0.07	--	--	0.03	--	0.19	--	0.11	--	0.12	--
Benzo(a)pyrene	0.3	µg/g	0.05	--	0.02 U	--	0.04	0.02 U	0.35	--	0.08	--	--	0.03	--	0.14	--	0.14	--	0.09	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	0.08	--	0.02 U	--	0.07	0.02 U	0.54	--	0.1	--	--	0.05	--	0.19	--	0.21	--	0.13	--
Benzo(g,h,i)perylene	6.6	µg/g	0.04	--	0.02 U	--	0.04	0.02 U	0.71	--	0.12	--	--	0.04	--	0.07	--	0.11	--	0.06	--
Benzo(k)fluoranthene	0.78	µg/g	0.03	--	0.02 U	--	0.03	0.02 U	0.18	--	0.05	--	--	0.02 U	--	0.08	--	0.08	--	0.06	--
Chrysene	7	µg/g	0.07	--	0.02 U	--	0.05	0.02 U	0.49	--	0.08	--	--	0.06	--	0.2	--	0.12	--	0.15	--
Dibenzo(a,h)anthracene	0.1	µg/g	0.02 U	--	0.02 U	--	0.02 U	0.02 U	0.02	--	0.02 U	--	--	0.02 U	--	0.02 U	--	0.02 U	--	0.02 U	--
Fluoranthene	0.69	µg/g	0.14	--	0.02 U	--	0.11	0.02 U	0.84	--	0.09	--	--	0.06	--	0.52	--	0.26	--	0.3	--
Fluorene	62	µg/g	0.02 U	--	0.02 U	--	0.02 U	0.02 U	0.08	--	0.02 U	--	--	0.02 U	--	0.05	--	0.02	--	0.02	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	0.03	--	0.02 U	--	0.03	0.02 U	0.31	--	0.06	--	--	0.02	--	0.08	--	0.11	--	0.06	--
Naphthalene	0.6	µg/g	0.03 U	--	0.03 U	--	0.03 U	0.03 U	0.22	--	0.03	--	--	0.11	--	0.03	--	0.07	--	0.03	--
Phenanthrene	6.2	µg/g	0.09	--	0.02 U	--	0.08	0.02 U	0.76	--	0.04	--	--	0.17	--	0.44	--	0.1	--	0.21	--
Pyrene	78	µg/g	0.12	--	0.02 U	--	0.09	0.02 U	0.71	--	0.08	--	--	0.05	--	0.41	--	0.22	--	0.24	--
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	0.02 U	--	0.02 U	--	--	0.02 U	--	0.02 U	--	--	--	0.02 U	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	5	--	5	5	5	5	--	5	--	--	5	--	5	--	5	--	5	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	5	--	5	5	5	5	--	5	--	--	5	--	5	--	5	--	5	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	10	--	10	--	10	10	10	--	10	--	--	10	--	10	--	10	--	10	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10	10	10	10	10	10	10	--	10	--	--	10	--	10	--	10	--	10	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	50	--	50	--	50	50	330	--	130	--	--	110	--	50	--	400	--	200	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	50	50	50	50	50	50	330	--	130	--	--	110	--	50	--	400	--	200	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50	50	50	50	50	50	140	--	82	--	--	78	--	50	--	260	--	81	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-53	BH07-53	BH07-53	BH07-54	BH07-54	BH07-55	BH07-56	BH07-56	BH07-57	BH07-57	BH07-57	BH07-58	BH07-58	BH07-59	BH07-59	BH07-60	BH07-60	BH07-61	BH07-61
		Sample ID	BH07-53 SS-1	BH07-53 SS-2	Dup#1	BH07-54 SS-1A	BH07-54 SS-2	BH07-55 SS-1B	BH07-56 SS-1A	BH07-56 SS-2	BH07-57 SS-1A	Dup#5	BH07-57 SS-2	BH07-58 SS-1A	BH07-58 SS-2	BH07-59 SS-1A	BH07-59 SS-1B	BH07-60 SS-1	BH07-60 SS-1B	BH07-61 SS-1A	BH07-61 SS-2
		Start Depth (m)	0	1.22	1.22	0.05	1.22	0.91	0.05	1.22	0.05	0.05	1.22	0.05	1.22	0.15	0.3	0	0.76	0.05	1.22
		End Depth (m)	0.15	1.47	1.47	0.61	2	1.22	0.91	1.67	1.22	1.22	1.88	0.61	1.63	0.3	0.69	0.15	1.19	1.22	1.37
		Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	0.47 U	0.47 U	0.47 U	--	--	0.47 U	0.47 U	0.47 U	0.47 U	--	--	0.47 U	--	0.47 U	--	0.47 U	--	0.47 U	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	0.005 U	0.005 U	0.005 U	--	--	0.005 U	0.005 U	0.005 U	0.005 U	--	--	0.005 U	--	0.005 U	--	0.005 U	--	0.005 U	--
Chloromethane	NV	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,1,1-Trichloroethane	0.38	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,1-Dichloroethene	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,2-Dibromoethane	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,2-Dichlorobenzene	1.2	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,2-Dichloroethane	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,2-Dichloropropane	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,3-Dichlorobenzene	4.8	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,3-Dichloropropene	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,4-Dichlorobenzene	0.083	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	0.041 U	0.041 U	0.041 U	--	--	0.041 U	0.041 U	0.041 U	0.041 U	--	--	0.041 U	--	0.041 U	--	0.041 U	--	0.041 U	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	0.13 U	0.13 U	0.13 U	--	--	0.13 U	0.13 U	0.13 U	0.13 U	--	--	0.13 U	--	0.13 U	--	0.13 U	--	0.13 U	--
Bromodichloromethane	1.5	µg/g	0.003 U	0.003 U	0.003 U	--	--	0.003 U	0.003 U	0.003 U	0.003 U	--	--	0.003 U	--	0.003 U	--	0.003 U	--	0.003 U	--
Bromoform	0.27	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Bromomethane	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Carbon tetrachloride	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Chlorobenzene	2.4	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
cis-1,2-Dichloroethene	1.9	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	0.004 U	0.004 U	0.004 U	--	--	0.004 U	0.004 U	0.004 U	0.004 U	--	--	0.004 U	--	0.004 U	--	0.004 U	--	0.004 U	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
Tetrachloroethene	0.28	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--
trans-1,2-Dichloroethene	0.084	µg/g	0.003 U	0.003 U	0.003 U	--	--	0.003 U	0.003 U	0.003 U	0.003 U	--	--	0.003 U	--	0.003 U	--	0.003 U	--	0.003 U	--
trans-1,3-Dichloropropene	NV	µg/g	0.003 U	0.003 U	0.003 U	--	--	0.003 U	0.003 U	0.003 U	0.003 U	--	--	0.003 U	--	0.003 U	--	0.003 U	--	0.003 U	--
Trichloroethylene	0.061	µg/g	0.004 U	0.004 U	0.004 U	--	--	0.004 U	0.004 U	0.004 U	0.004 U	--	--	0.004 U	--	0.004 U	--	0.004 U	--	0.004 U	--
Trichlorofluoromethane	4	µg/g	0.004 U	0.004 U	0.004 U	--	--	0.004 U	0.004 U	0.004 U	0.004 U	--	--	0.004 U	--	0.004 U	--	0.004 U	--	0.004 U	--
Vinyl Chloride	0.02	µg/g	0.002 U	0.002 U	0.002 U	--	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	0.002 U	--	0.002 U	--	0.002 U	--	0.002 U	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-53	BH07-53	BH07-53	BH07-54	BH07-54	BH07-55	BH07-56	BH07-56	BH07-57	BH07-57	BH07-57	BH07-58	BH07-58	BH07-59	BH07-59	BH07-60	BH07-60	BH07-61	BH07-61
		Sample ID	BH07-53 SS-1	BH07-53 SS-2	Dup#1	BH07-54 SS-1A	BH07-54 SS-2	BH07-55 SS-1B	BH07-56 SS-1A	BH07-56 SS-2	BH07-57 SS-1A	Dup#5	BH07-57 SS-2	BH07-58 SS-1A	BH07-58 SS-2	BH07-59 SS-1A	BH07-59 SS-1B	BH07-60 SS-1	BH07-60 SS-1B	BH07-61 SS-1A	BH07-61 SS-2
		Start Depth (m)	0	1.22	1.22	0.05	1.22	0.91	0.05	1.22	0.05	0.05	1.22	0.05	1.22	0.15	0.3	0	0.76	0.05	1.22
		End Depth (m)	0.15	1.47	1.47	0.61	2	1.22	0.91	1.67	1.22	1.22	1.88	0.61	1.63	0.3	0.69	0.15	1.19	1.22	1.37
		Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-62	BH07-62	BH07-62	BH07-63	BH07-63	BH07-64	BH07-64	BH07-65	BH07-65	BH07-66	BH07-66	BH07-66	BH07-67	BH07-67	BH07-68	BH07-68	BH07-69	BH07-69	BH07-70
		Sample ID	BH07-62 SS-1A	BH07-62 SS-1B	Dup#6	BH07-63 SS-1A	BH07-63 SS-2	BH07-64 SS-1A	BH07-64 SS-2	BH07-65 SS-1A	BH07-65 SS-2	BH07-66	BH07-66 SS-1A	BH07-66 SS-2	BH07-67 SS1A	BH07-67 SS2	BH07-68 SS1	BH07-68 SS1A	BH07-69 SS1A	BH07-69 SS2	BH07-70 SS1A
		Start Depth (m)	0.05	0.61	0.61	0.05	1.22	0.05	1.22	0.05	0.61	0	0.05	1.22	0.05	1.22	0	0.05	0.08	1.22	0.05
		End Depth (m)	0.61	1.22	1.22	1.22	1.88	1.22	2.29	0.61	2.03	1.32	1.22	1.32	0.91	1.37	0.05	0.61	1.22	1.42	1.22
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	07 Mar 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	0.007 U	--	0.007 U	--	0.007 U	--	--	0.007 U	--	--	--	0.08 U	0.007 U	--	--	0.007 U	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	--	0.002 U	--	0.002 U	0.1 U	0.002 U	--	0.1 U	0.003	--	0.26	--	0.03 U	0.004	0.1 U	--	0.003	--	0.1 U
Ethylbenzene	1.1	µg/g	--	0.002 U	--	0.002 U	0.05 U	0.002 U	--	0.05 U	0.002 U	--	4.1	--	0.15	0.002 U	0.19	--	0.002 U	--	0.05 U
Toluene	2.3	µg/g	--	0.003	--	0.002 U	0.08 U	0.002 U	--	0.08 U	0.007	--	0.55	--	0.05 U	0.007	0.08 U	--	0.002 U	--	0.08 U
Xylene, o	NV	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.55	0.004	--	--	0.002 U	--	--
Xylenes, m & p	NV	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002	--	--	--	0.27	0.003	--	--	0.002 U	--	--
Xylenes, Total	3.1	µg/g	--	0.002 U	--	0.002 U	0.07 U	0.002 U	--	0.07 U	0.002	--	3.9	--	0.83	0.007	0.36	--	0.002 U	--	0.07 U
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	8.27	7.79	--	--	7.99	7.76	--	--	--	--	--	--	--	--	--	--	8.17	--	7.76
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	384	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	0.8 U	1.5	1.2	2.2	0.8 U	0.8 U	0.8 U	1.1	0.8 U	--	1.4	0.8 U	2.1	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Arsenic	18	µg/g	2.9	6.4	5.9	7.4	2.7	2.4	4.7	5.2	7.2	--	6.8	1.3	23	1.4	0.8	4.7	2.9	0.5	3.5
Barium	390	µg/g	36	135	151	73.7	19	21.7	36.4	62.9	24.1	--	32.4	14.9	156	16	9.6	80.9	32.1	14.6	64
Beryllium	4	µg/g	0.2 U	0.4	0.4	0.7	0.2	0.2 U	0.3	0.3	0.3	--	0.2	0.2 U	0.4	0.2	0.2 U	0.5	0.3	0.2 U	0.4
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	0.5	1.5	1.4	0.2	0.4	0.2 U	0.6	1.4	0.8	--	0.4	0.4	2.1	0.5	0.2 U	0.4	0.2 U	0.3	1
Chromium	160	µg/g	5.6	11.8	11.5	19.9	8	4.3	8.8	9.3	7.9	--	14.3	7.1	13.2	5.5	3.4	10.2	9.4	5.8	11.3
Cobalt	22	µg/g	3.2	6	5.7	5.7	2.5	1.5	3.9	4.1	3.5	--	7.7	2.3	2.9	3.6	0.7	4.2	3.6	1.8	3.4
Copper	140	µg/g	20.3	22.3	23.4	45.4	5.4	9.3	20	26.1	15	--	38.3	8.2	63.1	13.5	5.4	17.2	9.8	4.7	26.7
Lead	120	µg/g	78.3	199	200	63.7	61.4	34.8	73	10100	105	--	43.3	53	336	37.5	60.4	72.5	25.5	29.4	110
Molybdenum	6.9	µg/g	0.5	0.8	0.8	1.8	0.3	0.3	0.7	0.7	0.6	--	1.2	0.3	1.4	0.3 U	0.3 U	0.8	0.3 U	0.3 U	0.5
Nickel	100	µg/g	8.2	11.9	11.8	19.2	7.3	3.5	11.9	13.2	10.2	--	15.4	6.1	9.8	8.9	2.8	11.6	6.8	5.3	10.3
Selenium	2.4	µg/g	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	--	0.8 U	0.8 U	1	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8
Silver	20	µg/g	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	0.2 U	0.2	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	0.5	--	--	--	--	--	--	--	--	--
Vanadium	86	µg/g	9.4	19.3	17.3	28.1	14	6.8	15.7	14.9	12.7	--	28.1	10	16.2	12.6	4.1	19.6	15.9	7.6	19.5
Zinc	340	µg/g	230	479	527	83.1	354	51.5	563	426	514	--	218	349	379	538	81.8	200	43.7	275	699
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	65200	--	--	--	--	--	--	--	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	34600	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-62	BH07-62	BH07-62	BH07-63	BH07-63	BH07-64	BH07-64	BH07-65	BH07-65	BH07-66	BH07-66	BH07-66	BH07-67	BH07-67	BH07-68	BH07-68	BH07-69	BH07-69	BH07-70
		Sample ID	BH07-62 SS-1A	BH07-62 SS-1B	Dup#6	BH07-63 SS-1A	BH07-63 SS-2	BH07-64 SS-1A	BH07-64 SS-2	BH07-65 SS-1A	BH07-65 SS-2	BH07-66	BH07-66 SS-1A	BH07-66 SS-2	BH07-67 SS1A	BH07-67 SS2	BH07-68 SS1	BH07-68 SS1A	BH07-69 SS1A	BH07-69 SS2	BH07-70 SS1A
		Start Depth (m)	0.05	0.61	0.61	0.05	1.22	0.05	1.22	0.05	0.61	0	0.05	1.22	0.05	1.22	0	0.05	0.08	1.22	0.05
		End Depth (m)	0.61	1.22	1.22	1.22	1.88	1.22	2.29	0.61	2.03	1.32	1.22	1.32	0.91	1.37	0.05	0.61	1.22	1.42	1.22
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	07 Mar 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	5160	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	--	--	48200	--	--	--	--	--	--	--	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	740	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	555	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	39.3	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	272	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	62.6	14.6	--	--	29.4	1.78	--	--	--	--	--	--	--	--	--	--	6.59	--	9.05
Chromium, Hexavalent (Cr6+)	8	µg/g	0.4 U	0.4 U	--	--	0.4 U	0.4 U	--	--	--	--	--	--	--	--	--	--	0.4 U	--	0.4 U
Cyanide, Free	0.051	µg/g	0.08 U	0.08 U	--	--	0.08 U	0.08 U	--	--	--	--	--	--	--	--	--	--	0.08 U	--	0.08 U
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	0.231	0.208	--	--	0.2	0.074	--	--	--	--	--	--	--	--	--	--	0.152	--	0.208
Mercury	0.27	µg/g	0.013	0.067	--	--	0.027	0.011 U	--	--	--	--	--	--	--	--	--	--	0.012	--	0.064
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	154	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	0.292	0.073	--	--	0.134	0.062	--	--	--	--	--	--	--	--	--	--	0.057	--	0.623
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	0.03 U	--	--	--	0.03 U	--	0.03 U	--	--	0.03 U	--	--	--	0.03 U	--	0.03 U	--	0.03 U
Acenaphthylene	0.15	µg/g	--	0.02	--	--	--	0.02 U	--	0.02 U	--	--	0.02 U	--	--	--	0.02 U	--	0.02 U	--	0.02 U
Anthracene	0.67	µg/g	--	0.02 U	--	--	--	0.03	--	0.04	--	--	0.02 U	--	--	--	0.12	--	0.02 U	--	0.02 U
Benzo(a)anthracene	0.5	µg/g	--	0.09	--	--	--	0.37	--	0.13	--	--	0.03	--	--	--	0.09	--	0.02 U	--	0.07
Benzo(a)pyrene	0.3	µg/g	--	0.11	--	--	--	0.44	--	0.1	--	--	0.02	--	--	--	0.13	--	0.02 U	--	0.06
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	0.17	--	--	--	0.64	--	0.15	--	--	0.03	--	--	--	0.03	--	0.02	--	0.09
Benzo(g,h,i)perylene	6.6	µg/g	--	0.17	--	--	--	0.37	--	0.08	--	--	0.06	--	--	--	0.02 U	--	0.02 U	--	0.04
Benzo(k)fluoranthene	0.78	µg/g	--	0.05	--	--	--	0.22	--	0.06	--	--	0.02 U	--	--	--	0.1	--	0.02 U	--	0.04
Chrysene	7	µg/g	--	0.14	--	--	--	0.45	--	0.17	--	--	0.06	--	--	--	0.16	--	0.03	--	0.09
Dibenzo(a,h)anthracene	0.1	µg/g	--	0.02 U	--	--	--	0.07	--	0.02 U	--	--	0.02 U	--	--	--	0.31	--	0.02 U	--	0.02 U
Fluoranthene	0.69	µg/g	--	0.18	--	--	--	0.53	--	0.34	--	--	0.05	--	--	--	0.17	--	0.03	--	0.17
Fluorene	62	µg/g	--	0.02 U	--	--	--	0.02 U	--	0.02	--	--	0.02 U	--	--	--	0.02	--	0.02 U	--	0.02 U
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	0.11	--	--	--	0.3	--	0.06	--	--	0.03	--	--	--	0.02 U	--	0.02 U	--	0.03
Naphthalene	0.6	µg/g	--	0.03	--	--	--	0.04	--	0.07	--	--	0.03	--	--	--	0.03 U	--	0.03 U	--	0.03 U
Phenanthrene	6.2	µg/g	--	0.08	--	--	--	0.19	--	0.25	--	--	0.06	--	--	--	0.1	--	0.08	--	0.09
Pyrene	78	µg/g	--	0.15	--	--	--	0.46	--	0.27	--	--	0.04	--	--	--	0.03	--	0.02	--	0.14
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	0.02 U	--	--	--	--	--	0.02 U	0.02 U	--	0.02 U	0.02 U	1.5	0.02 U	0.07	0.05	--	--	0.02 U
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	5	5	--	5	--	--	5	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	5	5	--	5	--	--	11	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	10	--	--	--	10	--	10	--	--	10	--	--	--	--	--	10	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	10	--	--	10	10	--	10	--	--	10	10	10	--	--	10	10	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	50	--	--	--	50	--	52	--	--	310	--	--	--	--	--	50	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	50	--	--	50	50	--	52	--	--	310	50	13000	--	--	350	50	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	50	--	--	50	50	--	50	--	--	68	50	7300	--	--	130	50	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH07-62	BH07-62	BH07-62	BH07-63	BH07-63	BH07-64	BH07-64	BH07-65	BH07-65	BH07-66	BH07-66	BH07-66	BH07-67	BH07-67	BH07-68	BH07-68	BH07-69	BH07-69	BH07-70
		Sample ID	BH07-62 SS-1A	BH07-62 SS-1B	Dup#6	BH07-63 SS-1A	BH07-63 SS-2	BH07-64 SS-1A	BH07-64 SS-2	BH07-65 SS-1A	BH07-65 SS-2	BH07-66	BH07-66 SS-1A	BH07-66 SS-2	BH07-67 SS1A	BH07-67 SS2	BH07-68 SS1	BH07-68 SS1A	BH07-69 SS1A	BH07-69 SS2	BH07-70 SS1A
		Start Depth (m)	0.05	0.61	0.61	0.05	1.22	0.05	1.22	0.05	0.61	0	0.05	1.22	0.05	1.22	0	0.05	0.08	1.22	0.05
		End Depth (m)	0.61	1.22	1.22	1.22	1.88	1.22	2.29	0.61	2.03	1.32	1.22	1.32	0.91	1.37	0.05	0.61	1.22	1.42	1.22
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	07 Mar 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	0.47 U	--	0.47 U	--	0.47 U	--	--	0.47 U	--	--	--	0.26 U	0.47 U	--	--	0.47 U	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	0.005 U	--	0.005 U	--	0.005 U	--	--	0.005 U	--	--	--	0.08 U	0.005 U	--	--	0.005 U	--	--
Chloromethane	NV	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.11 U	0.002 U	--	--	0.002 U	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.04 U	0.002 U	--	--	0.002 U	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.04 U	0.002 U	--	--	0.002 U	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.02 U	0.002 U	--	--	0.002 U	--	--
1,1-Dichloroethene	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,2-Dibromoethane	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.04 U	0.002 U	--	--	0.002 U	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,2-Dichloroethane	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.03 U	0.002 U	--	--	0.002 U	--	--
1,2-Dichloropropane	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.03 U	0.002 U	--	--	0.002 U	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,3-Dichloropropene	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	0.041 U	--	0.041 U	--	0.041 U	--	--	0.041 U	--	--	--	0.29 U	0.041 U	--	--	0.041 U	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	0.13 U	--	0.14	--	0.13 U	--	--	0.13 U	--	--	--	0.47 U	0.13 U	--	--	0.13 U	--	--
Bromodichloromethane	1.5	µg/g	--	0.003 U	--	0.003 U	--	0.003 U	--	--	0.003 U	--	--	--	0.04 U	0.003 U	--	--	0.003 U	--	--
Bromoform	0.27	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.03 U	0.002 U	--	--	0.002 U	--	--
Bromomethane	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.09 U	0.002 U	--	--	0.002 U	--	--
Carbon tetrachloride	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
Chlorobenzene	2.4	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.04 U	0.002 U	--	--	0.002 U	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.02 U	0.002 U	--	--	0.002 U	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	0.004 U	--	0.004 U	--	0.004 U	--	--	0.004 U	--	--	--	0.06 U	0.004 U	--	--	0.004 U	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
Tetrachloroethene	0.28	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.05 U	0.002 U	--	--	0.002 U	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	0.003 U	--	0.003 U	--	0.003 U	--	--	0.003 U	--	--	--	0.05 U	0.003 U	--	--	0.003 U	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	0.003 U	--	0.003 U	--	0.003 U	--	--	0.003 U	--	--	--	0.04 U	0.003 U	--	--	0.003 U	--	--
Trichloroethylene	0.061	µg/g	--	0.004 U	--	0.004 U	--	0.004 U	--	--	0.004 U	--	--	--	0.03 U	0.004 U	--	--	0.004 U	--	--
Trichlorofluoromethane	4	µg/g	--	0.004 U	--	0.004 U	--	0.004 U	--	--	0.004 U	--	--	--	0.08 U	0.004 U	--	--	0.004 U	--	--
Vinyl Chloride	0.02	µg/g	--	0.002 U	--	0.002 U	--	0.002 U	--	--	0.002 U	--	--	--	0.1 U	0.002 U	--	--	0.002 U	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	BH07-62	BH07-62	BH07-62	BH07-63	BH07-63	BH07-64	BH07-64	BH07-65	BH07-65	BH07-66	BH07-66	BH07-66	BH07-67	BH07-67	BH07-68	BH07-68	BH07-69	BH07-69	BH07-70
			Sample ID	BH07-62 SS-1A	BH07-62 SS-1B	Dup#6	BH07-63 SS-1A	BH07-63 SS-2	BH07-64 SS-1A	BH07-64 SS-2	BH07-65 SS-1A	BH07-65 SS-2	BH07-66	BH07-66 SS-1A	BH07-66 SS-2	BH07-67 SS1A	BH07-67 SS2	BH07-68 SS1	BH07-68 SS1A	BH07-69 SS1A	BH07-69 SS2	BH07-70 SS1A
			Start Depth (m)	0.05	0.61	0.61	0.05	1.22	0.05	1.22	0.05	0.61	0	0.05	1.22	0.05	1.22	0	0.05	0.08	1.22	0.05
			End Depth (m)	0.61	1.22	1.22	1.22	1.88	1.22	2.29	0.61	2.03	1.32	1.22	1.32	0.91	1.37	0.05	0.61	1.22	1.42	1.22
			Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	08 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	08 Feb 2007	08 Feb 2007	09 Feb 2007	09 Feb 2007	07 Mar 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007	09 Feb 2007

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-70	BH07-71	BH07-71	BH08	BH08	BH08	BH13-40	BH17-200	BH17-200	BH17-200	BH17-200	BH17-201	BH17-201	BH17-201	BH17-202	BH17-202	BH17-202	BH17-202	BH17-203
Sample ID			BH07-70 SS2	BH07-71 SS1A	BH07-71 SS2	BH8-SS1	BH15-SS1	BH8-SS2	BH13-40	BH17-200-3-3.5	BH17-200-3.5-4	BH17-200-4-6	BH17-200-6-6.5	BH17-201-0-1	BH17-201-0-2	BH17-201-2-3	BH17-202-0-2	BH17-202-2-4	BH17-202-4-6	BH17-202-6-7	BH17-203-0-2
Start Depth (m)			1.22	0.05	1.22	0	1	1	1.83	0.91	1.07	1.22	1.83	0	0	0.61	0	0.61	1.22	1.83	0
End Depth (m)			1.73	1.22	1.32	0.15	1.15	1.15	2.44	1.07	1.22	1.83	1.98	0.3	0.61	0.91	0.61	1.22	1.83	2.13	0.61
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			09 Feb 2007	09 Feb 2007	09 Feb 2007	08 May 1998	08 May 1998	08 May 1998	12 Dec 2013	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	11 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	0.007 U	--	--	--	--	--	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	0.14 U	--	0.14 U	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	1 U	--	1 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.0068 U	--	0.0068 U	--	--	--	--	0.0068 U	--	0.0068 U	0.0068 U
Ethylbenzene	1.1	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.018 U	--	0.018 U	--	--	--	--	0.018 U	--	0.018 U	0.018 U
Toluene	2.3	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.08 U	--	0.08 U	--	--	--	--	0.08 U	--	0.08 U	0.08 U
Xylene, o	NV	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	0.02 U	0.02 U
Xylenes, m & p	NV	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.03 U	--	0.03 U	--	--	--	--	0.03 U	--	0.03 U	0.03 U
Xylenes, Total	3.1	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	9	25.7	13.1	5.03	7.43	4.01	7.99	3.8	7.6	6.64	5.6	5.41	11.1
pH	NV	pH UNITS	--	7.95	--	7.81	8.64	7.78	--	7.39	--	8.52	--	--	7.71	7.84	8.16	--	8.57	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	8.7	--	4.6	--	--	13.9	3.4	39.7	--	5.8	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	2.4	--	2.4	--	--	3.2	1.1	1.8	--	1.7	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	2.1	--	4.1	--	--	1.8	1.7	3.1	--	4.6	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	0.8 U	0.8 U	0.8 U	--	--	--	0.2 U	1 U	--	1 U	--	--	3.3	1 U	1.5	--	1 U	--	--
Arsenic	18	µg/g	2.3	3.4	1.8	--	--	--	4.9	12.4	--	2	--	--	11.3	2.8	3.2	--	9.3	--	--
Barium	390	µg/g	38.7	56.3	11.2	--	--	--	11	92.2	--	12.3	--	--	85.1	24	26.3	--	17.9	--	--
Beryllium	4	µg/g	0.2 U	0.3	0.2 U	--	--	--	0.2 U	0.51	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--
Boron	120	µg/g	--	--	--	--	--	--	5 U	9.9	--	8.6	--	--	6.7	5 U	5.7	--	6.7	--	--
Cadmium	1.2	µg/g	0.4	0.2 U	0.2 U	--	--	--	0.65	1.47	--	0.5 U	--	--	1.44	0.5 U	0.5 U	--	1.29	--	--
Chromium	160	µg/g	77.5	6.3	3.3	--	--	--	5.9	17.3	--	7.9	--	--	15.3	4.2	12.2	--	7.9	--	--
Cobalt	22	µg/g	12.7	3.4	0.8	--	--	--	4.1	8	--	2.1	--	--	4.2	4.1	3.2	--	3.8	--	--
Copper	140	µg/g	17.1	8.9	3	--	--	--	16	15.6	--	7	--	--	77.4	28.1	10.2	--	23.5	--	--
Lead	120	µg/g	67	45.3	11	--	--	--	30	134	--	50.3	--	--	282	29.1	77.9	--	95.6	--	--
Molybdenum	6.9	µg/g	0.4	0.4	0.3 U	--	--	--	0.5 U	1.2	--	1 U	--	--	1.2	1 U	1 U	--	1 U	--	--
Nickel	100	µg/g	46.5	6.9	3.4	--	--	--	10	11.5	--	6.1	--	--	15.3	10.2	8.4	--	10.3	--	--
Selenium	2.4	µg/g	0.8 U	0.8 U	0.8 U	--	--	--	0.5 U	1 U	--	1 U	--	--	1 U	1 U	1 U	--	1 U	--	--
Silver	20	µg/g	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--
Thallium	1	µg/g	0.2 U	0.2 U	0.2 U	--	--	--	0.087	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--
Uranium	23	µg/g	--	--	--	--	--	--	0.64	1 U	--	1 U	--	--	1 U	1 U	1 U	--	1 U	--	--
Vanadium	86	µg/g	35.8	12.8	3.8	--	--	--	8.9	38.1	--	12.6	--	--	27.3	17.3	20.7	--	17.9	--	--
Zinc	340	µg/g	1110	34.9	164	--	--	--	620	722	--	335	--	--	1140	446	53.2	--	548	--	--
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	38300	--	185000	--	--	52900	35000	16100	--	156000	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	19800	--	75200	--	--	27000	22700	5860	--	63600	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-70	BH07-71	BH07-71	BH08	BH08	BH08	BH13-40	BH17-200	BH17-200	BH17-200	BH17-200	BH17-201	BH17-201	BH17-201	BH17-202	BH17-202	BH17-202	BH17-202	BH17-203
Sample ID			BH07-70 SS2	BH07-71 SS1A	BH07-71 SS2	BH8-SS1	BH15-SS1	BH8-SS2	BH13-40	BH17-200-3-3.5	BH17-200-3.5-4	BH17-200-4-6	BH17-200-6-6.5	BH17-201-0-1	BH17-201-0-2	BH17-201-2-3	BH17-202-0-2	BH17-202-2-4	BH17-202-4-6	BH17-202-6-7	BH17-203-0-2
Start Depth (m)			1.22	0.05	1.22	0	1	1	1.83	0.91	1.07	1.22	1.83	0	0	0.61	0	0.61	1.22	1.83	0
End Depth (m)			1.73	1.22	1.32	0.15	1.15	1.15	2.44	1.07	1.22	1.83	1.98	0.3	0.61	0.91	0.61	1.22	1.83	2.13	0.61
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			09 Feb 2007	09 Feb 2007	09 Feb 2007	08 May 1998	08 May 1998	08 May 1998	12 Dec 2013	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	11 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	1 U	--	1 U	--	--	9.3	1 U	1 U	--	1 U	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	34600	--	8900	--	--	23800	18100	23900	--	16000	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	0.87	--	0.15	--	--	0.3	0.1 U	0.25	--	0.22	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	3.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	0.4 U	--	--	--	--	--	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--
Cyanide, Free	0.051	µg/g	--	0.08 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	0.125	--	--	--	--	--	0.178	--	0.199	--	--	0.26	0.152	0.401	--	0.208	--	--
Mercury	0.27	µg/g	--	0.011 U	--	--	--	--	--	0.0892	--	0.0163	--	--	0.0451	0.0144	0.0178	--	0.0309	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	0.027	--	--	--	--	--	0.17	--	0.38	--	--	0.12	0.2	0.13	--	0.43	--	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	0.005 U	0.03 U	--	0.03 U	--	--	0.06	0.03 U	0.058	--	0.03 U	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	0.0071 U	0.042 U	--	0.042 U	--	--	0.133	0.042 U	0.131	--	0.042 U	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	0.005 U	0.03 U	--	0.03 U	--	--	0.073	0.03 U	0.073	--	0.03 U	--	--
Acenaphthene	7.9	µg/g	--	0.03 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	0.05 U	--	--
Acenaphthylene	0.15	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	0.05 U	--	--
Anthracene	0.67	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.101	0.05 U	0.05 U	--	0.05 U	--	--
Benzo(a)anthracene	0.5	µg/g	--	0.02 U	--	--	--	--	0.0051	0.05 U	--	0.05 U	--	--	0.339	0.05 U	0.106	--	0.05 U	--	--
Benzo(a)pyrene	0.3	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.279	0.05 U	0.103	--	0.05 U	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	0.0056	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	0.02	--	--	--	--	--	0.05 U	--	0.05 U	--	--	0.398	0.05 U	0.191	--	0.05 U	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.184	0.05 U	0.088	--	0.05 U	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.19	0.05 U	0.077	--	0.05 U	--	--
Chrysene	7	µg/g	--	0.02	--	--	--	--	0.0066	0.05 U	--	0.05 U	--	--	0.376	0.05 U	0.164	--	0.05 U	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.051	0.05 U	0.05 U	--	0.05 U	--	--
Fluoranthene	0.69	µg/g	--	0.02	--	--	--	--	0.012	0.05 U	--	0.05 U	--	--	0.836	0.05 U	0.198	--	0.05 U	--	--
Fluorene	62	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	0.05 U	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	0.02 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.186	0.05 U	0.076	--	0.05 U	--	--
Naphthalene	0.6	µg/g	--	0.03 U	--	--	--	--	0.005 U	0.05 U	--	0.05 U	--	--	0.074	0.05 U	0.064	--	0.05 U	--	--
Phenanthrene	6.2	µg/g	--	0.02	--	--	--	--	0.01	0.05 U	--	0.05 U	--	--	0.497	0.05 U	0.136	--	0.05 U	--	--
Pyrene	78	µg/g	--	0.02	--	--	--	--	0.011	0.05 U	--	0.05 U	--	--	0.645	0.05 U	0.159	--	0.05 U	--	--
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.015 U	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.023 U	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	10 U	--	5 U	--	5 U	--	--	--	--	5 U	--	5 U	5 U
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	10 U	--	5 U	--	5 U	--	5 U	5 U	--	5 U	--	5 U	5 U
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	10	--	--	--	--	--	--	--	--	--	--	13	10 U	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10	10	--	--	--	--	10 U	--	10 U	--	10 U	--	13	10 U	--	10 U	--	14	10 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	50	--	--	--	--	--	--	--	--	--	--	518	229	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	50	50	--	--	--	--	50 U	--	50 U	--	50 U	--	521	229	--	50 U	--	91	50 U
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50	50	--	--	--	--	50 U	--	50 U	--	50 U	--	50 U	50 U	--	50 U	--	50 U	50 U
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	72 U	--	72 U	--	535	229	--	72 U	--	105	72 U

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-70	BH07-71	BH07-71	BH08	BH08	BH08	BH13-40	BH17-200	BH17-200	BH17-200	BH17-200	BH17-201	BH17-201	BH17-201	BH17-202	BH17-202	BH17-202	BH17-202	BH17-203
Sample ID			BH07-70 SS2	BH07-71 SS1A	BH07-71 SS2	BH8-SS1	BH15-SS1	BH8-SS2	BH13-40	BH17-200-3-3.5	BH17-200-3.5-4	BH17-200-4-6	BH17-200-6-6.5	BH17-201-0-1	BH17-201-0-2	BH17-201-2-3	BH17-202-0-2	BH17-202-2-4	BH17-202-4-6	BH17-202-6-7	BH17-203-0-2
Start Depth (m)			1.22	0.05	1.22	0	1	1	1.83	0.91	1.07	1.22	1.83	0	0	0.61	0	0.61	1.22	1.83	0
End Depth (m)			1.73	1.22	1.32	0.15	1.15	1.15	2.44	1.07	1.22	1.83	1.98	0.3	0.61	0.91	0.61	1.22	1.83	2.13	0.61
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			09 Feb 2007	09 Feb 2007	09 Feb 2007	08 May 1998	08 May 1998	08 May 1998	12 Dec 2013	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	11 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	0.47 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	0.002 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,1,1-Trichloroethane	0.38	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,1-Dichloroethane	0.47	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,1-Dichloroethene	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,2-Dibromoethane	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,2-Dichlorobenzene	1.2	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,2-Dichloroethane	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,2-Dichloropropane	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,3-Dichlorobenzene	4.8	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,3-Dichloropropene	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.042 U	--	0.042 U	--	--	--	--	0.042 U	--	0.042 U	0.042 U
1,4-Dichlorobenzene	0.083	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	0.041 U	--	--	--	--	0.5 U	--	0.5 U	--	0.5 U	--	--	--	--	0.5 U	--	0.5 U	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	0.5 U	--	0.5 U	--	0.5 U	--	--	--	--	0.5 U	--	0.5 U	0.5 U
Acetone	16	µg/g	--	0.13 U	--	--	--	--	0.5 U	--	0.5 U	--	0.5 U	--	--	--	--	0.5 U	--	0.5 U	0.5 U
Bromodichloromethane	1.5	µg/g	--	0.003 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Bromoform	0.27	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Bromomethane	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Carbon tetrachloride	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Chlorobenzene	2.4	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Chloroform	0.05	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	0.03 U	--	0.03 U	--	0.03 U	--	--	--	--	0.03 U	--	0.03 U	0.03 U
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Dichloromethane	0.1	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	0.004 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
n-Hexane	2.8	µg/g	--	--	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.156
Styrene	0.7	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Tetrachloroethene	0.28	µg/g	--	0.002 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g	--	0.003 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
trans-1,3-Dichloropropene	NV	µg/g	--	0.003 U	--	--	--	--	0.04 U	--	0.03 U	--	0.03 U	--	--	--	--	0.03 U	--	0.03 U	0.03 U
Trichloroethylene	0.061	µg/g	--	0.004 U	--	--	--	--	0.08	--	0.01 U	--	0.01 U	--	--	--	--	0.01 U	--	0.01 U	0.01 U
Trichlorofluoromethane	4	µg/g	--	0.004 U	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	0.05 U	0.05 U
Vinyl Chloride	0.02	µg/g	--	0.002 U	--	--	--	--	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	0.02 U	0.02 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH07-70	BH07-71	BH07-71	BH08	BH08	BH08	BH13-40	BH17-200	BH17-200	BH17-200	BH17-200	BH17-201	BH17-201	BH17-201	BH17-202	BH17-202	BH17-202	BH17-202	BH17-203
Sample ID			BH07-70 SS2	BH07-71 SS1A	BH07-71 SS2	BH8-SS1	BH15-SS1	BH8-SS2	BH13-40	BH17-200-3-3.5	BH17-200-3.5-4	BH17-200-4-6	BH17-200-6-6.5	BH17-201-0-1	BH17-201-0-2	BH17-201-2-3	BH17-202-0-2	BH17-202-2-4	BH17-202-4-6	BH17-202-6-7	BH17-203-0-2
Start Depth (m)			1.22	0.05	1.22	0	1	1	1.83	0.91	1.07	1.22	1.83	0	0	0.61	0	0.61	1.22	1.83	0
End Depth (m)			1.73	1.22	1.32	0.15	1.15	1.15	2.44	1.07	1.22	1.83	1.98	0.3	0.61	0.91	0.61	1.22	1.83	2.13	0.61
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			09 Feb 2007	09 Feb 2007	09 Feb 2007	08 May 1998	08 May 1998	08 May 1998	12 Dec 2013	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	10 Oct 2017	11 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH17-203	BH18-204	BH18-204	BH18-204	BH18-205	BH18-205	BH18-206	BH18-206	BH18-207	BH18-207	BH18-207	BH18-207i	BH18-207i	BH18-207i	BH18-208	BH19-100I	BH19-102I	BH19-102II	BH19-209	BH19-209
Sample ID			BH17-203-6-8	BH18-204-1	DUP1 JUL23	BH18-204-2	BH18-205-1	BH18-205-2	BH18-206-1	BH18-206-2	BH18-207-1	DUP1 JUL 20	BH18-207-2	BH18-207I-0.5-2.5	BH18-207I-5-7	BH18-207I-7.5-9.5	BH18-208-1	BH17-100I	BH17-102I	BH17-102II	BH19-209-2.5	BH19-209-7
Start Depth (m)			1.83	1.52	1.52	3.05	0.76	1.52	0.76	1.52	0	0	0.76	0.1524	1.524	2.286	0.76	0.3048	0.1524	0.1524	0.762	2.1336
End Depth (m)			2.44	2.13	2.13	3.4	1.37	1.58	1.37	1.96	0.6	0.6	0.89	0.762	2.1336	2.8956	1.37	0.4572	0.3048	0.3048	0.762	2.1336
Sample Type			N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
Sample Date			11 Oct 2017	23 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	20 Jul 2018	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jul 2018	03 Apr 2019	03 Apr 2019	03 Apr 2019	16 Apr 2019	16 Apr 2019
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	0.0068 U	0.0084	0.0077	0.0068 UJ	0.0068 UJ	--	--	--	--	--	0.032	0.0068 U	0.0068 U	--	--	0.0068 U	0.0068 U	0.0068 U	0.0068 U
Ethylbenzene	1.1	µg/g	--	0.018 U	0.018 U	0.018 U	0.018 UJ	0.018 UJ	--	--	--	--	--	0.018 U	0.018 U	0.018 U	--	--	0.018 U	0.018 U	0.018 U	0.018 U
Toluene	2.3	µg/g	--	0.08 U	0.08 U	0.08 U	0.08 UJ	0.08 UJ	--	--	--	--	--	0.097	0.08 U	0.08 U	--	--	0.08 U	0.08 U	0.08 U	0.08 U
Xylene, o	NV	µg/g	--	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ	--	--	--	--	--	0.099	0.02 U	0.02 U	--	--	0.023	0.02 U	0.02 U	0.02 U
Xylenes, m & p	NV	µg/g	--	0.03 U	0.03 U	0.03 U	0.03 UJ	0.03 UJ	--	--	--	--	--	0.128	0.03 U	0.03 U	--	--	0.03 U	0.03 U	0.03 U	0.03 U
Xylenes, Total	3.1	µg/g	--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.226	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	0.0025	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	0.0026	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	4.65	5.38	8.09	2.13 J	1.28 J	4.43	4.4	--	--	4.3 J	12.1	6.59	8.08	14.4	--	8.51	5.98	8.63	3.67
pH	NV	pH UNITS	--	--	--	--	--	--	8.46	--	--	--	--	--	--	--	--	7.71	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	4.9	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	7.2	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	--	--	--	--	--	1 U	--	2.3	2.6	2.4	--	2 U	2 U	1 U	--	--	--	--	--
Arsenic	18	µg/g	--	--	--	--	--	--	7.2	--	7.8	5.8	3.2	--	4	4.1	10.1	--	--	--	--	--
Barium	390	µg/g	--	--	--	--	--	--	35.7	--	26.9	26.1	9.4	--	20	22	29.1	--	--	--	--	--
Beryllium	4	µg/g	--	--	--	--	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	2 U	2 U	0.5 U	--	--	--	--	--
Boron	120	µg/g	--	--	--	--	--	--	7.6	--	14	14.5	7.9	--	100 U	100 U	9.8	--	--	--	--	--
Cadmium	1.2	µg/g	--	--	--	--	--	--	1.43	--	3.21	2.8	3.98	--	1.18	5.09	0.8	--	--	--	--	--
Chromium	160	µg/g	--	--	--	--	--	--	8.9	--	13	11.5	9.1	--	10 U	10	14.1	--	--	--	--	--
Cobalt	22	µg/g	--	--	--	--	--	--	4.6	--	2.5	2.1	1.1	--	3.6	3.7	12.6	--	--	--	--	--
Copper	140	µg/g	--	--	--	--	--	--	22.8	--	31.8	34	44.3	--	23	48	13.6	--	--	--	--	--
Lead	120	µg/g	--	--	--	--	--	--	113	--	207	147	48.5	--	101	91	190	--	--	--	--	--
Molybdenum	6.9	µg/g	--	--	--	--	--	--	1 U	--	1.8	1.4	1 U	--	2 U	2 U	1 U	--	--	--	--	--
Nickel	100	µg/g	--	--	--	--	--	--	12.3	--	9.3	7	3.1	--	10	16	15.1	--	--	--	--	--
Selenium	2.4	µg/g	--	--	--	--	--	--	1 U	--	1 U	1 U	1 U	--	4 U	4 U	1 U	--	--	--	--	--
Silver	20	µg/g	--	--	--	--	--	--	0.2 U	--	0.2 U	0.2 U	0.2 U	--	2 U	2 U	0.2 U	--	--	--	--	--
Thallium	1	µg/g	--	--	--	--	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	1 U	1 U	0.5 U	--	--	--	--	--
Uranium	23	µg/g	--	--	--	--	--	--	1 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U	--	--	--	--	--
Vanadium	86	µg/g	--	--	--	--	--	--	18.7	--	14.6	15.2	14.4	--	12.3	14.3	30	--	--	--	--	--
Zinc	340	µg/g	--	--	--	--	--	--	614	--	7840	11000	37500	--	2500	8650	665	--	--	--	--	--
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	141000	--	183000	181000	174000	--	146000	150000	129000	--	--	--	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	52500	--	82900	82900	95100	--	62700	61300	76100	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	BH17-203	BH18-204	BH18-204	BH18-204	BH18-205	BH18-205	BH18-206	BH18-206	BH18-207	BH18-207	BH18-207	BH18-207i	BH18-207i	BH18-207i	BH18-208	BH19-100I	BH19-102I	BH19-102II	BH19-209	BH19-209
		Sample ID	BH17-203-6-8	BH18-204-1	DUP1 JUL23	BH18-204-2	BH18-205-1	BH18-205-2	BH18-206-1	BH18-206-2	BH18-207-1	DUP1 JUL 20	BH18-207-2	BH18-207I-0.5-2.5	BH18-207I-5-7	BH18-207I-7.5-9.5	BH18-208-1	BH17-100I	BH17-102I	BH17-102II	BH19-209-2.5	BH19-209-7
		Start Depth (m)	1.83	1.52	1.52	3.05	0.76	1.52	0.76	1.52	0	0	0.76	0.1524	1.524	2.286	0.76	0.3048	0.1524	0.1524	0.762	2.1336
		End Depth (m)	2.44	2.13	2.13	3.4	1.37	1.58	1.37	1.96	0.6	0.6	0.89	0.762	2.1336	2.8956	1.37	0.4572	0.3048	0.3048	0.762	2.1336
		Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
		Sample Date	11 Oct 2017	23 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	20 Jul 2018	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jul 2018	03 Apr 2019	03 Apr 2019	03 Apr 2019	16 Apr 2019	16 Apr 2019
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	1 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	16700	--	19400	21500	31400	--	11100	67500	24000	--	--	--	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	0.13	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	0.021	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	0.77	--	--	--	--	--	--	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.03 U	--	--	0.03 U	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.042 U	--	--	0.042 U	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.03 U	--	--	0.03 U	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.057	--	--	0.05 U	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Chrysene	7	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.062	--	--	0.05 U	--	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.081	--	--	0.05 U	--	--	--	--	--
Fluorene	62	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.02	--	--	0.013 U	--	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.064	--	--	0.046 U	--	--	--	--	--
Pyrene	78	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.084	--	--	0.05 U	--	--	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	5 UJ	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	5 UJ	--	5 U	--	--	5 UJ	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	10 UJ	--	10 U	--	--	10 UJ	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	51 J	--	179	--	--	50 UJ	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	50 UJ	--	50 U	--	--	50 UJ	--	--	--	--	--	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	72 UJ	--	179	--	--	72 UJ	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	BH17-203	BH18-204	BH18-204	BH18-204	BH18-205	BH18-205	BH18-206	BH18-206	BH18-207	BH18-207	BH18-207	BH18-207i	BH18-207i	BH18-207i	BH18-208	BH19-100I	BH19-102I	BH19-102II	BH19-209	BH19-209
			Sample ID	BH17-203-6-8	BH18-204-1	DUP1 JUL23	BH18-204-2	BH18-205-1	BH18-205-2	BH18-206-1	BH18-206-2	BH18-207-1	DUP1 JUL 20	BH18-207-2	BH18-207I-0.5-2.5	BH18-207I-5-7	BH18-207I-7.5-9.5	BH18-208-1	BH17-100I	BH17-102I	BH17-102II	BH19-209-2.5	BH19-209-7
			Start Depth (m)	1.83	1.52	1.52	3.05	0.76	1.52	0.76	1.52	0	0	0.76	0.1524	1.524	2.286	0.76	0.3048	0.1524	0.1524	0.762	2.1336
			End Depth (m)	2.44	2.13	2.13	3.4	1.37	1.58	1.37	1.96	0.6	0.6	0.89	0.762	2.1336	2.8956	1.37	0.4572	0.3048	0.3048	0.762	2.1336
			Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	11 Oct 2017	23 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	20 Jul 2018	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jul 2018	03 Apr 2019	03 Apr 2019	03 Apr 2019	16 Apr 2019	16 Apr 2019
SVOCs (other)																							
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																							
1,1,1,2-Tetrachloroethane	0.058	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.38	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.47	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethene	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichlorobenzene	1.2	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloropropane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichlorobenzene	4.8	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichloropropene	0.05	µg/g		--	0.042 U	0.042 U	0.042 U	0.042 UJ	0.042 UJ	--	--	--	--	--	0.042 U	0.042 U	0.042 U	--	--	0.042 U	0.042 U	0.042 U	0.042 U
1,4-Dichlorobenzene	0.083	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dioxane	1.8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		--	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	--	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g		--	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	--	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	16	µg/g		--	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	--	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	1.5	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Bromoform	0.27	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Bromomethane	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Carbon tetrachloride	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Chlorobenzene	2.4	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Chlorodibromomethane	2.3	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,3-Dichloropropene	NV	µg/g		--	0.03 U	0.03 U	0.03 U	0.03 UJ	0.03 UJ	--	--	--	--	--	0.03 U	0.03 U	0.03 U	--	--	0.03 U	0.03 U	0.03 U	0.03 U
Dichlorodifluoromethane	16	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Dichloromethane	0.1	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
n-Hexane	2.8	µg/g		--	0.15 U	0.15 U	0.15 U	0.081 J	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Styrene	0.7	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Tetrachloroethene	0.28	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,3-Dichloropropene	NV	µg/g		--	0.03 U	0.03 U	0.03 U	0.03 UJ	0.03 UJ	--	--	--	--	--	0.03 U	0.03 U	0.03 U	--	--	0.03 U	0.03 U	0.03 U	0.03 U
Trichloroethylene	0.061	µg/g		--	0.111	0.068	0.041	0.561 J	0.091 J	--	--	--	--	--	35.4	0.308	0.04	--	--	0.032	0.011	0.037	0.013
Trichlorofluoromethane	4	µg/g		--	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 UJ	--	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl Chloride	0.02	µg/g		--	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ	--	--	--	--	--	0.02 U	0.02 U	0.02 U	--	--	0.02 U	0.02 U	0.02 UJ	0.02 UJ

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	BH17-203	BH18-204	BH18-204	BH18-204	BH18-205	BH18-205	BH18-206	BH18-206	BH18-207	BH18-207	BH18-207	BH18-207i	BH18-207i	BH18-207i	BH18-208	BH19-100I	BH19-102I	BH19-102II	BH19-209	BH19-209
			Sample ID	BH17-203-6-8	BH18-204-1	DUP1 JUL23	BH18-204-2	BH18-205-1	BH18-205-2	BH18-206-1	BH18-206-2	BH18-207-1	DUP1 JUL 20	BH18-207-2	BH18-207I-0.5-2.5	BH18-207I-5-7	BH18-207I-7.5-9.5	BH18-208-1	BH17-100I	BH17-102I	BH17-102II	BH19-209-2.5	BH19-209-7
			Start Depth (m)	1.83	1.52	1.52	3.05	0.76	1.52	0.76	1.52	0	0	0.76	0.1524	1.524	2.286	0.76	0.3048	0.1524	0.1524	0.762	2.1336
			End Depth (m)	2.44	2.13	2.13	3.4	1.37	1.58	1.37	1.96	0.6	0.6	0.89	0.762	2.1336	2.8956	1.37	0.4572	0.3048	0.3048	0.762	2.1336
			Sample Type	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	11 Oct 2017	23 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	23 Jul 2018	23 Jul 2018	20 Jul 2018	20 Jul 2018	20 Jul 2018	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jul 2018	03 Apr 2019	03 Apr 2019	03 Apr 2019	16 Apr 2019	16 Apr 2019
Analyte	Table 6 SCS [a]	Unit																					

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH19-209	BH19-209	BH19-210	BH19-210	BH19-210	BH19-210	BH19-211	BH19-211	BH19-211	BH20-212	BH20-213	BH20-214	BH20-214	BW11	C	C	C11	C12	C14	C2
Sample ID			SOIL-DUP1	BH19-209-9.5	BH19-210-2.5	BH19-210-6	BH19-210-7.5	BH19-210-9.5	BH19-211-2.5	BH19-211-4	BH19-211-10	BH20-212-0.5-2	BH20-213-0.5-2.5	BH20-214-0.5-2	BH20-214-2.5-3	BW11-1	C-2	C-4	C11-1	C12-1	C14-1	C2-2
Start Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.1524	0.1524	0.1524	0.762	0.4	0.3	0.9	0.34	0.13	0.12	0.61
End Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.6096	0.762	0.6096	0.9144	0.4	0.8	1.3	0.4	0.3	0.61	1.07
Sample Type			FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	21 Feb 2020	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	20 Feb 1991	08 Feb 1991	08 Feb 1991
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	0.14 U	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 UJ	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	--	0.0322	0.0068 U	--	--	--	--	--	--	--
Ethylbenzene	1.1	µg/g	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	--	0.234	0.018 U	--	--	--	--	--	--	--
Toluene	2.3	µg/g	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	--	0.611	0.08 U	--	--	--	--	--	--	--
Xylene, o	NV	µg/g	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--	1.32	0.02 U	--	--	--	--	--	--	--
Xylenes, m & p	NV	µg/g	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	1.27	0.03 U	--	--	--	--	--	--	--
Xylenes, Total	3.1	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	2.59	0.05 U	--	--	--	--	--	--	--
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	3.67	6.73	6.34	5.52	4.88	11.1	4.49	3.45	8.21	15.4	11.7	12.3	16	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.2	--	--	7.7	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70	--	240	580
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	8.5	76.7	64.1	43.8	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	2.77	8.47	10.1	6.22	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	3.75	1.42	10.5	13.5	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	--	--	--	--	--	--	--	--	1.2	1.4	3	1 U	--	--	--	--	--	--	--
Arsenic	18	µg/g	--	--	--	--	--	--	--	--	--	4.9	7.5	9.2	8.5	--	--	--	--	--	--	--
Barium	390	µg/g	--	--	--	--	--	--	--	--	--	23.1	48.9	54.5	51.3	--	--	--	25	--	32	53.9
Beryllium	4	µg/g	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.89	--	--	0.4	--	0.4	0.5
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	6.2	5.6	9.5	10.4	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.89	0.5 U	0.5 U	--	0.3 U	--	0.3 U	0.6
Chromium	160	µg/g	--	--	--	--	--	--	--	--	--	14.7	16	9.4	15.6	9.1	5.1	--	0.3 U	--	14.5	11.7
Cobalt	22	µg/g	--	--	--	--	--	--	--	--	--	5	7.3	5	5.7	4	1.9	--	393	--	21	22
Copper	140	µg/g	--	--	--	--	--	--	--	--	--	25.9	30.6	26	21.9	31	11	--	24.5	--	45.4	29.6
Lead	120	µg/g	--	--	--	--	--	--	--	--	--	23.4	42.5	67.2	133	83	1727	32	17	--	50	120
Molybdenum	6.9	µg/g	--	--	--	--	--	--	--	--	--	1 U	1.9	1.1	1	1.11	1 U	3 U	3 U	--	3 U	3 U
Nickel	100	µg/g	--	--	--	--	--	--	--	--	--	11.5	16	10.5	14.2	13	5.6	--	2 U	--	14	11
Selenium	2.4	µg/g	--	--	--	--	--	--	--	--	--	1 U	1 U	1.9	1 U	--	--	--	--	--	--	--
Silver	20	µg/g	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	--	7.8	--	0.2 U	0.2 U
Thallium	1	µg/g	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	2 U	--	2 U	2 U
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--
Vanadium	86	µg/g	--	--	--	--	--	--	--	--	--	28.8	23.7	13.8	26.1	--	--	--	0.3 U	--	11.7	20.7
Zinc	340	µg/g	--	--	--	--	--	--	--	--	--	56.2	63.7	175	567	235	74	412	133	--	278	507
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	14900	3120	40500	98300	--	--	--	145000	--	27400	28500
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	3000	1490	13000	52300	--	--	--	42000	--	7050	13700

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH19-209	BH19-209	BH19-210	BH19-210	BH19-210	BH19-210	BH19-211	BH19-211	BH19-211	BH20-212	BH20-213	BH20-214	BH20-214	BW11	C	C	C11	C12	C14	C2
Sample ID			SOIL-DUP1	BH19-209-9.5	BH19-210-2.5	BH19-210-6	BH19-210-7.5	BH19-210-9.5	BH19-211-2.5	BH19-211-4	BH19-211-10	BH20-212-0.5-2	BH20-213-0.5-2.5	BH20-214-0.5-2	BH20-214-2.5-3	BW11-1	C-2	C-4	C11-1	C12-1	C14-1	C2-2
Start Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.1524	0.1524	0.1524	0.762	0.4	0.3	0.9	0.34	0.13	0.12	0.61
End Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.6096	0.762	0.6096	0.9144	0.4	0.8	1.3	0.4	0.3	0.61	1.07
Sample Type			FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	21 Feb 2020	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	20 Feb 1991	08 Feb 1991	08 Feb 1991
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3870	--	3210	9070
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	--	--	70900	96600	20700	30100	--	--	--	9850	--	51100	72400
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	386	--	408	787
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1020	--	360	660
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	130	--	54	30.6
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	103	--	100	115
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	--	5	9
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	0.24	0.61	0.37	0.43	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	10 U	10 U	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	--	--	0.136	0.533	0.445	0.373	--	0.056	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	--	0.005 U	0.0394	0.185	0.0751	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	330	--	210	230
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	0.29	0.1 U	0.32	0.51	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	0.038	0.11	1.73	0.166	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	0.07	0.242	3.76	0.368	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	0.032	0.133	2.04	0.202	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.186	0.05 U	--	--	--	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.328	0.05 U	--	--	--	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.054	0.762	0.05 U	--	--	--	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.504	0.05 U	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.847	0.056	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.325	0.05 U	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.224	0.05 U	--	--	--	--	--	--	--
Chrysene	7	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.058	1.03	0.064	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.103	0.05 U	--	--	--	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.066	1.56	0.08	--	--	--	--	--	--	--
Fluorene	62	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.21	0.05 U	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.253	0.05 U	--	--	--	--	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	--	--	--	--	0.014	0.088	1.18	0.12	--	--	--	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	--	--	--	--	0.046 U	0.125	2.58	0.168	--	--	--	--	--	--	--
Pyrene	78	µg/g	--	--	--	--	--	--	--	--	--	0.05 U	0.061	1.27	0.069	--	--	--	--	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	--	5 U	--	33.1	5 U	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	--	5 U	--	36.6	5 U	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	10 U	--	50	12	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	--	--	--	--	10 U	--	52	12	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	50 U	--	185	68	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	--	--	--	--	50 U	--	193	68	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	--	--	--	--	50 U	--	61	50 U	--	--	--	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	290	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	72 U	--	342	80	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	BH19-209	BH19-209	BH19-210	BH19-210	BH19-210	BH19-210	BH19-211	BH19-211	BH19-211	BH20-212	BH20-213	BH20-214	BH20-214	BW11	C	C	C11	C12	C14	C2
			Sample ID	SOIL-DUP1	BH19-209-9.5	BH19-210-2.5	BH19-210-6	BH19-210-7.5	BH19-210-9.5	BH19-211-2.5	BH19-211-4	BH19-211-10	BH20-212-0.5-2	BH20-213-0.5-2.5	BH20-214-0.5-2	BH20-214-2.5-3	BW11-1	C-2	C-4	C11-1	C12-1	C14-1	C2-2
			Start Depth (m)	2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.1524	0.1524	0.1524	0.762	0.4	0.3	0.9	0.34	0.13	0.12	0.61
			End Depth (m)	2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.6096	0.762	0.6096	0.9144	0.4	0.8	1.3	0.4	0.3	0.61	1.07
			Sample Type	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	21 Feb 2020	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	20 Feb 1991	08 Feb 1991	08 Feb 1991
SVOCs (other)																							
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																							
1,1,1,2-Tetrachloroethane	0.058	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,1-Dichloroethene	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,2-Dibromoethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,2-Dichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,2-Dichloropropane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,3-Dichloropropene	0.05	µg/g		0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	--	0.042 U	0.042 U	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
1,4-Dioxane	1.8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.7 U	0.5 U	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	--	--	--	--	--	--
Acetone	16	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	--	--	--	--	--	--
Bromodichloromethane	1.5	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	4.1 U	0.05 U	--	--	--	--	--	--	--
Bromoform	0.27	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Bromomethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Carbon tetrachloride	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Chlorobenzene	2.4	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Chlorodibromomethane	2.3	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Chloroform	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.15 U	0.05 U	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U	0.03 U	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
n-Hexane	2.8	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.254	0.05 U	--	--	--	--	--	--	--
Styrene	0.7	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Tetrachloroethene	0.28	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U	0.03 U	--	--	--	--	--	--	--
Trichloroethylene	0.061	µg/g		0.01 U	0.034	0.01 U	0.01 U	0.01 U	0.01 U	0.12	0.209	0.085	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	--
Trichlorofluoromethane	4	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--
Vinyl Chloride	0.02	µg/g		0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			BH19-209	BH19-209	BH19-210	BH19-210	BH19-210	BH19-210	BH19-211	BH19-211	BH19-211	BH20-212	BH20-213	BH20-214	BH20-214	BW11	C	C	C11	C12	C14	C2
Sample ID			SOIL-DUP1	BH19-209-9.5	BH19-210-2.5	BH19-210-6	BH19-210-7.5	BH19-210-9.5	BH19-211-2.5	BH19-211-4	BH19-211-10	BH20-212-0.5-2	BH20-213-0.5-2.5	BH20-214-0.5-2	BH20-214-2.5-3	BW11-1	C-2	C-4	C11-1	C12-1	C14-1	C2-2
Start Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.1524	0.1524	0.1524	0.762	0.4	0.3	0.9	0.34	0.13	0.12	0.61
End Depth (m)			2.1336	2.8956	0.762	1.8288	2.286	2.8956	0.762	1.2192	3.048	0.6096	0.762	0.6096	0.9144	0.4	0.8	1.3	0.4	0.3	0.61	1.07
Sample Type			FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	16 Apr 2019	21 Feb 2020	21 Feb 2020	21 Feb 2020	21 Feb 2020	23 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	20 Feb 1991	08 Feb 1991	08 Feb 1991
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	C7	C8	CE10	CS-58	CS-60	CW10	D	D	D3	DSW7	ES-11	ES-11	ES-12	ES-14	ES-15	ES-16	ES-17	ESW8	ESW8	EW8
		Sample ID	C7-2	C8-1	CE10-2	CS-58	CS-60	CW10-2	D-1	D-2	Sump 5	DSW7-1	ES-11	ES-11A	ES-12	ES-14A	ES-15	ES-16A	ES-17A	ESW8-1 (ESW-1)	ESW8-2 (ESW-2)	EW8-1 (EW-1)
		Start Depth (m)	0.61	0.14	0.4	1	1	0.6	0.1	0.9	0	0	0	0	0	0	0	0	0	0.4	0.7	0.2
		End Depth (m)	1.22	0.76	0.6	1.3	1.3	0.9	0.8	1.2	0.15	0.5	2	2	2	2	2	2	2	0.4	0.7	0.3
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 1991	08 Feb 1991	22 Jan 1991	22 Jul 1999	22 Jul 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	22 Jan 1991	16 Jun 1999	16 Jun 1999	16 Jun 1999	17 Jun 1999	17 Jun 1999	17 Jun 1999	23 Jun 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	10 U	10 U	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	1.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, o	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, m & p	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	3.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	7.4	--	6.8	--	--	--	--	--	--	--	--	7.5	--	--
Phosphorus	~~NV~~ 1600	µg/g	410	330	380	--	--	230	--	--	--	360	--	--	--	--	--	--	--	--	30	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	18	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	390	µg/g	32.6	32	44	--	--	18	--	--	--	30	--	--	--	--	--	--	--	--	25	--
Beryllium	4	µg/g	0.9	0.4	0.5	--	--	0.2	--	--	--	0.4	--	--	--	--	--	--	--	--	0.5	--
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	1.2	0.5	0.3 U	--	--	0.3 U	--	0.82	--	0.3 U	--	--	--	--	--	--	--	--	0.3 U	--
Chromium	160	µg/g	15.5	10.4	18.6	--	--	6.9	--	10	--	14.4	--	--	--	--	--	--	--	--	18.6	--
Cobalt	22	µg/g	6	24	6	--	--	2 U	--	11	--	4	--	--	--	--	--	--	--	--	2 U	--
Copper	140	µg/g	30.1	12.5	10	--	--	4	--	50	--	20	--	--	--	--	--	--	--	--	6	--
Lead	120	µg/g	24	23	92	--	--	10	--	60	--	26	--	--	--	--	--	--	--	--	46	--
Molybdenum	6.9	µg/g	3 U	3 U	10	--	--	3 U	--	1.63	--	5	--	--	--	--	--	--	--	--	3 U	3 U
Nickel	100	µg/g	12	9	12	--	--	5	--	23	--	10	--	--	--	--	--	--	--	--	2 U	--
Selenium	2.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	20	µg/g	0.2 U	0.2 U	0.2 U	--	--	0.2 U	--	1.2	--	0.2 U	--	--	--	--	--	--	--	--	0.2 U	--
Thallium	1	µg/g	2 U	2 U	3	--	--	2 U	--	--	--	2	--	--	--	--	--	--	--	--	2 U	--
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	86	µg/g	22.9	15.7	19.2	--	--	8.8	--	--	--	16.1	--	--	--	--	--	--	--	--	0.3 U	--
Zinc	340	µg/g	79	83	57	--	--	39	--	1434	--	60	--	--	--	--	--	--	--	--	394	--
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	13000	21800	4610	--	--	14500	--	--	--	1920	--	--	--	--	--	--	--	--	141000	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	3100	4450	2440	--	--	2860	--	--	--	1960	--	--	--	--	--	--	--	--	83700	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			C7	C8	CE10	CS-58	CS-60	CW10	D	D	D3	DSW7	ES-11	ES-11	ES-12	ES-14	ES-15	ES-16	ES-17	ESW8	ESW8	EW8
Sample ID			C7-2	C8-1	CE10-2	CS-58	CS-60	CW10-2	D-1	D-2	Sump 5	DSW7-1	ES-11	ES-11A	ES-12	ES-14A	ES-15	ES-16A	ES-17A	ESW8-1 (ESW-1)	ESW8-2 (ESW-2)	EW8-1 (EW-1)
Start Depth (m)			0.61	0.14	0.4	1	1	0.6	0.1	0.9	0	0	0	0	0	0	0	0	0	0.4	0.7	0.2
End Depth (m)			1.22	0.76	0.6	1.3	1.3	0.9	0.8	1.2	0.15	0.5	2	2	2	2	2	2	2	0.4	0.7	0.3
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			08 Feb 1991	08 Feb 1991	22 Jan 1991	22 Jul 1999	22 Jul 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	22 Jan 1991	16 Jun 1999	16 Jun 1999	16 Jun 1999	17 Jun 1999	17 Jun 1999	17 Jun 1999	23 Jun 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	6210	6910	8500	--	--	5060	--	--	--	9480	--	--	--	--	--	--	--	--	5460	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	38500	20500	28700	--	--	7530	--	--	--	15100	--	--	--	--	--	--	--	--	14300	--
Manganese	~~NV~~ 1800 [b]	µg/g	916	407	338	--	--	150	--	--	--	276	--	--	--	--	--	--	--	--	274	--
Potassium	~~NV~~ 6000 [b]	µg/g	790	990	1050	--	--	560	--	--	--	970	--	--	--	--	--	--	--	--	280	--
Strontium	~~NV~~ 87 [b]	µg/g	29.5	37.8	30.4	--	--	24.5	--	--	--	15.4	--	--	--	--	--	--	--	--	42.8	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	219	163	192	--	--	146	--	--	--	203	--	--	--	--	--	--	--	--	13.4	--
Zirconium	~~NV~~ 48 [b]	µg/g	7	6	7	--	--	3	--	--	--	5	--	--	--	--	--	--	--	--	6	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	10 U	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	0.048	--	--	--	--	--	--	--	--	--	--	0.054	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	200	220	150	--	--	90	--	--	--	130	--	--	--	--	--	--	--	--	140	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	2 U	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.05 U	0.25 U	0.62	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	0.1 U	0.5 U	0.75	0.4 U	0.1 U	0.1 U	0.05 U	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.05 U	0.25 U	0.13	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	0.05 U	0.25 U	0.16	0.17	0.05 U	0.1	0.05 U	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	0.05 U	0.25 U	0.07	0.2	0.05 U	0.05 U	0.05 U	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	0.05 U	0.25 U	0.11	0.06	0.05 U	0.05 U	0.05 U	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.12	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Chrysene	7	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.33	0.39	0.05 U	0.65	0.05 U	0.11	0.05 U	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	0.2 U	0.2	--	--	--	0.05 U	0.25 U	0.05	0.07	0.05 U	0.07	0.05 U	--	--	--
Fluorene	62	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	0.05 U	0.25 U	0.26	0.13	0.05 U	0.16	0.05 U	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	0.05 U	0.25 U	0.05 U	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	0.2 U	0.1	--	--	--	0.05 U	0.25 U	0.19	0.2 U	0.05 U	0.05 U	0.05 U	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	0.2 U	0.3	--	--	--	0.05 U	0.25 U	0.66	0.15	0.05 U	0.05 U	0.05 U	--	--	--
Pyrene	78	µg/g	--	--	--	--	--	0.2 U	0.1	--	--	--	0.06	0.22	0.14	0.34	0.05 U	0.27	0.05 U	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	C7	C8	CE10	CS-58	CS-60	CW10	D	D	D3	DSW7	ES-11	ES-11	ES-12	ES-14	ES-15	ES-16	ES-17	ESW8	ESW8	EW8
		Sample ID	C7-2	C8-1	CE10-2	CS-58	CS-60	CW10-2	D-1	D-2	Sump 5	DSW7-1	ES-11	ES-11A	ES-12	ES-14A	ES-15	ES-16A	ES-17A	ESW8-1 (ESW-1)	ESW8-2 (ESW-2)	EW8-1 (EW-1)
		Start Depth (m)	0.61	0.14	0.4	1	1	0.6	0.1	0.9	0	0	0	0	0	0	0	0	0	0.4	0.7	0.2
		End Depth (m)	1.22	0.76	0.6	1.3	1.3	0.9	0.8	1.2	0.15	0.5	2	2	2	2	2	2	2	0.4	0.7	0.3
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	08 Feb 1991	08 Feb 1991	22 Jan 1991	22 Jul 1999	22 Jul 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	22 Jan 1991	16 Jun 1999	16 Jun 1999	16 Jun 1999	17 Jun 1999	17 Jun 1999	17 Jun 1999	23 Jun 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			C7	C8	CE10	CS-58	CS-60	CW10	D	D	D3	DSW7	ES-11	ES-11	ES-12	ES-14	ES-15	ES-16	ES-17	ESW8	ESW8	EW8
Sample ID			C7-2	C8-1	CE10-2	CS-58	CS-60	CW10-2	D-1	D-2	Sump 5	DSW7-1	ES-11	ES-11A	ES-12	ES-14A	ES-15	ES-16A	ES-17A	ESW8-1 (ESW-1)	ESW8-2 (ESW-2)	EW8-1 (EW-1)
Start Depth (m)			0.61	0.14	0.4	1	1	0.6	0.1	0.9	0	0	0	0	0	0	0	0	0	0.4	0.7	0.2
End Depth (m)			1.22	0.76	0.6	1.3	1.3	0.9	0.8	1.2	0.15	0.5	2	2	2	2	2	2	2	0.4	0.7	0.3
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			08 Feb 1991	08 Feb 1991	22 Jan 1991	22 Jul 1999	22 Jul 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991	08 Feb 1991	22 Jan 1991	16 Jun 1999	16 Jun 1999	16 Jun 1999	17 Jun 1999	17 Jun 1999	17 Jun 1999	23 Jun 1999	22 Jan 1991	22 Jan 1991	22 Jan 1991
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			EW8	H	HNE19	HW16	I	I	IE15	INE15	JE15	JS15	JS15	K	KE13	KNW10	KW32	L	LN2	LW23	MW17-100S	MW17-100S
Sample ID			EW8-3 (EW-3)	H-2	HNE19-1	HW16-1	I-1	I-4	IE15-1	INE15-1 (INE-1)	JE15-2	JS15-1	JS15-3	K-1	KE13-P1	KNW10-1 (KMN2)	KW32-1 (KW-1)	L-3 (M-3)	LN2-2 (H2-2/MN-2)	LW23-2 (L-2)	MW17-100S-1-1.5	MW17-100S-4.5-6
Start Depth (m)			0.5	0.5	0.4	0	0.5	1	0.3	0.3	0.1	0.1	0.3	0	0.1	0.1	0.2	0.8	0.1	0.3	0.3	1.37
End Depth (m)			0.7	0.8	0.4	0.1	0.5	1.5	0.8	1	0.6	0.2	0.7	0.7	0.7	0.7	1	1	0.5	1.1	0.46	1.83
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	10 U	--	--	--	--	--	10 U	--	--	--	--	--	10 U	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0068 U	--
Ethylbenzene	1.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.018 U	--
Toluene	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.08 U	--
Xylene, o	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--
Xylenes, m & p	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.03 U	--
Xylenes, Total	3.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.3	3.42
pH	NV	pH UNITS	--	--	--	--	7.9	--	--	--	--	--	--	7.8	--	--	--	--	6.7	6.7	9.45	8.21
Phosphorus	~~NV~~ 1600	µg/g	20 U	--	--	330	150	150	320	250	--	--	--	230	--	450	200	--	280	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32.6	3.2
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5	1.4
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	4.2
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	--	--	--	--	--	--	--	0.24	--	0.91	--	--	--	--	0.24	--	--	1 U	1 U
Arsenic	18	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3	2.1
Barium	390	µg/g	14	--	--	44	43	14	36	25	35	--	29	41	--	65.5	43	89	63	--	33.6	35.7
Beryllium	4	µg/g	0.4	--	--	0.5	0.4	0.4	0.4	0.3	3	--	1 U	0.4	--	0.7 U	0.7	3	1.1	--	0.5 U	0.5 U
Boron	120	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4	5.3
Cadmium	1.2	µg/g	0.3 U	0.5 U	0.5 U	0.6	0.3 U	0.3 U	0.3 U	0.3 U	0.5 U	--	0.5 U	0.3 U	--	0.3 U	0.4	0.5 U	0.3 U	--	0.5 U	0.88
Chromium	160	µg/g	14.9	8.2	6.4	22.1	71.6	18	17.6	8.6	5.1	--	3.4	84.7	--	11.1	16.7	15	29.1	--	18.1	53.6
Cobalt	22	µg/g	2 U	2.9	3.2	5	8	2 U	4	2	2.3	--	2	10	--	8	7	6.2	15	--	3.6	9
Copper	140	µg/g	5	12	29	26	2460	14	19	17	19	--	6.2	92	--	9.8	45	22	37	--	15.6	47.3
Lead	120	µg/g	24	86	27	830	2450	35	51	42	31	--	12	103	--	138	94	215	50	--	20.4	116
Molybdenum	6.9	µg/g	3 U	--	--	6	25	3 U	9	4	1 U	--	1 U	35	--	3 U	6	1	21	--	1 U	1 U
Nickel	100	µg/g	2 U	8.7	7.3	11	17	2 U	10	6	4.7	--	4.2	55	--	10	18	19	28	--	7.7	21.9
Selenium	2.4	µg/g	--	--	--	--	--	--	--	--	0.24	--	0.22 U	--	--	--	--	0.27	--	--	1 U	1 U
Silver	20	µg/g	0.2 U	1.9	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	--	1 U	0.2 U	--	0.2 U	0.2 U	1 U	0.2 U	--	0.2 U	0.2 U
Thallium	1	µg/g	2 U	--	--	2 U	2 U	2 U	2 U	2 U	--	--	--	2 U	--	2 U	2 U	--	2 U	--	0.5 U	0.5 U
Uranium	23	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	1 U
Vanadium	86	µg/g	0.3 U	--	--	17.5	30.4	0.3 U	16.9	10.3	32	--	6	15.1	--	23.2	13.3	61	23.7	--	39.9	100
Zinc	340	µg/g	331	578	41	303	1810	586	94	141	65	--	16	431	--	753	209	740	2220	--	42.7	724
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b]	µg/g	136000	--	--	14800	6820	134000	12300	30700	--	--	--	6960	--	20300	4100	--	4410	--	23300	119000
Magnesium	~~NV~~ 17000 [b]	µg/g	87700	--	--	6240	2390	81700	3480	5700	--	--	--	3700	--	10900	1960	--	1030	--	6030	59400

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			EW8	H	HNE19	HW16	I	I	IE15	INE15	JE15	JS15	JS15	K	KE13	KNW10	KW32	L	LN2	LW23	MW17-100S	MW17-100S
Sample ID			EW8-3 (EW-3)	H-2	HNE19-1	HW16-1	I-1	I-4	IE15-1	INE15-1 (INE-1)	JE15-2	JS15-1	JS15-3	K-1	KE13-P1	KNW10-1 (KMN2)	KW32-1 (KW-1)	L-3 (M-3)	LN2-2 (H2-2/MN-2)	LW23-2 (L-2)	MW17-100S-1-1.5	MW17-100S-4.5-6
Start Depth (m)			0.5	0.5	0.4	0	0.5	1	0.3	0.3	0.1	0.1	0.3	0	0.1	0.1	0.2	0.8	0.1	0.3	0.3	1.37
End Depth (m)			0.7	0.8	0.4	0.1	0.5	1.5	0.8	1	0.6	0.2	0.7	0.7	0.7	0.7	1	1	0.5	1.1	0.46	1.83
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	4270	--	--	9870	8500	5540	6760	4160	--	--	--	3300	--	12300	3850	--	6730	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	1 U
Iron	~~NV~~ 38000 [b]	µg/g	5580	--	--	24100	128000	6510	33300	13600	--	--	--	91100	--	37300	29200	--	80400	--	34000	46100
Manganese	~~NV~~ 1800 [b]	µg/g	226	--	--	342	1810	221	603	395	--	--	--	840	--	669	341	--	461	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	350	--	--	890	440	470	660	390	--	--	--	130	--	560	250	--	300	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	36.7	--	--	24.2	29.9	35.9	29	44.5	--	--	--	20.7	--	27	41.5	--	61.5	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	19.7	--	--	197	360	27.7	183	111	--	--	--	76.8	--	17.3	118	--	268	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	5	--	--	5	19	5	7	5	--	--	--	8	--	12	6	--	10	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2	0.1 U
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	10 U	10 U	--	--	--	--	--	10 U	--	10 U	--	--	--	--	10 U	--	--	0.2 U	0.32
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	0.1 U	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	0.047	--	--	--	--	--	--	0.038	--	--	--	--	0.027	--	0.343	0.157
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	0.06	--	0.01 U	--	--	--	--	0.15	--	--	0.0066	0.0191
Sodium	~~NV~~ 200 [b]	µg/g	160	--	--	120	160	110	140	120	--	--	--	80	--	60	80	--	180	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.28	0.49
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	2 U	--	--	--	--	--	2 U	--	--	--	--	--	2 U	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Anthracene	0.67	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Chrysene	7	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	0.2	--	--	--	--	--	0.1	--	--	--	--	--	0.1	--	--	--
Fluorene	62	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Naphthalene	0.6	µg/g	--	--	--	--	0.1	--	--	--	--	--	0.2 U	--	--	--	--	--	0.1	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	0.2	--	--	--	--	--	0.1	--	--	--	--	--	0.2	--	--	--
Pyrene	78	µg/g	--	--	--	--	0.1	--	--	--	--	--	0.1	--	--	--	--	--	0.1	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	0.01 U	--	--	0.01 U	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5 U	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5 U	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10 U	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50 U	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50 U	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	72 U	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			EW8	H	HNE19	HW16	I	I	IE15	INE15	JE15	JS15	JS15	K	KE13	KNW10	KW32	L	LN2	LW23	MW17-100S	MW17-100S
Sample ID			EW8-3 (EW-3)	H-2	HNE19-1	HW16-1	I-1	I-4	IE15-1	INE15-1 (INE-1)	JE15-2	JS15-1	JS15-3	K-1	KE13-P1	KNW10-1 (KMN2)	KW32-1 (KW-1)	L-3 (M-3)	LN2-2 (H2-2/MN-2)	LW23-2 (L-2)	MW17-100S-1-1.5	MW17-100S-4.5-6
Start Depth (m)			0.5	0.5	0.4	0	0.5	1	0.3	0.3	0.1	0.1	0.3	0	0.1	0.1	0.2	0.8	0.1	0.3	0.3	1.37
End Depth (m)			0.7	0.8	0.4	0.1	0.5	1.5	0.8	1	0.6	0.2	0.7	0.7	0.7	0.7	1	1	0.5	1.1	0.46	1.83
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
Isophorone	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--	--	--	0.2 U	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	1 U	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			EW8	H	HNE19	HW16	I	I	IE15	INE15	JE15	JS15	JS15	K	KE13	KNW10	KW32	L	LN2	LW23	MW17-100S	MW17-100S
Sample ID			EW8-3 (EW-3)	H-2	HNE19-1	HW16-1	I-1	I-4	IE15-1	INE15-1 (INE-1)	JE15-2	JS15-1	JS15-3	K-1	KE13-P1	KNW10-1 (KMN2)	KW32-1 (KW-1)	L-3 (M-3)	LN2-2 (H2-2/MN-2)	LW23-2 (L-2)	MW17-100S-1-1.5	MW17-100S-4.5-6
Start Depth (m)			0.5	0.5	0.4	0	0.5	1	0.3	0.3	0.1	0.1	0.3	0	0.1	0.1	0.2	0.8	0.1	0.3	0.3	1.37
End Depth (m)			0.7	0.8	0.4	0.1	0.5	1.5	0.8	1	0.6	0.2	0.7	0.7	0.7	0.7	1	1	0.5	1.1	0.46	1.83
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	22 Jan 1991	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	MW17-102D	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103D	MW17-103D	MW17-104D	MW17-104D	MW17-105D	MW17-105D	MW17-105D	MW17-105D
		Sample ID	MW17-100S-6-7	MW17-101S/D-0.5-1.5	MW17-101S/D-2-3	MW17-101S/D-4-5.5	DUP 10	MW17-102D-0.5-1	MW17-102D-0.5-4	MW17-102D-4-5.5	MW17-102D-6-7	MW17-103S/D-1-1.5	MW17-103S/D-1-3	MW17-103S/D-2-3	MW17-103S/D-4-6	MW17-104S/D-2-4	MW17-104S/D-4-6	MW17-105S/D-0-0.3	MW17-105S/D-0.5-1.5	MW17-105S/D-4-6	MW17-105S/D-6-7
		Start Depth (m)	1.83	0.15	0.61	1.22	1.22	0.15	0.15	1.22	1.83	0.3	0.3	0.61	1.22	0.61	1.22	0	0.15	1.22	1.83
		End Depth (m)	2.13	0.46	0.91	1.68	1.68	0.3	1.22	1.68	2.13	0.46	0.91	0.91	1.83	1.22	1.83	0.09	0.46	1.83	2.06
		Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	12 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	17 Oct 2017	17 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	--	0.25 U	0.05 U	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	--	0.25 U	0.05 U	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	0.14 U	0.14 U	--	--	0.14 U	--	--	0.14 U	--	--	0.14 U	0.14 U	--	--	0.0071 U	0.14 U	--
2,4-Dimethylphenol	38	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2,4-Dinitrophenol	2	µg/g	--	--	1 U	1 U	--	--	1 U	--	--	1 U	--	--	1 U	1 U	--	--	5 U	1 U	--
2,4-Dinitrotoluene	NV	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2,6-Dinitrotoluene	NV	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	0.1 U	0.3 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
4-Chloroaniline	0.5	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Diethylphthalate	0.5	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Dimethylphthalate	0.5	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Phenol	9.4	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
BTEX																					
Benzene	0.21	µg/g	0.0068 U	--	--	0.0068 U	0.0068 U	0.0068 U	--	--	0.0068 U	--	--	0.007	0.0068 U	--	0.0068 U	--	--	0.0068 U	0.0068 U
Ethylbenzene	1.1	µg/g	0.018 U	--	--	0.018 U	0.018 U	0.018 U	--	--	0.018 U	--	--	0.018 U	0.018 U	--	0.018 U	--	--	0.018 U	0.018 U
Toluene	2.3	µg/g	0.08 U	--	--	0.08 U	0.08 U	0.08 U	--	--	0.08 U	--	--	0.08 U	0.08 U	--	0.08 U	--	--	0.08 U	0.08 U
Xylene, o	NV	µg/g	0.02 U	--	--	0.02 U	0.02 U	0.036	--	--	0.02 U	--	--	0.059	0.02 U	--	0.02 U	--	--	0.02 U	0.02 U
Xylenes, m & p	NV	µg/g	0.03	--	--	0.03 U	0.03 U	0.04	--	--	0.03 U	--	--	0.055	0.03 U	--	0.03 U	--	--	0.03 U	0.03 U
Xylenes, Total	3.1	µg/g	0.05 U	--	--	0.05 U	0.05 U	0.076	--	--	0.05 U	--	--	0.115	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2,4-Dichlorophenol	0.19	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
2-Chlorophenol	1.6	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Pentachlorophenol	0.1	µg/g	--	--	0.1 U	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	0.1 U	0.1 U	--	--	0.5 U	0.1 U	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	0.0484	--	0.0055	--	--	--	--	0.0068	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	5.16	--	0.56	--	--	--	--	0.68	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	0.0516	--	0.0056	--	--	--	--	0.0068	--
Moisture	NV	%	4.27	4.64	5.48	4.98	5.44	7.89	8.65	13.6	5.65	7.71	--	6.5	3.62	14.4	4.03	9.94	8.04	1.11	1.57
pH	NV	pH UNITS	--	--	8.31	8.38	--	--	--	7.57	8.6	7.41	--	--	8.14	8.09	--	7.66	--	8.16	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	3.1	3.5	--	--	--	2.6	3.5	4.8	--	--	3	2.2	--	4.9	--	1.5	--
Magnesium	NV	mg/l	--	--	3.2	3.2	--	--	--	1 U	1 U	1 U	--	--	1 U	14.5	--	1 U	--	1 U	--
Sodium	NV	mg/l	--	--	5.3	10.8	--	--	--	1.4	4.5	1 U	--	--	2.9	3.6	--	1 U	--	1.5	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	--	--	1 U	1 U	--	--	--	1 U	1 U	1.8	--	--	1 U	1 U	--	2.9	--	1 U	--
Arsenic	18	µg/g	--	--	6	5.7	--	--	--	9.3	3	3.3	--	--	2.2	9.3	--	11.3	--	4.1	--
Barium	390	µg/g	--	--	36.9	23.1	--	--	--	115	60.5	35.4	--	--	16.1	106	--	80	--	16.1	--
Beryllium	4	µg/g	--	--	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.57	--	0.5 U	--	0.5 U	--
Boron	120	µg/g	--	--	8.5	7.3	--	--	--	5.8	5 U	5.2	--	--	9.9	8.4	--	12.6	--	8.2	--
Cadmium	1.2	µg/g	--	--	6.6	0.85	--	--	--	1.54	0.5 U	0.5 U	--	--	0.69	2.35	--	1.34	--	1.04	--
Chromium	160	µg/g	--	--	8.3	10.3	--	--	--	16.6	21.5	18.9	--	--	8	17	--	16.4	--	9.8	--
Cobalt	22	µg/g	--	--	3.7	3.9	--	--	--	9.8	5.1	2.8	--	--	2.4	8.5	--	5.9	--	3.7	--
Copper	140	µg/g	--	--	29.2	29.6	--	--	--	59.9	25.1	22.9	--	--	8.7	32.7	--	38	--	24.8	--
Lead	120	µg/g	--	--	96.2	58.4	--	--	--	424	45	51.2	--	--	66.8	142	--	175	--	80.5	--
Molybdenum	6.9	µg/g	--	--	1 U	1 U	--	--	--	1	1 U	1.3	--	--	1 U	1 U	--	1.9	--	1 U	--
Nickel	100	µg/g	--	--	16.7	9.6	--	--	--	22.6	10.4	10.1	--	--	7.9	24.7	--	17.4	--	13	--
Selenium	2.4	µg/g	--	--	1 U	1 U	--	--	--	1 U	1 U	1 U	--	--	1 U	1 U	--	1 U	--	1 U	--
Silver	20	µg/g	--	--	0.2 U	0.2 U	--	--	--	0.2 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	--	0.2 U	--	0.2 U	--
Thallium	1	µg/g	--	--	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	0.5 U	--
Uranium	23	µg/g	--	--	1 U	1 U	--	--	--	1 U	1 U	1 U	--	--	1 U	1 U	--	1 U	--	1 U	--
Vanadium	86	µg/g	--	--	13	12.2	--	--	--	35.6	31	17.7	--	--	17.3	31.1	--	24.8	--	15.6	--
Zinc	340	µg/g	--	--	1240	410	--	--	--	784	393	69.4	--	--	456	725	--	901	--	590	--
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	164000	167000	--	--	--	44200	106000	10300	--	--	172000	79500	165000	55900	--	157000	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	73800	72000	--	--	--	19200	29700	4840	--	--	85300	48600	87600	25900	--	66800	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	MW17-102D	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103D	MW17-103D	MW17-104D	MW17-104D	MW17-105D	MW17-105D	MW17-105D	MW17-105D
Sample ID			MW17-100S-6-7	MW17-101S/D-0.5-1.5	MW17-101S/D-2-3	MW17-101S/D-4-5.5	DUP 10	MW17-102D-0.5-1	MW17-102D-0.5-4	MW17-102D-4-5.5	MW17-102D-6-7	MW17-103S/D-1-1.5	MW17-103S/D-1-3	MW17-103S/D-2-3	MW17-103S/D-4-6	MW17-104S/D-2-4	MW17-104S/D-4-6	MW17-105S/D-0-0.3	MW17-105S/D-0.5-1.5	MW17-105S/D-4-6	MW17-105S/D-6-7
Start Depth (m)			1.83	0.15	0.61	1.22	1.22	0.15	0.15	1.22	1.83	0.3	0.3	0.61	1.22	0.61	1.22	0	0.15	1.22	1.83
End Depth (m)			2.13	0.46	0.91	1.68	1.68	0.3	1.22	1.68	2.13	0.46	0.91	0.91	1.83	1.22	1.83	0.09	0.46	1.83	2.06
Sample Type			N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			12 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	17 Oct 2017	17 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	1 U	1 U	--	--	--	1 U	1 U	1 U	--	--	1 U	1 U	1 U	4.8	--	1 U	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	11300	9780	--	--	--	23500	17300	21900	--	--	8690	23500	10700	30100	--	11400	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	0.14	0.15	--	--	--	0.33	0.21	0.23	--	--	0.12	0.48	--	0.57	--	0.21	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	0.2 U	0.2 U	--	--	--	0.31	0.2 U	0.2 U	--	--	0.2 U	0.2 U	--	0.2 U	--	0.2 U	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	0.215	0.249	--	--	--	0.136	0.178	0.17	--	--	0.166	0.241	--	0.174	--	0.128	--
Mercury	0.27	µg/g	--	--	0.124	0.018	--	--	--	0.0432	0.0095	0.246	--	--	0.0289	0.0993	--	0.0537	--	0.0352	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	0.51	1	--	--	--	0.24	0.65	0.13 U	--	--	0.45	0.19	--	0.12 U	--	0.34	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	0.03 U	0.03 U	--	--	0.132	--	0.031	0.162	--	--	0.03 U	0.03 U	--	--	0.58	0.03 U	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	0.042 U	0.042 U	--	--	0.278	--	0.072	0.329	--	--	0.042 U	0.042 U	--	--	1.26	0.042 U	--
2-Methylnaphthalene	NV	µg/g	--	--	0.03 U	0.03 U	--	--	0.146	--	0.04	0.167	--	--	0.03 U	0.03 U	--	--	0.67	0.03 U	--
Acenaphthene	7.9	µg/g	--	--	0.05 U	0.05 U	--	--	0.379	--	0.119	0.05 U	--	--	0.05 U	0.05 U	--	--	0.27	0.05 U	--
Acenaphthylene	0.15	µg/g	--	--	0.05 U	0.05 U	--	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	--	0.25 U	0.05 U	--
Anthracene	0.67	µg/g	--	--	0.05 U	0.05 U	--	--	0.69	--	0.21	0.071	--	--	0.05 U	0.05 U	--	--	0.63	0.05 U	--
Benzo(a)anthracene	0.5	µg/g	--	--	0.05 U	0.06 U	--	--	1.9	--	0.441	0.661	--	--	0.111	0.05 U	--	--	1.37	0.05 U	--
Benzo(a)pyrene	0.3	µg/g	--	--	0.05 U	0.05 U	--	--	1.65	--	0.356	0.748	--	--	0.307	0.05 U	--	--	1.21	0.05 U	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	0.05 U	0.05 U	--	--	1.74	--	0.495	0.902	--	--	0.289	0.05 U	--	--	1.36	0.05 U	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	0.05 U	0.05 U	--	--	0.992	--	0.221	0.526	--	--	0.253	0.05 U	--	--	0.81	0.05 U	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	0.05 U	0.05 U	--	--	1.39	--	0.165	0.623	--	--	0.224	0.05 U	--	--	1.07	0.05 U	--
Chrysene	7	µg/g	--	--	0.05 U	0.213	--	--	1.93	--	0.49	0.797	--	--	0.139	0.05 U	--	--	1.46	0.103	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	0.05 U	0.05 U	--	--	0.25	--	0.061	0.15	--	--	0.074	0.05 U	--	--	0.25 U	0.05 U	--
Fluoranthene	0.69	µg/g	--	--	0.05 U	0.05 U	--	--	4.27	--	1.06	0.646	--	--	0.069	0.05 U	--	--	2.5	0.05 U	--
Fluorene	62	µg/g	--	--	0.05 U	0.05 U	--	--	0.357	--	0.128	0.05 U	--	--	0.05 U	0.05 U	--	--	0.27	0.05 U	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	0.05 U	0.05 U	--	--	1.36	--	0.225	0.673	--	--	0.344	0.05 U	--	--	1.04	0.05 U	--
Naphthalene	0.6	µg/g	--	--	0.05 U	0.05 U	--	--	0.18	--	0.056	0.121	--	--	0.05 U	0.05 U	--	--	0.59	0.05 U	--
Phenanthrene	6.2	µg/g	--	--	0.05 U	0.05 U	--	--	3.92	--	1.1	0.565	--	--	0.05 U	0.05 U	--	--	2.97	0.05 U	--
Pyrene	78	µg/g	--	--	0.05 U	0.109	--	--	3.68	--	0.806	0.594	--	--	0.064	0.05 U	--	--	2.18	0.05 U	--
PCBs																					
Aroclor 1242	NV	µg/g	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	5 U	--	--	5 U	5 U	5 U	--	--	5 U	--	--	5 U	5 U	--	5 U	--	--	5 U	5 U
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	5 U	--	--	5 U	5 U	5 U	--	--	5 U	--	--	5 U	5 U	--	5 U	--	--	5 U	5 U
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	50	--	--	--	--	10 U	--	--	--	10 U	--	--	--	--	23	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10 U	--	--	50	10 U	10 U	--	--	10 U	--	--	11	10 U	--	14	--	--	23	10 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	727	--	--	--	--	50 U	--	--	--	98	--	--	--	--	120	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	50 U	--	--	727	90	91	--	--	50 U	--	--	295	97	--	59	--	--	120	50 U
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50 U	--	--	157	50 U	50 U	--	--	50 U	--	--	459	94	--	50 U	--	--	50 U	50 U
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	400	--	--	--	--	--	--	--	2430	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	72 U	--	--	934	90	91	--	--	72 U	--	--	766	193	--	72	--	--	143	72 U

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	MW17-102D	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103D	MW17-103D	MW17-104D	MW17-104D	MW17-105D	MW17-105D	MW17-105D	MW17-105D
			Sample ID	MW17-100S-6-7	MW17-101S/D-0.5-1.5	MW17-101S/D-2-3	MW17-101S/D-4-5.5	DUP 10	MW17-102D-0.5-1	MW17-102D-0.5-4	MW17-102D-4-5.5	MW17-102D-6-7	MW17-103S/D-1-1.5	MW17-103S/D-1-3	MW17-103S/D-2-3	MW17-103S/D-4-6	MW17-104S/D-2-4	MW17-104S/D-4-6	MW17-105S/D-0-0.3	MW17-105S/D-0.5-1.5	MW17-105S/D-4-6	MW17-105S/D-6-7
			Start Depth (m)	1.83	0.15	0.61	1.22	1.22	0.15	0.15	1.22	1.83	0.3	0.3	0.61	1.22	0.61	1.22	0	0.15	1.22	1.83
			End Depth (m)	2.13	0.46	0.91	1.68	1.68	0.3	1.22	1.68	2.13	0.46	0.91	0.91	1.83	1.22	1.83	0.09	0.46	1.83	2.06
			Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	12 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	17 Oct 2017	17 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,1,1-Trichloroethane	0.38	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,1,2-Trichloroethane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,1-Dichloroethane	0.47	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,1-Dichloroethene	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,2-Dibromoethane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,2-Dichlorobenzene	1.2	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,2-Dichloroethane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,2-Dichloropropane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,3-Dichlorobenzene	4.8	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,3-Dichloropropene	0.05	µg/g		0.042 U	--	--	0.042 U	0.042 U	0.042 U	--	--	0.042 U	--	--	0.042 U	0.042 U	--	0.042 U	--	--	0.042 U	0.042 U
1,4-Dichlorobenzene	0.083	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
1,4-Dioxane	1.8	mg/kg		--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g		0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U
Acetone	16	µg/g		0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U
Bromodichloromethane	1.5	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Bromoform	0.27	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Bromomethane	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Carbon tetrachloride	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Chlorobenzene	2.4	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Chlorodibromomethane	2.3	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Chloroform	0.05	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
cis-1,3-Dichloropropene	NV	µg/g		0.03 U	--	--	0.03 U	0.03 U	0.03 U	--	--	0.03 U	--	--	0.03 U	0.03 U	--	0.03 U	--	--	0.03 U	0.03 U
Dichlorodifluoromethane	16	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Dichloromethane	0.1	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
n-Hexane	2.8	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.083	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Styrene	0.7	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Tetrachloroethene	0.28	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
trans-1,3-Dichloropropene	NV	µg/g		0.03 U	--	--	0.03 U	0.03 U	0.03 U	--	--	0.03 U	--	--	0.03 U	0.03 U	--	0.03 U	--	--	0.03 U	0.03 U
Trichloroethylene	0.061	µg/g		0.01 U	--	--	0.01 U	0.01 U	0.082	--	--	0.01 U	--	--	0.01 U	0.01 U	--	0.01 U	--	--	0.01 U	0.01 U
Trichlorofluoromethane	4	µg/g		0.05 U	--	--	0.05 U	0.05 U	0.05 U	--	--	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	0.05 U	0.05 U
Vinyl Chloride	0.02	µg/g		0.02 U	--	--	0.02 U	0.02 U	0.02 U	--	--	0.02 U	--	--	0.02 U	0.02 U	--	0.02 U	--	--	0.02 U	0.02 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	MW17-102D	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103D	MW17-103D	MW17-104D	MW17-104D	MW17-105D	MW17-105D	MW17-105D	MW17-105D
			Sample ID	MW17-100S-6-7	MW17-101S/D-0.5-1.5	MW17-101S/D-2-3	MW17-101S/D-4-5.5	DUP 10	MW17-102D-0.5-1	MW17-102D-0.5-4	MW17-102D-4-5.5	MW17-102D-6-7	MW17-103S/D-1-1.5	MW17-103S/D-1-3	MW17-103S/D-2-3	MW17-103S/D-4-6	MW17-104S/D-2-4	MW17-104S/D-4-6	MW17-105S/D-0-0.3	MW17-105S/D-0.5-1.5	MW17-105S/D-4-6	MW17-105S/D-6-7
			Start Depth (m)	1.83	0.15	0.61	1.22	1.22	0.15	0.15	1.22	1.83	0.3	0.3	0.61	1.22	0.61	1.22	0	0.15	1.22	1.83
			End Depth (m)	2.13	0.46	0.91	1.68	1.68	0.3	1.22	1.68	2.13	0.46	0.91	0.91	1.83	1.22	1.83	0.09	0.46	1.83	2.06
			Sample Type	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	12 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	20 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	26 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	25 Oct 2017	17 Oct 2017	17 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017	24 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW17-106D	MW17-107S	MW17-107S	MW17-107S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-109S	MW17-109S	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW17-111S
Sample ID			BH17-204-0.5-2	MW17-107S-0.5-2	DUP 7	MW17-107S-4.5-5.5	MW17-108S-0-1	MW17-108S-2-4	DUP 6	MW17-108S-8-9	MW17-108S-9-9.5	MW17-108S-10-10.5	MW17-109S-0-1	MW17-109S-0-2	MW17-109S-4-5	DUP9	MW17-110S-0-2	MW17-110S-4-6	MW17-111S-0-1	MW17-111S-0-2	DUP 8
Start Depth (m)			0.15	0.15	0.15	1.37	0	0.61	0.61	2.44	2.74	3.05	0	0	1.22	1.22	0	1.22	0	0	0
End Depth (m)			0.61	0.61	0.61	1.68	0.3	0.91	0.91	2.67	2.9	3.2	0.3	0.61	1.52	1.52	0.61	1.83	0.3	0.61	0.61
Sample Type			N	N	FD	N	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	FD
Sample Date			18 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--	0.237	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	--	--	--	--	--	0.05 U	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	0.14 U	0.14 U	--	0.14 U	--	0.14 U	0.14 U	--	--	--	--	--	--	--	0.14 U	--	--	--	--
2,4-Dimethylphenol	38	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2,4-Dinitrophenol	2	µg/g	1 U	1 U	--	1 U	--	1 U	1 U	--	--	--	--	--	--	--	1 U	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
4-Chloroaniline	0.5	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Diethylphthalate	0.5	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Dimethylphthalate	0.5	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Phenol	9.4	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	0.012	0.0452 J	0.0109 J	0.0068 U	--	--	--	--	0.0068 U	0.0068 U	--	--	0.0068 U	0.0068 U	--	0.0068 U	--	--	--
Ethylbenzene	1.1	µg/g	0.039	0.053 J	0.018 UJ	0.018 U	--	--	--	--	0.018 U	0.018 U	--	--	0.018 U	0.018 U	--	0.018 U	--	--	--
Toluene	2.3	µg/g	0.08 U	0.211 J	0.08 UJ	0.08 U	--	--	--	--	0.08 U	0.08 U	--	--	0.08 U	0.08 U	--	0.08 U	--	--	--
Xylene, o	NV	µg/g	0.333	0.121 J	0.064 J	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	0.02 U	--	--	--
Xylenes, m & p	NV	µg/g	0.158	0.133 J	0.075 J	0.03 U	--	--	--	--	0.03 U	0.03 U	--	--	0.032	0.03 U	--	0.03 U	--	--	--
Xylenes, Total	3.1	µg/g	0.491	0.254 J	0.139 J	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
2-Chlorophenol	1.6	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Pentachlorophenol	0.1	µg/g	0.1 U	0.1 U	--	0.1 U	--	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	0.031	--	--	--	--	--	--	--	--	--	0.0052	0.243	--	--	--
Carbon	NV	%	--	--	--	--	3.24	--	--	--	--	--	--	--	--	--	0.53	25.1	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	0.0324	--	--	--	--	--	--	--	--	--	0.0053	0.251	--	--	--
Moisture	NV	%	12.3	11.8	11.6	7.78	--	5.12	5.25	7.57	7.77	7.38	7.9	7.83	15 J	5.61 J	18.2	3.1	10.2	3.92	4.26
pH	NV	pH UNITS	10.64	7.8	--	8.86	--	7.76	7.75	7.39	--	--	--	7.63	8.14	--	7.32	8.38	--	7.13	7.05
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	33.4	5.9	--	4.9	--	15.4	14.5	9.5	--	--	--	2.3	3.2	--	4.5	2.8	--	2.9	2.5
Magnesium	NV	mg/l	1 U	1 U	--	1.2	--	19	18.1	12.9	--	--	--	1 U	1.5	--	1.3	3.2	--	1 U	1 U
Sodium	NV	mg/l	9.1	1 U	--	2.8	--	7.8	8.2	3.6	--	--	--	1.7	2.3	--	1 U	2.7	--	1.3	1.3
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	1 U	1 U	--	1 U	--	5.9	6.6	6.5	--	--	--	1 U	1 U	--	2.9	1 U	--	1.1	1.3
Arsenic	18	µg/g	2.5	2.8	--	2.4	--	12.3	10.6	8.7	--	--	--	6	2	--	9.9	2.4	--	10.2	10.9
Barium	390	µg/g	33.8	20.3	--	22.4	--	28.7	33.2	50.5	--	--	--	16.8	18.3	--	46.2	19	--	51.3	50.8
Beryllium	4	µg/g	0.5 U	0.5 U	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	--	0.56	0.5 U	--	0.5 U	0.5 U
Boron	120	µg/g	6	5 U	--	6.3	--	15.3	15.3	21.3	--	--	--	6	15.4	--	9.3	8.6	--	6.7	5.9
Cadmium	1.2	µg/g	0.5 U	0.5 U	--	0.58	--	41.4	38.3	83.4	--	--	--	0.5 U	11.7	--	0.5 U	0.5 U	--	0.5 U	0.5 U
Chromium	160	µg/g	8.7	6.9	--	11.3	--	55.1	54.8	26.2	--	--	--	8.1	6	--	12.7	7.3	--	27.9	30.2
Cobalt	22	µg/g	2.9	3.2	--	4.7	--	2.6	2.5	4.5	--	--	--	3.3	3.7	--	5.9	2.8	--	7.4	7.6
Copper	140	µg/g	12.8	8.9	--	13.9	--	69.6	74.8	364	--	--	--	12	11.8	--	44	5.3	--	26.5	27.7
Lead	120	µg/g	10	33.1	--	75.1	--	197	233	121	--	--	--	7.9	158	--	149	65.3	--	34.9	31.5
Molybdenum	6.9	µg/g	1 U	1 U	--	1 U	--	2.2	1.8	1 U	--	--	--	1 U	1.3	--	1.7	1 U	--	1.5	1.4
Nickel	100	µg/g	9.1	7	--	11.6	--	10.3	9.7	10.5	--	--	--	6	8	--	16.2	6.3	--	18.4	19.4
Selenium	2.4	µg/g	1 U	1 U	--	1 U	--	1 U	1 U	1 U	--	--	--	1 U	1 U	--	1 U	1 U	--	1 U	1 U
Silver	20	µg/g	0.2 U	0.2 U	--	0.2 U	--	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	0.2 U	--	0.2 U	0.2 U	--	0.2 U	0.2 U
Thallium	1	µg/g	0.5 U	0.5 U	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U
Uranium	23	µg/g	1 U	1 U	--	1 U	--	1 U	1 U	1 U	--	--	--	1 U	1.7	--	1 U	1 U	--	1 U	1 U
Vanadium	86	µg/g	12.3	13.9	--	19.6	--	41.1	43.2	56.4	--	--	--	19.7	10.9	--	17.1	14.5	--	41.3	43.6
Zinc	340	µg/g	37.5	53.4	--	534	--	24400	25300	67200	--	--	--	56.6	3900	--	130	398	--	85.5	79.1
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b]	µg/g	13700	33200	--	143000	--	142000	139000	83500	--	--	--	108000	196000	--	4110	134000	--	5410	5120
Magnesium	~~NV~~ 17000 [b]	µg/g	3640	4490	--	46300	--	74700	74200	40000	--	--	--	32500	103000	--	1550	77700	--	3080	2960

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-106D	MW17-107S	MW17-107S	MW17-107S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-109S	MW17-109S	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW17-111S
		Sample ID	BH17-204-0.5-2	MW17-107S-0.5-2	DUP 7	MW17-107S-4.5-5.5	MW17-108S-0-1	MW17-108S-2-4	DUP 6	MW17-108S-8-9	MW17-108S-9-9.5	MW17-108S-10-10.5	MW17-109S-0-1	MW17-109S-0-2	MW17-109S-4-5	DUP9	MW17-110S-0-2	MW17-110S-4-6	MW17-111S-0-1	MW17-111S-0-2	DUP 8
		Start Depth (m)	0.15	0.15	0.15	1.37	0	0.61	0.61	2.44	2.74	3.05	0	0	1.22	1.22	0	1.22	0	0	0
		End Depth (m)	0.61	0.61	0.61	1.68	0.3	0.91	0.91	2.67	2.9	3.2	0.3	0.61	1.52	1.52	0.61	1.83	0.3	0.61	0.61
		Sample Type	N	N	FD	N	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	FD
		Sample Date	18 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	1 U	1 U	--	1 U	--	1 U	1 U	1 U	--	--	--	1 U	1 U	--	1 U	1 U	--	1 U	1 U
Iron	~~NV~~ 38000 [b]	µg/g	9690	15200	--	14500	--	51100	52400	67100	--	--	--	11400	5630	--	28800	11200	--	53000	55100
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	0.22	0.18	--	0.11	--	0.34	0.35	0.35	--	--	--	0.1 U	0.14	--	0.49	0.17	--	0.3	0.3
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	0.2 U	0.2 U	--	0.2 U	--	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	0.2 U	--	0.2 U	0.2 U	--	0.21	0.2 U
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	0.346	0.172	--	0.162	--	0.478	0.445	0.352	--	--	--	0.127	0.153	--	0.161	0.163	--	0.112	0.108
Mercury	0.27	µg/g	0.0054	0.0061	--	0.0235	--	0.0893	0.112	0.0108	--	--	--	0.0089	0.096	--	0.0605	0.0313	--	0.0102	0.0092
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	0.43	0.11 U	--	0.29	--	0.31	0.34	0.18	--	--	--	0.31	0.26	--	0.11 U	0.26	--	0.21	0.22
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	0.097	0.073	--	0.03 U	--	0.03 U	0.03 U	--	--	0.03 U	--	--	--	--	1.8	0.03 U	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	0.193	0.141	--	0.042 U	--	0.042 U	0.042 U	--	--	0.042 U	--	--	--	--	3.59	0.042 U	--	--	--
2-Methylnaphthalene	NV	µg/g	0.096	0.068	--	0.03 U	--	0.03 U	0.03 U	--	--	0.03 U	--	--	--	--	1.79	0.03 U	--	--	--
Acenaphthene	7.9	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--	0.098 J	0.05 U	--	--	--
Acenaphthylene	0.15	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--	0.091	0.05 U	--	--	--
Anthracene	0.67	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--	0.189	0.05 U	--	--	--
Benzo(a)anthracene	0.5	µg/g	0.096	0.053	--	0.05 U	--	0.05 U	0.075	--	--	0.05 U	--	--	--	--	0.97	0.05 U	--	--	--
Benzo(a)pyrene	0.3	µg/g	0.131	0.05 U	--	0.05 U	--	0.05 U	0.067	--	--	0.05 U	--	--	--	--	0.837	0.05 U	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	0.201	0.063	--	0.05 U	--	0.05 U	0.073	--	--	0.05 U	--	--	--	--	1.03	0.05 U	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	0.18	0.05 U	--	0.05 U	--	0.05 U	0.074	--	--	0.05 U	--	--	--	--	0.634	0.05 U	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	0.106	0.05 U	--	0.05 U	--	0.05 U	0.066	--	--	0.05 U	--	--	--	--	0.723	0.05 U	--	--	--
Chrysene	7	µg/g	0.162	0.066	--	0.05 U	--	0.081 J	0.158 J	--	--	0.192	--	--	--	--	1.43	0.05 U	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--	0.185	0.05 U	--	--	--
Fluoranthene	0.69	µg/g	0.132	0.092	--	0.05 U	--	0.05 UJ	0.145 J	--	--	0.05 U	--	--	--	--	1.92	0.05 U	--	--	--
Fluorene	62	µg/g	0.05 U	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.052	--	--	--	--	0.151	0.05 U	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	0.138	0.05 U	--	0.05 U	--	0.05 U	0.091	--	--	0.05 U	--	--	--	--	0.648	0.05 U	--	--	--
Naphthalene	0.6	µg/g	0.066	0.05 U	--	0.05 U	--	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--	1.04	0.05 U	--	--	--
Phenanthrene	6.2	µg/g	0.151	0.099	--	0.05 U	--	0.064 J	0.144 J	--	--	0.05 U	--	--	--	--	2.71	0.05 U	--	--	--
Pyrene	78	µg/g	0.109	0.083	--	0.05 U	--	0.05 U	0.135	--	--	0.085	--	--	--	--	1.56	0.05 U	--	--	--
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	0.01 U	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	0.01 U	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	0.01 U	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	0.01 U	--	--
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	0.02 U	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	13.2	10.8	5 U	5 U	--	--	--	--	5 U	5 U	--	--	8	5 U	--	5 U	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	13.8	11.4	5 U	5 U	--	--	--	--	5 UJ	5 U	--	--	8	5 U	--	5 U	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	10 U	10 U	--	10 U	--	--	--	--	--	55	--	--	--	--	--	10 U	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10 U	10 U	11	10 U	--	--	--	--	345	55	--	--	38	27	--	10 U	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	68	50 U	--	50 U	--	--	--	--	--	2280	--	--	--	--	--	128	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	70	50 U	63	50 U	--	--	--	--	14700	2280	--	--	232	195	--	128	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50 U	50 U	50 U	50 U	--	--	--	--	981	142	--	--	63	84	--	94	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	360	260	--	350	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	83	72 U	74	72 U	--	--	--	--	16000	2480	--	--	341	306	--	222	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-106D	MW17-107S	MW17-107S	MW17-107S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-109S	MW17-109S	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW17-111S
		Sample ID	BH17-204-0.5-2	MW17-107S-0.5-2	DUP 7	MW17-107S-4.5-5.5	MW17-108S-0-1	MW17-108S-2-4	DUP 6	MW17-108S-8-9	MW17-108S-9-9.5	MW17-108S-10-10.5	MW17-109S-0-1	MW17-109S-0-2	MW17-109S-4-5	DUP9	MW17-110S-0-2	MW17-110S-4-6	MW17-111S-0-1	MW17-111S-0-2	DUP 8
		Start Depth (m)	0.15	0.15	0.15	1.37	0	0.61	0.61	2.44	2.74	3.05	0	0	1.22	1.22	0	1.22	0	0	0
		End Depth (m)	0.61	0.61	0.61	1.68	0.3	0.91	0.91	2.67	2.9	3.2	0.3	0.61	1.52	1.52	0.61	1.83	0.3	0.61	0.61
		Sample Type	N	N	FD	N	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	FD
		Sample Date	18 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.2 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,1-Dichloroethane	0.47	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,1-Dichloroethene	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,2-Dibromoethane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,2-Dichloroethane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,2-Dichloropropane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,3-Dichloropropene	0.05	µg/g	0.042 U	0.042 U	0.042 U	0.042 U	--	--	--	--	0.042 U	0.042 U	--	--	0.042 U	0.042 U	--	0.042 U	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	--
Acetone	16	µg/g	0.5 U	1 U	0.5 U	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	0.5 U	--	--	--
Bromodichloromethane	1.5	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Bromoform	0.27	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Bromomethane	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Carbon tetrachloride	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Chlorobenzene	2.4	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Chlorodibromomethane	2.3	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Chloroform	0.05	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	0.03 U	0.03 U	0.03 U	0.03 U	--	--	--	--	0.03 U	0.03 U	--	--	0.03 U	0.03 U	--	0.03 U	--	--	--
Dichlorodifluoromethane	16	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Dichloromethane	0.1	µg/g	0.05 U	0.43 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
n-Hexane	2.8	µg/g	0.053	0.861 J	0.05 UJ	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.164 J	0.05 J	--	0.05 U	--	--	--
Styrene	0.7	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Tetrachloroethene	0.28	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	0.03 U	0.03 U	0.03 U	0.03 U	--	--	--	--	0.03 U	0.03 U	--	--	0.03 U	0.03 U	--	0.03 U	--	--	--
Trichloroethylene	0.061	µg/g	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	--	0.01 U	0.01 U	--	--	0.01 U	0.01 U	--	0.01 U	--	--	--
Trichlorofluoromethane	4	µg/g	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	0.05 U	0.05 U	--	0.05 U	--	--	--
Vinyl Chloride	0.02	µg/g	0.02 U	0.02 U	0.02 U	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	0.02 U	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-106D	MW17-107S	MW17-107S	MW17-107S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-108S	MW17-109S	MW17-109S	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW17-111S
		Sample ID	BH17-204-0.5-2	MW17-107S-0.5-2	DUP 7	MW17-107S-4.5-5.5	MW17-108S-0-1	MW17-108S-2-4	DUP 6	MW17-108S-8-9	MW17-108S-9-9.5	MW17-108S-10-10.5	MW17-109S-0-1	MW17-109S-0-2	MW17-109S-4-5	DUP9	MW17-110S-0-2	MW17-110S-4-6	MW17-111S-0-1	MW17-111S-0-2	DUP 8
		Start Depth (m)	0.15	0.15	0.15	1.37	0	0.61	0.61	2.44	2.74	3.05	0	0	1.22	1.22	0	1.22	0	0	0
		End Depth (m)	0.61	0.61	0.61	1.68	0.3	0.91	0.91	2.67	2.9	3.2	0.3	0.61	1.52	1.52	0.61	1.83	0.3	0.61	0.61
		Sample Type	N	N	FD	N	N	N	FD	N	N	N	N	N	N	FD	N	N	N	N	FD
		Sample Date	18 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	11 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	16 Oct 2017	12 Oct 2017	12 Oct 2017	12 Oct 2017
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-111S	MW17-111S	MW18-117S	MW18-117S	MW18-117S	MW18-117S	MW18-120D	MW18-121S	MW18-122D	MW18-123D	MW18-123D	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-125S	MW18-126D	MW18-126D	MW18-126D
		Sample ID	MW17-111S-2-4	MW17-111S-6-7	MW18-117S-1	MW18-117S-2	DUP 1 JUL 25	DUP 2 JUL 25	MW18-120D-3.0	MW18-121S-1	MW18-122D-1	MW18-123D-2.5	MW18-123D-5	MW18-124S-1	MW18-124S-2	MW18-125S-1	MW18-125S-2	MW18-125S-3	MW18-126D-1	MW18-126D-2	MW18-126D-3
		Start Depth (m)	0.61	1.83	0	0	0.76	0.76	0.76	0.76	0.76	0	0.76	0.76	1.52	0	0.76	1.52	0	0.76	1.52
		End Depth (m)	1.22	2.13	0.6	0.6	1.37	1.37	1.37	1.37	1.37	0.6	1.37	1.37	2.13	0.6	1.37	2.13	0.3	1.37	2.13
		Sample Type	N	N	N	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	12 Oct 2017	12 Oct 2017	25 Jul 2018	25 Jul 2018	25 Jul 2018	25 Jul 2018	21 Jun 2018	27 Jul 2018	26 Jul 2018	27 Jun 2018	27 Jun 2018	24 Jul 2018	24 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	0.0068 U	0.0068 U	0.0166	--	0.0132	--	--	--	--	--	0.0068 UJ	--	--	--	--	--	--	0.0205	--
Ethylbenzene	1.1	µg/g	0.018 U	0.018 U	0.033	--	0.025	--	--	--	--	--	0.018 UJ	--	--	--	--	--	--	0.033	--
Toluene	2.3	µg/g	0.08 U	0.08 U	0.101	--	0.08 U	--	--	--	--	--	0.08 UJ	--	--	--	--	--	--	0.116	--
Xylene, o	NV	µg/g	0.02 U	0.02 U	0.098	--	0.077	--	--	--	--	--	0.02 UJ	--	--	--	--	--	--	0.112	--
Xylenes, m & p	NV	µg/g	0.03 U	0.03 U	0.116	--	0.103	--	--	--	--	--	0.03 UJ	--	--	--	--	--	--	0.114	--
Xylenes, Total	3.1	µg/g	0.05 U	0.05 U	0.214	--	0.179	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.225	--
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	8.38	7	4.54	9.95	8.9	15.6	--	--	6.64	20.8	4.67	7.44	8.55	19.9	4.1	9.19	5.81	5.74	3.26
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	6.98	7.72 J	--	--	--	--	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	4	22.3	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	1.1	10.3	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	5.6	2.6	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	--	--	--	1 U	--	1 U	1 U	1 U	1 U	1 U	--	1 U	--	--	1 U	--	1 U	--	--
Arsenic	18	µg/g	--	--	--	1.5	--	1.5	7.2	8	3.7	8.5	--	2.7	--	--	2.3	--	3.6	--	--
Barium	390	µg/g	--	--	--	27.8	--	24.6	68.6	58.3	25.3	84.7	--	16.6	--	--	18	--	31.3	--	--
Beryllium	4	µg/g	--	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.55	--	0.5 U	--	--	0.5 U	--	0.5 U	--	--
Boron	120	µg/g	--	--	--	5.7	--	7.5	12.2	9.6	5 U	10.1	--	5 U	--	--	7.1	--	5.2	--	--
Cadmium	1.2	µg/g	--	--	--	0.5 U	--	0.5 U	1.19	0.99	0.5 U	1.82	--	0.5 U	--	--	0.5 U	--	0.5 U	--	--
Chromium	160	µg/g	--	--	--	10.4	--	10.2	10.6	10.3	7.4	16	--	8.5	--	--	7.6	--	10.1	--	--
Cobalt	22	µg/g	--	--	--	5.9	--	3.9	8.2	5.3	2.7	6.1	--	3.3	--	--	1.7	--	2.5	--	--
Copper	140	µg/g	--	--	--	14.9	--	11.1	17.2	15.1	6.9	24	--	11	--	--	6.5	--	8.6	--	--
Lead	120	µg/g	--	--	--	156	--	121	39.4	82.7	18.7	186	--	8.7	--	--	95.2	--	28.6	--	--
Molybdenum	6.9	µg/g	--	--	--	1 U	--	1 U	1 U	1	1 U	1 U	--	1 U	--	--	1 U	--	1 U	--	--
Nickel	100	µg/g	--	--	--	15.5	--	11	13.1	11.6	6.1	17.2	--	5.6	--	--	4.9	--	7.6	--	--
Selenium	2.4	µg/g	--	--	--	1 U	--	1 U	1 U	1 U	1 U	1 U	--	1 U	--	--	1 U	--	1 U	--	--
Silver	20	µg/g	--	--	--	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	0.2 U	--	0.2 U	--	--
Thallium	1	µg/g	--	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	--	0.5 U	--	--
Uranium	23	µg/g	--	--	--	1 U	--	1 U	1 U	1 U	1 U	1 U	--	1 U	--	--	1 U	--	1 U	--	--
Vanadium	86	µg/g	--	--	--	65	--	39.4	23.4	20.8	13.1	27.7	--	21	--	--	9.2	--	14.2	--	--
Zinc	340	µg/g	--	--	--	536	--	389	585	403	44.1	543	--	48.7	--	--	175	--	71.5	--	--
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	109000	--	106000	158000	106000	2880	90500	--	91000	--	--	182000	--	10900	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	64000	--	64000	89300	58600	1800	49800	--	22300	--	--	111000	--	3890	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-111S	MW17-111S	MW18-117S	MW18-117S	MW18-117S	MW18-117S	MW18-120D	MW18-121S	MW18-122D	MW18-123D	MW18-123D	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-125S	MW18-126D	MW18-126D	MW18-126D
		Sample ID	MW17-111S-2-4	MW17-111S-6-7	MW18-117S-1	MW18-117S-2	DUP 1 JUL 25	DUP 2 JUL 25	MW18-120D-3.0	MW18-121S-1	MW18-122D-1	MW18-123D-2.5	MW18-123D-5	MW18-124S-1	MW18-124S-2	MW18-125S-1	MW18-125S-2	MW18-125S-3	MW18-126D-1	MW18-126D-2	MW18-126D-3
		Start Depth (m)	0.61	1.83	0	0	0.76	0.76	0.76	0.76	0.76	0	0.76	0.76	1.52	0	0.76	1.52	0	0.76	1.52
		End Depth (m)	1.22	2.13	0.6	0.6	1.37	1.37	1.37	1.37	1.37	0.6	1.37	1.37	2.13	0.6	1.37	2.13	0.3	1.37	2.13
		Sample Type	N	N	N	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	12 Oct 2017	12 Oct 2017	25 Jul 2018	25 Jul 2018	25 Jul 2018	25 Jul 2018	21 Jun 2018	27 Jul 2018	26 Jul 2018	27 Jun 2018	27 Jun 2018	24 Jul 2018	24 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	1 U	--	1 U	--	1 U	1 U	1 U	--	1 U	--	--	1 U	--	1 U	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	18400	--	14100	20200	16100	9040	19200	--	11300	--	--	6560	--	11300	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	0.25	0.78	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	--	0.2 U	0.2 UJ	--	--	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	0.05 U	0.05 UJ	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	--	0.117	0.33 J	--	--	--	--	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	0.0092	0.0903	--	--	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	0.64	0.12	--	--	--	--	--	--	--	--	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	0.07	--	0.03 UJ	0.03 U	0.3 U	--	--	0.03 U	0.262	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	0.16	--	0.042 UJ	0.042 U	0.42 U	--	--	0.042 U	0.6	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	0.091	--	0.03 UJ	0.03 U	0.3 U	--	--	0.03 U	0.338	--	--
Acenaphthene	7.9	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.05 U	--	--
Acenaphthylene	0.15	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.05 U	--	--
Anthracene	0.67	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.05 U	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.182	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.23	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.385	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.193	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.221	--	--
Chrysene	7	µg/g	--	--	--	--	--	--	--	--	0.055	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.295	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.073	--	--
Fluoranthene	0.69	µg/g	--	--	--	--	--	--	--	--	0.06	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.238	--	--
Fluorene	62	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.05 U	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.181	--	--
Naphthalene	0.6	µg/g	--	--	--	--	--	--	--	--	0.073	--	0.013 UJ	0.013 U	0.13 U	--	--	0.013 U	0.276	--	--
Phenanthrene	6.2	µg/g	--	--	--	--	--	--	--	--	0.074	--	0.046 UJ	0.046 U	0.46 U	--	--	0.046 U	0.224	--	--
Pyrene	78	µg/g	--	--	--	--	--	--	--	--	0.05 U	--	0.05 UJ	0.05 U	0.5 U	--	--	0.05 U	0.21	--	--
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	--	0.01 U
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	--	0.01 U
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	--	0.01 U
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	--	0.01 U
PCB, Total	0.35	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	--	0.02 U
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	5 U	--	5 U	--	5 U	--	--	--	--	--	--	--	--	--	--	--	5 U	--	
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	5 U	--	5 U	--	5 U	--	--	--	--	--	--	--	--	--	5 U	--	5 U	--	
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10 U	--	50 U	--	50 U	--	--	--	--	--	--	--	--	--	10 U	--	--	10 U	
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	50 U	--	670	--	800	--	--	--	--	--	--	--	--	--	53	--	--	60	
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50 U	--	490	--	410	--	--	--	--	--	--	--	--	--	50 U	--	--	50 U	
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	1330	--	980	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	72 U	--	1160	--	1220	--	--	--	--	--	--	--	--	--	72 U	--	--	72 U	

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	MW17-111S	MW17-111S	MW18-117S	MW18-117S	MW18-117S	MW18-117S	MW18-120D	MW18-121S	MW18-122D	MW18-123D	MW18-123D	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-125S	MW18-126D	MW18-126D	MW18-126D
			Sample ID	MW17-111S-2-4	MW17-111S-6-7	MW18-117S-1	MW18-117S-2	DUP 1 JUL 25	DUP 2 JUL 25	MW18-120D-3.0	MW18-121S-1	MW18-122D-1	MW18-123D-2.5	MW18-123D-5	MW18-124S-1	MW18-124S-2	MW18-125S-1	MW18-125S-2	MW18-125S-3	MW18-126D-1	MW18-126D-2	MW18-126D-3
			Start Depth (m)	0.61	1.83	0	0	0.76	0.76	0.76	0.76	0.76	0	0.76	0.76	1.52	0	0.76	1.52	0	0.76	1.52
			End Depth (m)	1.22	2.13	0.6	0.6	1.37	1.37	1.37	1.37	1.37	0.6	1.37	1.37	2.13	0.6	1.37	2.13	0.3	1.37	2.13
			Sample Type	N	N	N	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	12 Oct 2017	12 Oct 2017	25 Jul 2018	25 Jul 2018	25 Jul 2018	25 Jul 2018	21 Jun 2018	27 Jul 2018	26 Jul 2018	27 Jun 2018	27 Jun 2018	24 Jul 2018	24 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,1,1-Trichloroethane	0.38	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,1,2,2-Tetrachloroethane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,1,2-Trichloroethane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,1-Dichloroethane	0.47	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,1-Dichloroethene	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,2-Dibromoethane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,2-Dichlorobenzene	1.2	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,2-Dichloroethane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,2-Dichloropropane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,3-Dichlorobenzene	4.8	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,3-Dichloropropene	0.05	µg/g		0.042 U	0.042 U	--	--	--	--	--	--	--	--	0.042 UJ	--	--	--	--	--	--	0.042 U	--
1,4-Dichlorobenzene	0.083	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
1,4-Dioxane	1.8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		0.5 U	0.5 U	--	--	--	--	--	--	--	--	0.5 UJ	--	--	--	--	--	--	0.5 U	--
4-Methyl-2-Pentanone	1.7	µg/g		0.5 U	0.5 U	--	--	--	--	--	--	--	--	0.5 UJ	--	--	--	--	--	--	0.5 U	--
Acetone	16	µg/g		0.5 U	0.5 U	--	--	--	--	--	--	--	--	0.5 UJ	--	--	--	--	--	--	0.5 U	--
Bromodichloromethane	1.5	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Bromoform	0.27	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Bromomethane	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Carbon tetrachloride	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Chlorobenzene	2.4	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Chlorodibromomethane	2.3	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Chloroform	0.05	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
cis-1,2-Dichloroethene	1.9	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
cis-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	--	--	--	--	--	--	--	--	0.03 UJ	--	--	--	--	--	--	0.03 U	--
Dichlorodifluoromethane	16	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Dichloromethane	0.1	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
n-Hexane	2.8	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.17 U	--
Styrene	0.7	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Tetrachloroethene	0.28	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
trans-1,2-Dichloroethene	0.084	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
trans-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	--	--	--	--	--	--	--	--	0.03 UJ	--	--	--	--	--	--	0.03 U	--
Trichloroethylene	0.061	µg/g		0.01 U	0.01 U	--	--	--	--	--	--	--	--	0.01 UJ	--	--	--	--	--	--	0.017	--
Trichlorofluoromethane	4	µg/g		0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 UJ	--	--	--	--	--	--	0.05 U	--
Vinyl Chloride	0.02	µg/g		0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 UJ	--	--	--	--	--	--	0.02 U	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW17-111S	MW17-111S	MW18-117S	MW18-117S	MW18-117S	MW18-117S	MW18-120D	MW18-121S	MW18-122D	MW18-123D	MW18-123D	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-125S	MW18-126D	MW18-126D	MW18-126D
Sample ID			MW17-111S-2-4	MW17-111S-6-7	MW18-117S-1	MW18-117S-2	DUP 1 JUL 25	DUP 2 JUL 25	MW18-120D-3.0	MW18-121S-1	MW18-122D-1	MW18-123D-2.5	MW18-123D-5	MW18-124S-1	MW18-124S-2	MW18-125S-1	MW18-125S-2	MW18-125S-3	MW18-126D-1	MW18-126D-2	MW18-126D-3
Start Depth (m)			0.61	1.83	0	0	0.76	0.76	0.76	0.76	0.76	0	0.76	0.76	1.52	0	0.76	1.52	0	0.76	1.52
End Depth (m)			1.22	2.13	0.6	0.6	1.37	1.37	1.37	1.37	1.37	0.6	1.37	1.37	2.13	0.6	1.37	2.13	0.3	1.37	2.13
Sample Type			N	N	N	N	FD	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			12 Oct 2017	12 Oct 2017	25 Jul 2018	25 Jul 2018	25 Jul 2018	25 Jul 2018	21 Jun 2018	27 Jul 2018	26 Jul 2018	27 Jun 2018	27 Jun 2018	24 Jul 2018	24 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018	31 Jul 2018
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-126D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	OW01-II	OW06	OW07-31	OW07-31	OW07-32	OW07-32	OW07-32	OW07-33	OW07-34D	OW07-34D	OW07-34D	OW07-35	OW07-36D
		Sample ID	DUP JULY 31	MW18-129D-1	DUP2 JUL23	MW18-129D-2	DUP3 JUL23	MW18-129D-3	AS4-OWI-II	BH6-SS1	OW07-31SS1	DUP#8	OW07-32SS1	OW07-32	OW07-32SS2	OW07-33SS1	OW07-34SS1	OW07-34SS2	DUP#11	OW07-35SS1	OW07-36SS1
		Start Depth (m)	1.52	0.76	0.76	1.52	1.52	2.29	2.13	0	0	0	0	0	1.22	0	0	1.22	1.22	0	0.08
		End Depth (m)	2.13	1.37	1.37	2.13	2.13	2.57	2.29	0.15	1.22	1.22	1.07	1.65	1.65	1.22	1.22	1.57	1.57	1.22	0.61
		Sample Type	FD	N	FD	N	FD	N	N	N	N	FD	N	N	N	N	N	N	FD	N	N
		Sample Date	31 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	11 May 1998	08 May 1998	22 Feb 2007	22 Feb 2007	22 Feb 2007	07 Mar 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	0.007 U	0.007 U	0.007 U	--	0.007 U	0.007 U	0.007 U	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.003	0.002 U	--	0.007	0.005	0.004	--	--	--	--
Ethylbenzene	1.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.003	0.003	0.002 U	--	--	--	--
Toluene	2.3	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.016	0.012	0.003	--	--	--	--
Xylene, o	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002	0.002	0.002 U	--	--	--	--
Xylenes, m & p	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.004	0.004	0.002 U	--	--	--	--
Xylenes, Total	3.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.006	0.006	0.002 U	--	--	--	--
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	18.6	5.13	4.01	2.44	2.06	2.27	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	7.94	7.98	--	--	--	7.99	7.69	7.98	--	7.8	--	--	7.96	7.5	--	--	7.85	8.18
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	495	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	6.7	6.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	2	2.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	3.2	3.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	--	1 U	1 U	--	--	--	--	--	1	--	1.5	--	--	0.8 U	2.6	--	--	--	--
Arsenic	18	µg/g	--	7.8	7.2	--	--	--	--	--	3.1	--	7.1	--	--	3.7	8.2	--	--	--	--
Barium	390	µg/g	--	31.4	27.4	--	--	--	--	--	26.2	--	36.2	--	--	62.8	107	--	--	--	--
Beryllium	4	µg/g	--	0.5 U	0.5 U	--	--	--	--	--	0.2	--	0.4	--	--	0.3	0.5	--	--	--	--
Boron	120	µg/g	--	11.8	9.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	1.2	µg/g	--	1	0.96	--	--	--	--	--	0.2 U	--	0.5	--	--	1.2	1.3	--	--	--	--
Chromium	160	µg/g	--	12.6	12.3	--	--	--	--	--	6.2	--	11.9	--	--	9.3	25.9	--	--	--	--
Cobalt	22	µg/g	--	4.8	4.5	--	--	--	--	--	3	--	4.8	--	--	4.7	3.6	--	--	--	--
Copper	140	µg/g	--	27	23.4	--	--	--	--	--	12	--	50.3	--	--	15.6	48.2	--	--	--	--
Lead	120	µg/g	--	103	97.7	--	--	--	--	--	47.5	--	117	--	--	107	274	--	--	--	--
Molybdenum	6.9	µg/g	--	1	1 U	--	--	--	--	--	0.4	--	1.5	--	--	0.4	0.8	--	--	--	--
Nickel	100	µg/g	--	14.1	13	--	--	--	--	--	6.7	--	11.2	--	--	11	10.6	--	--	--	--
Selenium	2.4	µg/g	--	1 U	1 U	--	--	--	--	--	0.4 U	--	0.4 U	--	--	0.4 U	0.4 U	--	--	--	--
Silver	20	µg/g	--	0.2 U	0.2 U	--	--	--	--	--	0.2 U	--	0.2 U	--	--	0.2 U	0.4	--	--	--	--
Thallium	1	µg/g	--	0.5 U	0.5 U	--	--	--	--	--	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	--	--	--	--
Uranium	23	µg/g	--	1 U	1 U	--	--	--	--	--	--	--	--	0.5	--	--	--	--	--	--	--
Vanadium	86	µg/g	--	21.3	20	--	--	--	--	--	11.2	--	18.9	--	--	15.3	16.8	--	--	--	--
Zinc	340	µg/g	--	410	372	--	--	--	--	--	62.2	--	256	--	--	720	635	--	--	--	--
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b.]	µg/g	--	157000	136000	--	--	--	--	--	--	--	--	116000	--	--	--	--	--	--	--
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	86300	82500	--	--	--	--	--	--	--	--	63800	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Location		MW18-126D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	OW01-II	OW06	OW07-31	OW07-31	OW07-32	OW07-32	OW07-32	OW07-33	OW07-34D	OW07-34D	OW07-34D	OW07-35	OW07-36D
	Sample ID		DUP JULY 31	MW18-129D-1	DUP2 JUL23	MW18-129D-2	DUP3 JUL23	MW18-129D-3	AS4-OWI-II	BH6-SS1	OW07-31SS1	DUP#8	OW07-32SS1	OW07-32	OW07-32SS2	OW07-33SS1	OW07-34SS1	OW07-34SS2	DUP#11	OW07-35SS1	OW07-36SS1
	Start Depth (m)		1.52	0.76	0.76	1.52	1.52	2.29	2.13	0	0	0	0	0	1.22	0	0	1.22	1.22	0	0.08
	End Depth (m)		2.13	1.37	1.37	2.13	2.13	2.57	2.29	0.15	1.22	1.22	1.07	1.65	1.65	1.22	1.22	1.57	1.57	1.22	0.61
	Sample Type		FD	N	FD	N	FD	N	N	N	N	FD	N	N	N	N	N	N	FD	N	N
	Sample Date		31 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	11 May 1998	08 May 1998	22 Feb 2007	22 Feb 2007	22 Feb 2007	07 Mar 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	6240	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	~~NV~~ 38000 [b]	µg/g	--	16700	15500	--	--	--	--	--	--	--	--	17500	--	--	--	--	--	--	--
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	566	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	874	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	57.8	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	104	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	0.26	0.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	4.59	--	18.8	--	--	33.1	25.3	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	0.21	0.32	--	--	--	--	--	0.4 U	--	0.4 U	--	--	0.4 U	0.4 U	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	0.08 U	--	0.08 U	--	--	0.08 U	0.08 U	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	0.17	0.175	--	--	--	--	--	0.189	--	0.514	--	--	0.244	0.296	--	--	--	--
Mercury	0.27	µg/g	--	0.0521	0.0454	--	--	--	--	--	0.014	--	0.036	--	--	0.037	0.051	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	157	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	0.28	0.3	--	--	--	--	--	0.039	--	0.151	--	--	0.142	0.165	--	--	--	--
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	--	--	0.03 U	0.03 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	0.042 U	0.042 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	--	0.03 U	0.03 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.03 U	--	--	--	94	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.02	--	--	--	2 U	--	--	--	--
Anthracene	0.67	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.05	--	--	--	160	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.6	--	--	--	200	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.54	--	--	--	130	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.77	--	--	--	190	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.45	--	--	--	70	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.23	--	--	--	66	--	--	--	--
Chrysene	7	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.56	--	--	--	180	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.12	--	--	--	26	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.78	--	--	--	660	--	--	--	--
Fluorene	62	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.02 U	--	--	--	150	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.46	--	--	--	80	--	--	--	--
Naphthalene	0.6	µg/g	--	--	--	0.013 U	0.013 U	--	--	--	--	--	0.05	--	--	--	220	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	--	0.046 U	0.046 U	--	--	--	--	--	0.41	--	--	--	900	--	--	--	--
Pyrene	78	µg/g	--	--	--	0.05 U	0.05 U	--	--	--	--	--	0.7	--	--	--	470	--	--	--	--
PCBs																					
Aroclor 1242	NV	µg/g	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	0.02 U	--	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	0.02 U	0.06	0.02 U	0.03	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	5	5	5	--	5	5	5	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	6	--	--	5	5	5	--	5	5	5	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	--	--	--	13	--	--	--	10	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	--	--	--	--	10 U	--	--	10	10	13	--	10	10	82	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	--	--	--	89	--	--	--	50	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	--	--	--	--	58	--	--	50	50	94	--	50	50	700	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	--	--	--	--	50 U	--	--	50	50	51	--	50	50	69	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	72 U	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-126D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	OW01-II	OW06	OW07-31	OW07-31	OW07-32	OW07-32	OW07-32	OW07-33	OW07-34D	OW07-34D	OW07-34D	OW07-35	OW07-36D
Sample ID			DUP JULY 31	MW18-129D-1	DUP2 JUL23	MW18-129D-2	DUP3 JUL23	MW18-129D-3	AS4-OWI-II	BH6-SS1	OW07-31SS1	DUP#8	OW07-32SS1	OW07-32	OW07-32SS2	OW07-33SS1	OW07-34SS1	OW07-34SS2	DUP#11	OW07-35SS1	OW07-36SS1
Start Depth (m)			1.52	0.76	0.76	1.52	1.52	2.29	2.13	0	0	0	0	0	1.22	0	0	1.22	1.22	0	0.08
End Depth (m)			2.13	1.37	1.37	2.13	2.13	2.57	2.29	0.15	1.22	1.22	1.07	1.65	1.65	1.22	1.22	1.57	1.57	1.22	0.61
Sample Type			FD	N	FD	N	FD	N	N	N	N	FD	N	N	N	N	N	N	FD	N	N
Sample Date			31 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	11 May 1998	08 May 1998	22 Feb 2007	22 Feb 2007	22 Feb 2007	07 Mar 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	0.47 U	0.47 U	0.47 U	--	0.47 U	0.47 U	0.47 U	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	0.005 U	0.005 U	0.005 U	--	0.005 U	0.005 U	0.005 U	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	0.041 U	0.041 U	0.041 U	--	0.041 U	0.041 U	0.041 U	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g	--	--	--	--	--	--	--	--	0.13 U	0.13 U	0.13 U	--	0.13 U	0.13 U	0.13 U	--	--	--	--
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	0.003 U	--	0.003 U	0.003 U	0.003 U	--	--	--	--
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	0.004 U	--	0.004 U	0.004 U	0.004 U	--	--	--	--
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	0.003 U	--	0.003 U	0.003 U	0.003 U	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	0.003 U	0.003 U	0.003 U	--	0.003 U	0.003 U	0.003 U	--	--	--	--
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	0.004 U	--	0.004 U	0.004 U	0.004 U	--	--	--	--
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	0.004 U	0.004 U	0.004 U	--	0.004 U	0.004 U	0.004 U	--	--	--	--
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	0.002 U	0.002 U	0.002 U	--	0.002 U	0.002 U	0.002 U	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-126D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	MW18-129D	OW01-II	OW06	OW07-31	OW07-31	OW07-32	OW07-32	OW07-32	OW07-33	OW07-34D	OW07-34D	OW07-34D	OW07-35	OW07-36D
		Sample ID	DUP JULY 31	MW18-129D-1	DUP2 JUL23	MW18-129D-2	DUP3 JUL23	MW18-129D-3	AS4-OWI-II	BH6-SS1	OW07-31SS1	DUP#8	OW07-32SS1	OW07-32	OW07-32SS2	OW07-33SS1	OW07-34SS1	OW07-34SS2	DUP#11	OW07-35SS1	OW07-36SS1
		Start Depth (m)	1.52	0.76	0.76	1.52	1.52	2.29	2.13	0	0	0	0	0	1.22	0	0	1.22	1.22	0	0.08
		End Depth (m)	2.13	1.37	1.37	2.13	2.13	2.57	2.29	0.15	1.22	1.22	1.07	1.65	1.65	1.22	1.22	1.57	1.57	1.22	0.61
		Sample Type	FD	N	FD	N	FD	N	N	N	N	FD	N	N	N	N	N	N	FD	N	N
		Sample Date	31 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	23 Jul 2018	11 May 1998	08 May 1998	22 Feb 2007	22 Feb 2007	22 Feb 2007	07 Mar 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW07-36D	OW07-37	OW07-37	OW07-38S	OW07-38S	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP13-01	TP13-02	TP13-03	TP13-04	TP13-05	TP13-06	TP13-08	TP13-08
		Sample ID	OW07-36SS1A	OW07-37SS1	OW07-37SS-1A	OW07-38SS1	OW07-38SS2	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP1-5	TP2-4	TP3-6	TP4-6	TP5-4	TP6-4	TP8-4	DUP1
		Start Depth (m)	0.61	0	0.61	0	1.22	2.29	1	1	1	1	1	1	0.1	1.22	0.1	0.1	1.22	0.1	0.1	0.1
		End Depth (m)	1.22	0.61	1.22	1.22	1.8	2.25	1.3	1.3	1.3	1.3	1.3	1.3	0.3	1.42	0.3	0.3	1.42	0.3	0.3	0.3
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
		Sample Date	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	12 Dec 2013	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	03 Dec 2013	03 Dec 2013
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	0.007 U	0.007 U	0.007 U	0.007 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	--	0.003	0.002 U	0.002 U	0.01	0.02 U	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Ethylbenzene	1.1	µg/g	--	0.002 U	0.002 U	0.002 U	0.005	0.02 U	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.025	0.02 U	0.02 U	0.02 U	0.02 U
Toluene	2.3	µg/g	--	0.007	0.002 U	0.002 U	0.027	0.02 U	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.067	0.02 U	0.02 U	0.02 U	0.02 U
Xylene, o	NV	µg/g	--	0.002 U	0.002 U	0.002 U	0.005	0.02 U	--	--	--	--	--	--	0.047	0.02 U	0.02 U	0.06	0.02 U	0.02 U	0.02 U	0.02 U
Xylenes, m & p	NV	µg/g	--	0.002 U	0.002 U	0.002 U	0.008	0.02 U	--	--	--	--	--	--	0.06	0.02 U	0.02 U	0.061	0.02 U	0.02 U	0.02 U	0.02 U
Xylenes, Total	3.1	µg/g	--	0.002 U	0.002 U	0.002 U	0.013	0.02 U	--	--	--	--	--	--	0.11	0.02 U	0.02 U	0.12	0.02 U	0.02 U	0.02 U	0.02 U
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	--	--	--	--	--	3.3	--	--	--	--	--	--	32	9.6	5.8	9.1	5.2	4.1	16	16
pH	NV	pH UNITS	8.12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	740	640	320	180	250	240	450	410
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	--	0.8 U	0.8 U	1.5	--	0.98	--	--	--	--	--	--	1.7	0.2 U	0.29	2	0.2 U	0.2 U	2.6	2.6
Arsenic	18	µg/g	--	3.2	2.1	20.5	--	4.9	--	--	--	--	--	--	6.2	3.7	3	5.2	2.2	1.9	8.8	8.6
Barium	390	µg/g	--	13.7	13.6	63.6	--	190	--	--	--	--	--	--	43	28	19	42	19	9.4	150	150
Beryllium	4	µg/g	--	0.2 U	0.2 U	0.4	--	0.2 U	--	--	--	--	--	--	0.34	0.2 U	0.2 U	0.24	0.2 U	0.2 U	0.56	0.51
Boron	120	µg/g	--	--	--	--	--	8.7	--	--	--	--	--	--	15	5 U	5 U	5 U	15	13	23	20
Cadmium	1.2	µg/g	--	0.4	0.2 U	1.3	--	1.9	--	--	--	--	--	--	0.67	0.53	0.77	0.38	4.8	5.1	2.2	1.6
Chromium	160	µg/g	--	5	3.6	41.4	--	9	--	--	--	--	--	--	11	9.2	8.7	15	5.7	4.2	40	33
Cobalt	22	µg/g	--	2.1	2.3	7.5	--	3.6	--	--	--	--	--	--	4.6	4.6	2.6	2.8	4.6	4	6.6	6
Copper	140	µg/g	--	26.1	6	84.4	--	29	--	--	--	--	--	--	24	30	24	33	12	11	70	73
Lead	120	µg/g	--	81.9	9.6	90.1	--	220	--	--	--	--	--	--	110	37	75	110	230	150	310	460
Molybdenum	6.9	µg/g	--	0.6	0.3 U	9.3	--	0.79	--	--	--	--	--	--	1	0.5 U	0.61	1.5	1.4	1.5	3.4	2.4
Nickel	100	µg/g	--	5.9	4.5	43.9	--	11	--	--	--	--	--	--	10	10	8.2	12	10	8.4	36	35
Selenium	2.4	µg/g	--	0.4 U	0.4 U	0.9	--	0.5 U	--	--	--	--	--	--	0.64	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Silver	20	µg/g	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	--	0.2 U	0.2 U	0.2 U	--	0.13	--	--	--	--	--	--	0.087	0.094	0.087	0.05 U	0.21	0.25	0.064	0.077
Uranium	23	µg/g	--	--	--	--	--	0.5	--	--	--	--	--	--	0.75	0.33	0.4	0.41	1.9	2	0.58	0.53
Vanadium	86	µg/g	--	9	6.1	14.8	--	11	--	--	--	--	--	--	22	26	16	15	10	8.7	36	34
Zinc	340	µg/g	--	306	39.8	371	--	2400	--	--	--	--	--	--	360	400	470	190	2000	2000	760	810
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	78000	89000	110000	18000	200000	220000	66000	66000
Magnesium	~~NV~~ 17000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	40000	10000	45000	8200	110000	120000	16000	16000

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW07-36D	OW07-37	OW07-37	OW07-38S	OW07-38S	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP13-01	TP13-02	TP13-03	TP13-04	TP13-05	TP13-06	TP13-08	TP13-08
		Sample ID	OW07-36SS1A	OW07-37SS1	OW07-37SS-1A	OW07-38SS1	OW07-38SS2	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP1-5	TP2-4	TP3-6	TP4-6	TP5-4	TP6-4	TP8-4	DUP1
		Start Depth (m)	0.61	0	0.61	0	1.22	2.29	1	1	1	1	1	1	0.1	1.22	0.1	0.1	1.22	0.1	0.1	0.1
		End Depth (m)	1.22	0.61	1.22	1.22	1.8	2.25	1.3	1.3	1.3	1.3	1.3	1.3	0.3	1.42	0.3	0.3	1.42	0.3	0.3	0.3
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
		Sample Date	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	12 Dec 2013	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	03 Dec 2013	03 Dec 2013
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	4900	4100	2600	4500	2500	1700	12000	11000
Bismuth	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	1 U	1 U	7.1	1 U	1 U	1 U	6.4	8.9
Iron	~~NV~~ 38000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	25000	17000	9800	23000	6500	5300	34000	33000
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	490	260	370	660	560	590	510	520
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	420	450	420	320	900	770	2000	1700
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	56	110	78	47	110	100	72	72
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	5 U	5 U	5 U	5.8	5 U	5 U	8.1	9.6
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.14	0.05 U	0.05 U	0.05 U	0.09	0.084	0.05 U	0.051
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	100 U	100 U	110	100 U	200	210	510	420
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.04	0.005 U	0.02	0.074	0.0053	0.005 U	0.34	0.79
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.078	0.0071 U	0.044	0.15	0.0071 U	0.0071 U	0.65	1.6
2-Methylnaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.038	0.005 U	0.024	0.08	0.005 U	0.005 U	0.32	0.79
Acenaphthene	7.9	µg/g	--	0.03 U	0.03 U	--	--	--	--	--	--	--	--	--	0.005 U	0.005 U	0.0068	0.012	0.005 U	0.005 U	1.5	4.1
Acenaphthylene	0.15	µg/g	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	0.005 U	0.005 U	0.005 U	0.0072	0.005 U	0.005 U	0.48	1
Anthracene	0.67	µg/g	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	0.0059	0.005 U	0.0091	0.028	0.005 U	0.005 U	4.3	10
Benzo(a)anthracene	0.5	µg/g	--	0.03	0.02	--	--	--	--	--	--	--	--	--	0.043	0.005 U	0.022	0.11	0.0073	0.0097	11	22
Benzo(a)pyrene	0.3	µg/g	--	0.04	0.02 U	--	--	--	--	--	--	--	--	--	0.044	0.005 U	0.018	0.1	0.0053	0.0091	8.9	17
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.13	0.005 U	0.032	0.18	0.0092	0.012	12	19
Benzo(b)fluoranthene	0.78	µg/g	--	0.05	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	0.08	0.02	--	--	--	--	--	--	--	--	--	0.07	0.005 U	0.013	0.064	0.005 U	0.0061	5.5	7.8
Benzo(k)fluoranthene	0.78	µg/g	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	0.03	0.005 U	0.0091	0.06	0.005 U	0.005 U	4.5	7.3
Chrysene	7	µg/g	--	0.04	0.02	--	--	--	--	--	--	--	--	--	0.064	0.005 U	0.025	0.12	0.015	0.014	9.1	18
Dibenzo(a,h)anthracene	0.1	µg/g	--	0.02	0.02 U	--	--	--	--	--	--	--	--	--	0.013	0.005 U	0.005 U	0.018	0.005 U	0.005 U	1.5	2.4
Fluoranthene	0.69	µg/g	--	0.04	0.03	--	--	--	--	--	--	--	--	--	0.07	0.005 U	0.061	0.21	0.013	0.024	28	58
Fluorene	62	µg/g	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	0.005 U	0.005 U	0.0064	0.011	0.005 U	0.005 U	1.9	5.1
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	0.06	0.02	--	--	--	--	--	--	--	--	--	0.058	0.005 U	0.012	0.067	0.005 U	0.005 U	5.9	8.8
Naphthalene	0.6	µg/g	--	0.03 U	0.03	--	--	--	--	--	--	--	--	--	0.024	0.005 U	0.047	0.064	0.005 U	0.005 U	0.72	1.5
Phenanthrene	6.2	µg/g	--	0.05	0.04	--	--	--	--	--	--	--	--	--	0.049	0.005 U	0.063	0.18	0.031	0.031	17	48
Pyrene	78	µg/g	--	0.02 U	0.02	--	--	--	--	--	--	--	--	--	0.16	0.005 U	0.048	0.17	0.012	0.02	18	44
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	0.01 U	0.01 U	--	--	0.01 U	0.01 U
Aroclor 1248	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	0.01 U	0.01 U	--	--	0.035	0.01 U
Aroclor 1254	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	0.01 U	0.01 U	--	--	0.16	0.026
Aroclor 1260	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	0.01 U	0.01 U	--	--	0.2	0.039
PCB, Total	0.35	µg/g	--	--	--	--	--	--	0.1	0.54	0.05 U	0.33	0.05 U	0.05 U	0.02 U	--	0.01 U	0.01 U	--	--	0.4	0.065
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	20 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	10	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	--	10	10	10	--	--	--	--	--	--	--	--	10 U	10 U	10 U	10 U	14	13	25	38
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	170	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	--	170	50	140	--	--	--	--	--	--	--	--	50 U	50 U	50 U	150	96	88	520	770
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	--	600	50	64	--	--	--	--	--	--	--	--	50 U	50 U	50 U	50 U	50 U	50 U	250	360
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	510	1100
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW07-36D	OW07-37	OW07-37	OW07-38S	OW07-38S	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP13-01	TP13-02	TP13-03	TP13-04	TP13-05	TP13-06	TP13-08	TP13-08
		Sample ID	OW07-36SS1A	OW07-37SS1	OW07-37SS-1A	OW07-38SS1	OW07-38SS2	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP1-5	TP2-4	TP3-6	TP4-6	TP5-4	TP6-4	TP8-4	DUP1
		Start Depth (m)	0.61	0	0.61	0	1.22	2.29	1	1	1	1	1	1	0.1	1.22	0.1	0.1	1.22	0.1	0.1	0.1
		End Depth (m)	1.22	0.61	1.22	1.22	1.8	2.25	1.3	1.3	1.3	1.3	1.3	1.3	0.3	1.42	0.3	0.3	1.42	0.3	0.3	0.3
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
		Sample Date	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	12 Dec 2013	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	03 Dec 2013	03 Dec 2013
Analyte	Table 6 SCS [a]	Unit																				
SVOCs (other)																						
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	0.47 U	0.47 U	0.47 U	0.47 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.38	µg/g	--	0.002 U	0.01	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.47	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethene	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromoethane	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichlorobenzene	1.2	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloropropane	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichlorobenzene	4.8	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichloropropene	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dichlorobenzene	0.083	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	0.041 U	0.041 U	0.041 U	0.041 U	0.5 U	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	16	µg/g	--	0.13 U	0.13 U	0.13 U	0.13 U	0.5 U	--	--	--	--	--	--	0.68	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	1.5	µg/g	--	0.003 U	0.003 U	0.003 U	0.003 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromoform	0.27	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromomethane	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Carbon tetrachloride	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlorobenzene	2.4	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroform	0.05	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	0.03 U	--	--	--	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dichloromethane	0.1	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	0.004 U	0.004 U	0.004 U	0.004 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
n-Hexane	2.8	µg/g	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Styrene	0.7	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Tetrachloroethene	0.28	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g	--	0.003 U	0.003 U	0.003 U	0.003 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
trans-1,3-Dichloropropene	NV	µg/g	--	0.003 U	0.003 U	0.003 U	0.003 U	0.04 U	--	--	--	--	--	--	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
Trichloroethylene	0.061	µg/g	--	0.004 U	0.004 U	0.004 U	0.004 U	1	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Trichlorofluoromethane	4	µg/g	--	0.004 U	0.004 U	0.004 U	0.004 U	0.05 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Vinyl Chloride	0.02	µg/g	--	0.002 U	0.002 U	0.002 U	0.002 U	0.02 U	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-36D	OW07-37	OW07-37	OW07-38S	OW07-38S	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP13-01	TP13-02	TP13-03	TP13-04	TP13-05	TP13-06	TP13-08	TP13-08
			Sample ID	OW07-36SS1A	OW07-37SS1	OW07-37SS-1A	OW07-38SS1	OW07-38SS2	OW13-39S	SS-40	SS-41	SS-42	SS-43	SS-44	SS-45	TP1-5	TP2-4	TP3-6	TP4-6	TP5-4	TP6-4	TP8-4	DUP1
			Start Depth (m)	0.61	0	0.61	0	1.22	2.29	1	1	1	1	1	1	0.1	1.22	0.1	0.1	1.22	0.1	0.1	0.1
			End Depth (m)	1.22	0.61	1.22	1.22	1.8	2.25	1.3	1.3	1.3	1.3	1.3	1.3	0.3	1.42	0.3	0.3	1.42	0.3	0.3	0.3
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
			Sample Date	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	22 Feb 2007	12 Dec 2013	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	06 Jul 1999	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	02 Dec 2013	03 Dec 2013	03 Dec 2013
Analyte		Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	TP13-09	TP13-10	TP13-11	TP13-11	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-301	TP17-301	TP17-301	TP17-302	TP17-302	TP17-302	TP17-303	TP17-303	TP17-303	TP17-304
			Sample ID	TP9-1	TP10-4	TP11-6	DUP2	TP17-300-0-1	DUP 3	TP17-300-1-2A	TP17-300-1-2	DUP 4	TP17-300-3-4	TP17-301-1-3	DUP 2	TP17-301-4-5	TP17-302-1-3	DUP 1	TP17-302-5-7	TP17-303-1-2	TP17-303-4-5	DUP 5	TP17-304-3-4
			Start Depth (m)	0.3	0.1	0.1	0.1	0	0	0.3	0.3	0.3	0.91	0.3	0.3	1.22	0.3	0.3	1.52	0.3	1.22	1.22	0.91
			End Depth (m)	0.5	0.3	0.3	0.3	0.3	0.3	0.61	0.61	0.61	1.22	0.91	0.91	1.52	0.91	0.91	2.13	0.61	1.52	1.52	1.22
			Sample Type	N	N	N	FD	N	FD	N	N	FD	N	N	FD	N	N	FD	N	N	N	FD	N
			Sample Date	03 Dec 2013	03 Dec 2013	03 Dec 2013	03 Dec 2013	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017
ABNs																							
1,1'-Biphenyl	0.31	µg/g		--	--	--	--	--	--	--	0.63 U	0.63 U	0.13 U	0.13	0.13 U	0.13 U	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g		--	--	--	--	--	--	--	0.63 U	0.63 U	0.13 U	0.13 U	0.13 U	0.13 U	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g		--	--	--	--	--	--	--	1.8 U	1.8 U	0.35 U	0.35 U	0.35 U	0.35 U	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g		--	--	--	--	--	--	--	13 U	13 U	2.5 U	2.5 U	2.5 U	2.5 U	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Phenol	9.4	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
BTEX																							
Benzene	0.21	µg/g		0.02 U	0.02 U	0.23	0.25	--	--	--	0.156	0.105	0.0068 U	0.0246	--	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	--	0.0068 U
Ethylbenzene	1.1	µg/g		0.02 U	0.02 U	0.36	0.4	--	--	--	0.092	0.066	0.018 U	0.052	--	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	--	0.018 U
Toluene	2.3	µg/g		0.02 U	0.02 U	1	1.2	--	--	--	0.606	0.406	0.08 U	0.184	--	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	--	0.08 U
Xylene, o	NV	µg/g		0.02 U	0.02 U	0.73	0.83	--	--	--	0.168	0.115	0.02 U	0.245	--	0.02 U	0.082 J	0.02 UJ	0.02 U	0.02 U	0.02 U	--	0.02 U
Xylenes, m & p	NV	µg/g		0.02 U	0.02 U	0.78	0.87	--	--	--	0.538	0.36	0.03 U	0.318	--	0.03 U	0.072 J	0.03 UJ	0.03 U	0.03 U	0.03 U	--	0.03 U
Xylenes, Total	3.1	µg/g		0.02 U	0.02 U	1.5	1.7	--	--	--	0.706	0.475	0.05 U	0.563	--	0.05 U	0.154 J	0.05 UJ	0.05 U	0.05 U	0.05 U	--	0.05 U
Chlorophenols																							
2,4,5-Trichlorophenol	4.4	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g		--	--	--	--	--	--	--	1.3 U	1.3 U	0.25 U	0.25 U	0.25 U	0.25 U	--	--	--	--	--	--	--
Dioxins and Furans																							
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g		--	--	--	--	5.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g		--	--	--	--	5.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g		--	--	--	--	5.19	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																							
Average Fraction Organic Carbon	NV	None		--	--	--	--	--	--	--	--	--	--	0.0546	--	0.0273	--	--	--	--	--	--	--
Carbon	NV	%		--	--	--	--	--	--	--	--	--	--	5.53	--	2.77	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None		--	--	--	--	--	--	--	--	--	--	0.0553	--	0.0277	--	--	--	--	--	--	--
Moisture	NV	%		12	12	34	21	2.09	1.84	--	5.62	6.4	6.51	8.66	10.9	10.1	11.1	9.52	12.1	5.57	11.2	6.27	7.02
pH	NV	pH UNITS		--	--	--	--	--	--	--	7.47	7.4	7.27	7.29	--	7.57	7.58	7.48	7.62	7.67	7.41	7.6	7.74
Phosphorus	~~NV~~ 1600	µg/g		440	830	2100	2000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l		--	--	--	--	--	--	--	3.6	3.1	2.6	4.5	--	4.4	13 J	6.7 J	4.3	3.8	1.8 J	5.9 J	18.9
Magnesium	NV	mg/l		--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	--	1 U	1.5	1 U	1.5	1 U	1 U	1 U	1.6
Sodium	NV	mg/l		--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	1.1	1 U	1 U	1 U	1 U
Metals and Hydride Forming Metals																							
Antimony	7.5	µg/g		4.2	0.46	1.1	2.1	--	--	--	1.9	1.7	1 U	2.3	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Arsenic	18	µg/g		6	8.2	7.4	9	--	--	--	6.5	5.8	2.2	9.5	--	1.7	3.6	3.1	2.2	3.7	5.4	3.7	5.7
Barium	390	µg/g		36	40	100	94	--	--	--	53.3	47.4	29.9	58.6	--	31.9	31.7	26.5	48.1	44.1	93 J	43.6 J	50.2
Beryllium	4	µg/g		0.29	0.47	0.85	0.62	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Boron	120	µg/g		7.7	6.7	11	11	--	--	--	5 U	5 U	8.9	6.9	--	8.5	5.8	5.1	8.8	5	5.4	5.1	10.1
Cadmium	1.2	µg/g		2.3	1.6	1.9	3.8	--	--	--	0.62	0.5 U	0.56	0.5 U	--	0.57	0.5 U	0.5 U	1.06	0.5 U	0.78	0.5 U	2.46
Chromium	160	µg/g		14	13	19	39	--	--	--	13.4	12	13.9	21.6	--	14.1	13.4	9.9	14	10.5	6.2 J	10.6 J	15.3
Cobalt	22	µg/g		4.9	7.6	2.4	3.9	--	--	--	3.8	3.5	4.5	5.6	--	5	3.8	3.3	4.7	4	8	4	8.8
Copper	140	µg/g		41	25	43	62	--	--	--	42.7	40	12.4	219	--	9.6	18.1	12.9	27	10.7	25.9 J	11.2 J	36.3
Lead	120	µg/g		270	160	230	470	--	--	--	108	94.4	73.4	72.9	--	68.2	26	30.4	87.4	19.6	46.8 J	20.4 J	205
Molybdenum	6.9	µg/g		1.3	0.66	1.6	2.1	--	--	--	1	1 U	1 U	1.3	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Nickel	100	µg/g		13	17	11	19	--	--	--	12	10.7	12.4	15.1	--	13.9	9.5	7.2	14.1	7.6	9.4	7.4	23.3
Selenium	2.4	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	20	µg/g		0.2 U	0.2 U	0.2	0.39	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g		0.2	0.17	0.062	0.1	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Uranium	23	µg/g		0.33	0.51	2.6	1.8	--	--	--	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1
Vanadium	86	µg/g		22	29	18	27	--	--	--	18.8	17.6	20.6	34.2	--	23.2	22.5	21.1	23.5	23.5	48 J	23.7 J	30.3
Zinc	340	µg/g		5600	940	890	2200	--	--	--	259	210	803	116	--	843	99.1	68.1	1070	41.4	665 J	43.8 J	2600
Calcium and Magnesium																							
Calcium	~~NV~~ 54000 [b]	µg/g		40000	76000	35000	24000	--	--	--	25400	24300	122000	6670	--	156000	16400	14300	82300	19400	40600 J	17600 J	105000
Magnesium	~~NV~~ 17000 [b]	µg/g		20000	35000	17000	7500	--	--	--	15100	13400	85900	3630	--	109000	5780	4330	36400	3430	35000 J	3370 J	47500

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

	Location		TP13-09	TP13-10	TP13-11	TP13-11	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-301	TP17-301	TP17-301	TP17-302	TP17-302	TP17-302	TP17-303	TP17-303	TP17-303	TP17-304
	Sample ID		TP9-1	TP10-4	TP11-6	DUP2	TP17-300-0-1	DUP 3	TP17-300-1-2A	TP17-300-1-2	DUP 4	TP17-300-3-4	TP17-301-1-3	DUP 2	TP17-301-4-5	TP17-302-1-3	DUP 1	TP17-302-5-7	TP17-303-1-2	TP17-303-4-5	DUP 5	TP17-304-3-4
	Start Depth (m)		0.3	0.1	0.1	0.1	0	0	0.3	0.3	0.3	0.91	0.3	0.3	1.22	0.3	0.3	1.52	0.3	1.22	1.22	0.91
	End Depth (m)		0.5	0.3	0.3	0.3	0.3	0.3	0.61	0.61	0.61	1.22	0.91	0.91	1.52	0.91	0.91	2.13	0.61	1.52	1.52	1.22
	Sample Type		N	N	N	FD	N	FD	N	N	FD	N	N	FD	N	N	FD	N	N	N	FD	N
	Sample Date		03 Dec 2013	03 Dec 2013	03 Dec 2013	03 Dec 2013	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	5300	8300	12000	9800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	1 U	1 U	36	150	--	--	--	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iron	~~NV~~ 38000 [b]	µg/g	39000	27000	15000	25000	--	--	--	37600	43900	9520	34200	--	11800	18900	17400	12100	13300	47000 J	13600 J	24800
Manganese	~~NV~~ 1800 [b]	µg/g	510	1300	440	740	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	470	610	570	740	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	28	54	190	130	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	9	5 U	6	7.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	0.16	0.14	0.1	0.27	--	0.16	0.18	0.17	0.1 U	0.15	0.14	0.13	0.1 U
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	0.124	0.117	0.0898	0.143	--	0.121	0.223	0.165	0.109	0.127	0.0763 J	0.157 J	0.266
Mercury	0.27	µg/g	0.13	0.05 U	0.05 U	0.097	--	--	--	0.067	0.0626	0.0447	0.0582	--	0.0405	0.0139	0.011	0.0203	0.0085	0.0146	0.009	0.051
Sodium	~~NV~~ 200 [b]	µg/g	100 U	120	460	300	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	0.15 U	0.16 U	0.17 U	0.13 U	--	0.13 U	0.1 U	0.11 U	0.11	0.14 U	0.2 U	0.11 U	0.1 U
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	0.014	0.0088	0.92	0.72	--	--	--	1.04	1.26	0.075 U	1.08 J	1.04	0.075 U	0.03 UJ	0.093 J	0.03 U	0.03 U	0.03 U	0.03 U	--
2-(1-)Methylnaphthalene	0.99	µg/g	0.029	0.016	2	1.6	--	--	--	4.47	4.93	0.0011 U	2	1.99	0.0011 U	0.042 UJ	0.205 J	0.042 U	0.042 U	0.042 U	0.042 U	--
2-Methylnaphthalene	NV	µg/g	0.014	0.0073	1.1	0.87	--	--	--	3.44	3.67	0.075 U	0.918 J	0.959	0.075 U	0.03 UJ	0.112 J	0.03 U	0.03 U	0.03 U	0.03 U	--
Acenaphthene	7.9	µg/g	0.13	0.005 U	0.23	0.44	--	--	--	0.63 U	0.63 U	0.13 U	0.13 U	0.13 U	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Acenaphthylene	0.15	µg/g	0.095	0.023	0.16	0.1	--	--	--	0.63 U	0.63 U	0.13 U	0.38	0.59	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Anthracene	0.67	µg/g	0.28	0.028	0.55	0.89	--	--	--	1.77	2.04	0.13 U	0.17	0.25	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Benzo(a)anthracene	0.5	µg/g	0.9	0.051	1.5	1.9	--	--	--	14.6	16.2	0.13 U	0.92 J	1.27 J	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Benzo(a)pyrene	0.3	µg/g	0.95	0.056	1	1.2	--	--	--	14.3	16.1	0.13 U	1.76	2.52	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Benzo(b&j)fluoranthene	0.78	µg/g	1.3	0.082	1.7	1.9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	9.26	10.5	0.13 U	2.44	3.03	0.13 U	0.114	0.122	0.05 U	0.05 U	0.05 U	0.057	--
Benzo(g,h,i)perylene	6.6	µg/g	0.65	0.037	0.44	0.45	--	--	--	18.8	20.1	0.13 U	1.48	2.22	0.13 U	0.05 U	0.062	0.05 U	0.05 U	0.05 U	0.05 U	--
Benzo(k)fluoranthene	0.78	µg/g	0.45	0.027	0.57	0.66	--	--	--	3.52	3.71	0.13 U	1.64	1.96	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Chrysene	7	µg/g	0.77	0.041	1.3	1.7	--	--	--	22.2	25.7	0.13 U	1.75	2.16	0.13 U	0.073	0.074	0.05 U	0.05 U	0.05 U	0.062	--
Dibenzo(a,h)anthracene	0.1	µg/g	0.15	0.0078	0.16	0.19	--	--	--	11.9	13.2	0.13 U	0.44	0.66	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Fluoranthene	0.69	µg/g	1.8	0.12	3.7	4.9	--	--	--	1.42	1.61	0.13 U	0.89	1.13	0.13 U	0.051	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Fluorene	62	µg/g	0.082	0.0093	0.27	0.55	--	--	--	0.63 U	0.63 U	0.13 U	0.13 U	0.13 U	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	0.68	0.038	0.53	0.58	--	--	--	6.48	7.86	0.13 U	1.61	2.47	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Naphthalene	0.6	µg/g	0.015	0.0073	1.2	1.1	--	--	--	2.46	2.75	0.13 U	0.46 J	0.56	0.13 U	0.05 U	0.082	0.05 U	0.05 U	0.05 U	0.05 U	--
Phenanthrene	6.2	µg/g	1.1	0.075	2.8	4.8	--	--	--	5.5	6.18	0.13 U	1.15	1.09	0.13 U	0.05 U	0.07	0.05 U	0.05 U	0.05 U	0.051	--
Pyrene	78	µg/g	1.5	0.094	2.9	3.7	--	--	--	4.77	5.11	0.13 U	1.49	1.91	0.13 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	--	--	0.55 U	0.7 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	--	1.28	1.65	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	--	0.4 U	0.45 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	--	0.05 U	0.05 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	--	1.28	1.65	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	10 U	10 U	20 U	10 U	--	--	--	5 U	5 U	5 U	7.1	--	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	10 U	10 U	20 U	10 U	--	--	--	5.3	5 U	5 U	7.9	--	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	--	--	--	10 U	10 U	10 U	14	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	10 U	10 U	29	60	--	--	--	10 U	10 U	10 U	15	--	10 U	10 U	10 U	10 U	10 U	10 U	--	31
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	--	--	--	405	436	66	145	--	52	50 U	50	50 U	50 U	50 U	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	290	86	240	370	--	--	--	477	516	66	158	--	52	50 U	50	50 U	50 U	50 U	--	204
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	98	50 U	81	80	--	--	--	865	813	50 U	58	--	50 U	50 U	50 U	50 U	50 U	50 U	--	59
F4G-SG (GHH-Silica)	2800	µg/g	--	--	--	--	--	--	--	1680	1890	--	--	--	--	--	--	--	--	--	--	250
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	--	--	--	--	--	--	--	1350	1330	72 U	238	--	72 U	72 U	72 U	72 U	72 U	72 U	--	294

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	TP13-09	TP13-10	TP13-11	TP13-11	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-301	TP17-301	TP17-301	TP17-302	TP17-302	TP17-302	TP17-303	TP17-303	TP17-303	TP17-304
			Sample ID	TP9-1	TP10-4	TP11-6	DUP2	TP17-300-0-1	DUP 3	TP17-300-1-2A	TP17-300-1-2	DUP 4	TP17-300-3-4	TP17-301-1-3	DUP 2	TP17-301-4-5	TP17-302-1-3	DUP 1	TP17-302-5-7	TP17-303-1-2	TP17-303-4-5	DUP 5	TP17-304-3-4
			Start Depth (m)	0.3	0.1	0.1	0.1	0	0	0.3	0.3	0.3	0.91	0.3	0.3	1.22	0.3	0.3	1.52	0.3	1.22	1.22	0.91
			End Depth (m)	0.5	0.3	0.3	0.3	0.3	0.3	0.61	0.61	0.61	1.22	0.91	0.91	1.52	0.91	0.91	2.13	0.61	1.52	1.52	1.22
			Sample Type	N	N	N	FD	N	FD	N	N	FD	N	N	FD	N	N	FD	N	N	N	FD	N
			Sample Date	03 Dec 2013	03 Dec 2013	03 Dec 2013	03 Dec 2013	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017
SVOCs (other)																							
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																							
1,1,1,2-Tetrachloroethane	0.058	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,1-Trichloroethane	0.38	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,2-Trichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1-Dichloroethane	0.47	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1-Dichloroethene	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dibromoethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichlorobenzene	1.2	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichloropropane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,3-Dichlorobenzene	4.8	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,3-Dichloropropene	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.042 U	0.042 U	0.042 U	--	--	--	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	--	0.042 U
1,4-Dichlorobenzene	0.083	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,4-Dioxane	1.8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
Acetone	16	µg/g		0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
Bromodichloromethane	1.5	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Bromoform	0.27	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Bromomethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Carbon tetrachloride	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chlorobenzene	2.4	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chlorodibromomethane	2.3	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chloroform	0.05	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
cis-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	0.03 U	0.03 U	--	--	--	0.03 U	0.03 U	0.03 U	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U
Dichlorodifluoromethane	16	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Dichloromethane	0.1	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
n-Hexane	2.8	µg/g		0.05 U	0.05 U	0.12	0.12	--	--	--	0.089	0.061	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Styrene	0.7	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Tetrachloroethene	0.28	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
trans-1,3-Dichloropropene	NV	µg/g		0.04 U	0.04 U	0.04 U	0.04 U	--	--	--	0.03 U	0.03 U	0.03 U	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U
Trichloroethylene	0.061	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.01 U	0.01 U	0.01 U	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	0.01 U
Trichlorofluoromethane	4	µg/g		0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Vinyl Chloride	0.02	µg/g		0.02 U	0.02 U	0.02 U	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--	0.02 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	TP13-09	TP13-10	TP13-11	TP13-11	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-300	TP17-301	TP17-301	TP17-301	TP17-302	TP17-302	TP17-302	TP17-303	TP17-303	TP17-303	TP17-304
		Sample ID	TP9-1	TP10-4	TP11-6	DUP2	TP17-300-0-1	DUP 3	TP17-300-1-2A	TP17-300-1-2	DUP 4	TP17-300-3-4	TP17-301-1-3	DUP 2	TP17-301-4-5	TP17-302-1-3	DUP 1	TP17-302-5-7	TP17-303-1-2	TP17-303-4-5	DUP 5	TP17-304-3-4
		Start Depth (m)	0.3	0.1	0.1	0.1	0	0	0.3	0.3	0.3	0.91	0.3	0.3	1.22	0.3	0.3	1.52	0.3	1.22	1.22	0.91
		End Depth (m)	0.5	0.3	0.3	0.3	0.3	0.3	0.61	0.61	0.61	1.22	0.91	0.91	1.52	0.91	0.91	2.13	0.61	1.52	1.52	1.22
		Sample Type	N	N	N	FD	N	FD	N	N	FD	N	N	FD	N	N	FD	N	N	N	FD	N
		Sample Date	03 Dec 2013	03 Dec 2013	03 Dec 2013	03 Dec 2013	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017
Analyte	Table 6 SCS [a]	Unit																				

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	TP17-304	TP17-305	TP17-306	TP17-306	TP17-307	TP17-308	TP18-309	TP18-309	TP18-310	TP18-310	TP18-310	TP18-311	TP18-311	TP18-312	TP18-312	TP18-313	TP18-313	TP18-314	TP18-314	TP18-314
		Sample ID	TP17-304-6-7	TP17-305-5-6	TP17-306-3-4	TP17-306-5-6	TP17-307-7-8	TP17-308-8-8.5	TP18-309-5	TP18-309-9.5	TP18-310-4	TP18-310-5	TP18-310-9	TP18-311-2	TP18-311-6.5	TP18-312-3	TP18-312-6	TP18-313-2	TP18-313-6	TP18-314-2	TP18-314-6	TP18-DUP1
		Start Depth (m)	1.83	1.52	0.91	1.52	2.13	2.44	1.22	2.74	0.91	1.22	2.44	0.3	1.83	0.61	1.52	0.3	1.52	0.3	1.52	1.52
		End Depth (m)	2	1.83	1.22	1.83	2.44	2.59	1.52	2.9	1.22	1.52	2.74	0.61	1.98	0.91	1.83	0.61	1.83	0.61	1.83	1.83
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
		Sample Date	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018
Analyte	Table 6 SCS [a]	Unit																				
ABNs																						
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.21	µg/g	0.0068 U	0.0068 U	0.0108	--	0.0068 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	1.1	µg/g	0.018 U	0.018 U	0.02	--	0.018 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	2.3	µg/g	0.08 U	0.08 U	0.08 U	--	0.08 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, o	NV	µg/g	0.02 U	0.02 U	0.079	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, m & p	NV	µg/g	0.03 U	0.03 U	0.081	--	0.03 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes, Total	3.1	µg/g	0.05 U	0.05 U	0.16	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorophenols																						
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																						
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	11.6	5.26	6.65	6.96	5.45	4.71	5.88	--	6.41	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	7.55	7.24	7.74	7.81	--	8.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	20.6	2.3	4.3	3.6	--	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	mg/l	1.6	1 U	1 U	1 U	--	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	mg/l	1 U	1 U	1 U	1	--	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	7.5	µg/g	1.4	1 U	8.5	8.5	--	1 U	1.2	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	1 U
Arsenic	18	µg/g	13.4	9.3	14	20.2	--	2.9	5	6.5	--	6.5	5.3	3.6	3.9	7.1	6	7.9	7.1	2.7	4	2.4
Barium	390	µg/g	91.9	48.9	109	119	--	19.8	24.9	38.6	--	39.2	25.4	19.2	27	71.4	44.2	116	49.5	18.5	20.8	14.7
Beryllium	4	µg/g	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Boron	120	µg/g	16.2	6.4	9	8.9	--	5 U	7.4	10.6	--	7.3	6.8	5	5 U	7.8	5.5	7.6	9.7	5 U	5.2	5 U
Cadmium	1.2	µg/g	2.57	0.77	1.22	1.43	--	0.5 U	8.78	7	--	1.42	2.67	0.5 U	0.5 U	1.36	0.98	1.84	1.63	0.5 U	0.5 U	0.5 U
Chromium	160	µg/g	18.6	28.7	20.7	19	--	9.6	11.4	14.8	--	21.6	12.3	8.8	8	15.2	13.6	14.8	13.5	7.7	8.8	6.7
Cobalt	22	µg/g	9.5	13.3	4.9	5	--	3.5	6	6.1	--	5.2	5.9	3.3	3.1	5.5	5.7	6.3	5.5	3.4	4.4	3.3
Copper	140	µg/g	45.1	95.9	105	124	--	15.1	35.2	58.1	--	41.1	40.7	15.4	22.4	18.4	18.2	27	25.3	13	19.6	12.7
Lead	120	µg/g	188	110	471	504	--	25.7	165	144	--	196	124	20	47.8	123	105	155	116	8.8	42.6 J	20.1 J
Molybdenum	6.9	µg/g	2	1 U	1.2	1.4	--	1 U	1.3	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	1 U
Nickel	100	µg/g	24.9	27.9	14.6	15.2	--	7.9	13.7	16.8	--	13.4	17.5	6.1	6.7	14.1	13.6	15.9	13.8	6.1	9.3	6
Selenium	2.4	µg/g	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	20	µg/g	0.2 U	0.2 U	0.24	0.26	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Uranium	23	µg/g	1.1	1 U	1 U	1 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vanadium	86	µg/g	35.2	47.9	24.2	22.9	--	21.7	22.8	28.9	--	29.7	22.7	22.4	17.1	28	23.5	28.3	25.1	20.6	19.7	17.7
Zinc	340	µg/g	2660	3440	562	565	--	160	9890	20700	--	1670	5530	103	152	442	727	517	666	68.4	438 J	223 J
Calcium and Magnesium																						
Calcium	~~NV~~ 54000 [b]	µg/g	91800	48100	68100	68800	--	98900	107000	82900	--	68300	89600	114000	58200	64000	66900	41500	75400	115000	102000	102000
Magnesium	~~NV~~ 17000 [b]	µg/g	49000	34300	27400	27000	--	27100	36100	28700	--	21500	27000	34400	16500	41400	34000	23300	40200	25800	32700	20800

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			TP17-304	TP17-305	TP17-306	TP17-306	TP17-307	TP17-308	TP18-309	TP18-309	TP18-310	TP18-310	TP18-310	TP18-311	TP18-311	TP18-312	TP18-312	TP18-313	TP18-313	TP18-314	TP18-314	TP18-314
Sample ID			TP17-304-6-7	TP17-305-5-6	TP17-306-3-4	TP17-306-5-6	TP17-307-7-8	TP17-308-8-8.5	TP18-309-5	TP18-309-9.5	TP18-310-4	TP18-310-5	TP18-310-9	TP18-311-2	TP18-311-6.5	TP18-312-3	TP18-312-6	TP18-313-2	TP18-313-6	TP18-314-2	TP18-314-6	TP18-DUP1
Start Depth (m)			1.83	1.52	0.91	1.52	2.13	2.44	1.22	2.74	0.91	1.22	2.44	0.3	1.83	0.61	1.52	0.3	1.52	0.3	1.52	1.52
End Depth (m)			2	1.83	1.22	1.83	2.44	2.59	1.52	2.9	1.22	1.52	2.74	0.61	1.98	0.91	1.83	0.61	1.83	0.61	1.83	1.83
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
Sample Date			04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018
Analyte	Table 6 SCS [a]	Unit																				
Non-Regulated Metals																						
Aluminum	~~NV~~ 29000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	1 U	1 U	10.7	4.1	--	1 U	1 U	1 U	--	1 U	1 U	1.7	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iron	~~NV~~ 38000 [b]	µg/g	34000	45600	20900	20200	--	11600	31600	42800	--	24400	27800	11900	11100	19600	17900	22000	18500	11700	13000	10200
Manganese	~~NV~~ 1800 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Boron (HWS)	1.5	µg/g	0.11	0.14	0.3	0.41	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	0.2 U	0.22	0.2 U	0.2 U	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	0.7	mS/cm	0.295	0.121	0.135	0.176	--	0.0764	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.27	µg/g	0.0622	0.0327	0.0522	0.0452	--	0.0152	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	~~NV~~ 200 [b]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	0.1 U	0.18 U	0.13 U	0.15	--	0.23 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCPs																						
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/g	--	--	0.129	0.256	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	0.99	µg/g	--	--	0.28	0.566	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/g	--	--	0.151	0.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	7.9	µg/g	--	--	0.058	0.349 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	0.15	µg/g	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	0.67	µg/g	--	--	0.113	0.887 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	0.5	µg/g	--	--	1	2.19 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.3	µg/g	--	--	1.33	1.99	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	--	1.85	2.38	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	6.6	µg/g	--	--	0.757	1.32	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.78	µg/g	--	--	0.678	1.16 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	7	µg/g	--	--	1.24	2.1 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.1	µg/g	--	--	0.236	0.399	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	0.69	µg/g	--	--	1.19	4.18 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	62	µg/g	--	--	0.05 U	0.395 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	--	0.769	1.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	0.6	µg/g	--	--	0.114	0.332	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	6.2	µg/g	--	--	0.527	3.75 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	78	µg/g	--	--	1.12	3.31 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCBs																						
Aroclor 1242	NV	µg/g	--	--	0.35 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	0.945	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	0.3 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	0.025 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	0.945	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	5 U	5 U	5 U	--	5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	5 U	5 U	5 U	--	5 U	--	5 U	--	5 U	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	18	21	10 U	--	14	--	10 U	--	10 U	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	74	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	177	451	66	--	69	--	530	--	82	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	50 U	72	50 U	--	123	--	879	--	50 U	--	--	--	--	--	--	--	--	--	--	--
F4G-SG (GHH-Silica)	2800	µg/g	--	300	--	--	360	--	2140	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	194	543	74	--	207	--	1410	--	82	--	--	--	--	--	--	--	--	--	--	--

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	TP17-304	TP17-305	TP17-306	TP17-306	TP17-307	TP17-308	TP18-309	TP18-309	TP18-310	TP18-310	TP18-310	TP18-311	TP18-311	TP18-312	TP18-312	TP18-313	TP18-313	TP18-314	TP18-314	TP18-314
			Sample ID	TP17-304-6-7	TP17-305-5-6	TP17-306-3-4	TP17-306-5-6	TP17-307-7-8	TP17-308-8-8.5	TP18-309-5	TP18-309-9.5	TP18-310-4	TP18-310-5	TP18-310-9	TP18-311-2	TP18-311-6.5	TP18-312-3	TP18-312-6	TP18-313-2	TP18-313-6	TP18-314-2	TP18-314-6	TP18-DUP1
			Start Depth (m)	1.83	1.52	0.91	1.52	2.13	2.44	1.22	2.74	0.91	1.22	2.44	0.3	1.83	0.61	1.52	0.3	1.52	0.3	1.52	1.52
			End Depth (m)	2	1.83	1.22	1.83	2.44	2.59	1.52	2.9	1.22	1.52	2.74	0.61	1.98	0.91	1.83	0.61	1.83	0.61	1.83	1.83
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
			Sample Date	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018
SVOCs (other)																							
2-Chloronaphthalene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																							
1,1,1,2-Tetrachloroethane	0.058	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	0.38	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,2-Trichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	0.47	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	1.2	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloropropane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	4.8	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichloropropene	0.05	µg/g		0.042 U	0.042 U	0.042 U	--	0.042 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.083	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	1.8	mg/kg		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g		0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methyl-2-Pentanone	1.7	µg/g		0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	16	µg/g		0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	1.5	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromoform	0.27	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	2.4	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorodibromomethane	2.3	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroform	0.05	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	1.9	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	0.03 U	--	0.03 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichlorodifluoromethane	16	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloromethane	0.1	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	0.75	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
n-Hexane	2.8	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	0.7	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.28	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	0.084	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/g		0.03 U	0.03 U	0.03 U	--	0.03 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethylene	0.061	µg/g		0.01 U	0.01 U	0.01 U	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichlorofluoromethane	4	µg/g		0.05 U	0.05 U	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride	0.02	µg/g		0.02 U	0.02 U	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte	Table 6 SCS [a]	Unit	Location	TP17-304	TP17-305	TP17-306	TP17-306	TP17-307	TP17-308	TP18-309	TP18-309	TP18-310	TP18-310	TP18-310	TP18-311	TP18-311	TP18-312	TP18-312	TP18-313	TP18-313	TP18-314	TP18-314	TP18-314
			Sample ID	TP17-304-6-7	TP17-305-5-6	TP17-306-3-4	TP17-306-5-6	TP17-307-7-8	TP17-308-8-8.5	TP18-309-5	TP18-309-9.5	TP18-310-4	TP18-310-5	TP18-310-9	TP18-311-2	TP18-311-6.5	TP18-312-3	TP18-312-6	TP18-313-2	TP18-313-6	TP18-314-2	TP18-314-6	TP18-DUP1
			Start Depth (m)	1.83	1.52	0.91	1.52	2.13	2.44	1.22	2.74	0.91	1.22	2.44	0.3	1.83	0.61	1.52	0.3	1.52	0.3	1.52	1.52
			End Depth (m)	2	1.83	1.22	1.83	2.44	2.59	1.52	2.9	1.22	1.52	2.74	0.61	1.98	0.91	1.83	0.61	1.83	0.61	1.83	1.83
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD
			Sample Date	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	04 Oct 2017	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	TP18-315	TP18-315	TP18-315	TP18-316	TP18-316	TP18-317	TP18-318	TP18-318	TP18-319	TP18-319	TP18-319	TP20-320	TP20-320	TP20-321	TP20-321	TP20-322	TP20-322	TP20-323	TP20-324
		Sample ID	TP18-315-1	TP18-315-2	TP18-315-5	TP18-316-1	TP18-316-2	TP18-317-5	TP18-318-2	TP18-DUP2	TP18-319-2	TP18-319-3	TP18-319-6	TP20-320-2.5-3'	DUP2	TP20-321-2.75-3.25'	TP20-321-4.5-5'	TP20-322-2-2.5'	DUP1	TP20-323-2-2.5'	TP20-324-1-1.5'
		Start Depth (m)	0.1	0.3	1.22	0	0.3	1.21	0.3	0.3	0.3	0.61	1.52	0.762	0.762	0.8382	1.3716	0.6096	0.6096	0.6096	0.3048
		End Depth (m)	0.3	0.61	1.32	0.3	0.6	1.21	0.61	0.61	0.61	0.91	1.83	0.9144	0.9144	0.9906	1.524	0.762	0.762	0.762	0.4572
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	FD	N	N
		Sample Date	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020
Analyte	Table 6 SCS [a]	Unit																			
ABNs																					
1,1'-Biphenyl	0.31	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	0.36	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	0.67	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	38	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	2	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	0.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	9.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.21	µg/g	0.0185	--	--	--	--	0.0068 U	0.007	0.0071	--	--	--	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0081	0.0068 U	--	0.0068 U
Ethylbenzene	1.1	µg/g	0.028	--	--	--	--	0.018 U	0.018 U	0.018 U	--	--	--	0.018 U	0.018 U	0.018 U	0.018 U	0.018	0.018 U	--	0.018 U
Toluene	2.3	µg/g	0.099	--	--	--	--	0.08 U	0.08 U	0.08 U	--	--	--	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	--	0.08 U
Xylene, o	NV	µg/g	0.074	--	--	--	--	0.02 U	0.021	0.025	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.072	0.055	--	0.02 U
Xylenes, m & p	NV	µg/g	0.086	--	--	--	--	0.03 U	0.033	0.035	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.07	0.057	--	0.03 U
Xylenes, Total	3.1	µg/g	0.16	--	--	--	--	0.05 U	0.054	0.06	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.141	0.112	--	0.05 U
Chlorophenols																					
2,4,5-Trichlorophenol	4.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	0.19	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1.6	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dioxins and Furans																					
Lower Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mid Point PCDD/F TEQ (WHO 2005)	13	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Upper Bound PCDD/F TEQ (WHO 2005)	NV	pg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Average Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fraction Organic Carbon	NV	None	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moisture	NV	%	7.2	7.55	8.78	10.2	7.64	12.2	6.98	6.73	--	16.7	11.2	4.65	4.62	4.32	9.88	8.53	10.7	10.2	4.67
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	~~NV~~ 1600	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	650	663	9.12	439	11.2	11.2	15.7	6.63
Magnesium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	10.1	9.41	2.49	12	1.28	1.27	1.31	0.69
Sodium	NV	mg/l	--	--	--	--	--	--	--	--	--	--	--	1.88	2.12	1.92	2.69	0.51	0.5 U	0.5 U	0.5 U
Metals and Hydride Forming Metals																					
Antimony	7.5	µg/g	--	--	--	--	--	--	1.9	--	3.6	--	--	1 U	1 U	1 U	1 U	1.5	1.4	1.5	1 U
Arsenic	18	µg/g	--	--	--	--	--	--	9.9	--	10.2	--	--	2	2	2.2	2.2	5.4	5.1	4.7	2.7
Barium	390	µg/g	--	--	--	--	--	--	48.2	--	54.7	--	--	24.3	23.4	16.8	21.8	26.5	30.8	37.2	18.9
Beryllium	4	µg/g	--	--	--	--	--	--	0.5 U	--	0.59	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Boron	120	µg/g	--	--	--	--	--	--	5 U	--	5	--	--	20.5	18.4	14.9	18.4	5 U	6.2	5.4	5.4
Cadmium	1.2	µg/g	--	--	--	--	--	--	0.5 U	--	0.73	--	--	2.58	2.13	2.21	3.03	0.5 U	0.5 U	0.5 U	0.75
Chromium	160	µg/g	--	--	--	--	--	--	14.6	--	29.8	--	--	6.2	6.5	7.2	6.5	13.9	12.5	14.9	9.6
Cobalt	22	µg/g	--	--	--	--	--	--	5	--	7.9	--	--	4.2	4.4	4.1	4.6	4.9	5.1	3.8	3.5
Copper	140	µg/g	--	--	--	--	--	--	36.5	--	113	--	--	10.5	10.5	11.5	11.4	21.1	19.7	21.1	13.5
Lead	120	µg/g	--	--	--	--	--	--	86.4	--	139	--	--	147	135	308	149	40.2	40.7	87.9	54.7
Molybdenum	6.9	µg/g	--	--	--	--	--	--	1	--	3	--	--	1.7	1.7	1 U	1.6	1 U	1 U	1 U	1 U
Nickel	100	µg/g	--	--	--	--	--	--	14.3	--	26.8	--	--	9	9.3	9.4	9.3	10.9	10.6	10.2	8.9
Selenium	2.4	µg/g	--	--	--	--	--	--	1 U	--	1 U	--	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	20	µg/g	--	--	--	--	--	--	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Thallium	1	µg/g	--	--	--	--	--	--	0.5 U	--	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Uranium	23	µg/g	--	--	--	--	--	--	1 U	--	1 U	--	--	2.1	2.2	1.5	1.9	1 U	1 U	1 U	1 U
Vanadium	86	µg/g	--	--	--	--	--	--	22.1	--	23.3	--	--	12.3	13.1	15.8	14	18.7	22.5	20.4	18.4
Zinc	340	µg/g	--	--	--	--	--	--	209	--	1680	--	--	1060	862	1000	1310	183	178	92.2	777
Calcium and Magnesium																					
Calcium	~~NV~~ 54000 [b]	µg/g	--	--	--	--	--	--	13600	--	10600	--	--	222000	212000	174000	205000	11200	9550	12300	98600
Magnesium	~~NV~~ 17000 [b]	µg/g	--	--	--	--	--	--	7000	--	6500	--	--	117000	113000	91800	111000	3920	3440	3890	34000

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			TP18-315	TP18-315	TP18-315	TP18-316	TP18-316	TP18-317	TP18-318	TP18-318	TP18-319	TP18-319	TP18-319	TP20-320	TP20-320	TP20-321	TP20-321	TP20-322	TP20-322	TP20-323	TP20-324
Sample ID			TP18-315-1	TP18-315-2	TP18-315-5	TP18-316-1	TP18-316-2	TP18-317-5	TP18-318-2	TP18-DUP2	TP18-319-2	TP18-319-3	TP18-319-6	TP20-320-2.5-3'	DUP2	TP20-321-2.75-3.25'	TP20-321-4.5-5'	TP20-322-2-2.5'	DUP1	TP20-323-2-2.5'	TP20-324-1-1.5'
Start Depth (m)			0.1	0.3	1.22	0	0.3	1.21	0.3	0.3	0.3	0.61	1.52	0.762	0.762	0.8382	1.3716	0.6096	0.6096	0.6096	0.3048
End Depth (m)			0.3	0.61	1.32	0.3	0.6	1.21	0.61	0.61	0.61	0.91	1.83	0.9144	0.9144	0.9906	1.524	0.762	0.762	0.762	0.4572
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	FD	N	N
Sample Date			05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020
Analyte	Table 6 SCS [a]	Unit																			
Non-Regulated Metals																					
Aluminum	~~NV~~ 29000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/g	--	--	--	--	--	--	5.7	--	1 U	--	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Iron	~~NV~~ 38000 [b.]	µg/g	--	--	--	--	--	--	34900	--	47100	--	--	6170	5920	7550	6830	40300	44900	24400	10900
Manganese	~~NV~~ 1800 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	~~NV~~ 6000 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	~~NV~~ 87 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	~~NV~~ 50 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	~~NV~~ 5400 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	~~NV~~ 48 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Boron (HWS)	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.12	0.15	0.1 U	0.1 U	0.23	0.22	0.2	0.1 U
Chloride (Cl)	~~NV~~ 200 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium, Hexavalent (Cr6+)	8	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Cyanide, Free	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	0.051	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Electrical Conductivity	0.7	mS/cm	--	--	--	--	--	--	--	--	--	--	--	2.13	2.19	0.123	1.64	0.116	0.112	0.139	0.0777
Mercury	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.0709	0.0706	0.0595	0.0773	0.0197	0.0167	0.0246	0.0099
Sodium	~~NV~~ 200 [b.]	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium Absorption Ratio	5	SAR	--	--	--	--	--	--	--	--	--	--	--	0.1 U	0.1 U	0.15	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
OCPs																					
Hexachlorobenzene	0.52	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	0.012	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorocyclopentadiene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	0.089	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/g	--	0.03 U	0.286	--	0.042	--	0.051	0.054	--	0.06	0.053	0.034	0.03 U	0.03 U	0.031	0.122	0.091	0.187	0.03 U
2-(1-)Methylnaphthalene	0.99	µg/g	--	0.042 U	0.644	--	0.089	--	0.115	0.121	--	0.127	0.108	0.042 U	0.042 U	0.042 U	0.042 U	0.276	0.209	0.416	0.042 U
2-Methylnaphthalene	NV	µg/g	--	0.032	0.358	--	0.047	--	0.064	0.068	--	0.067	0.055	0.03 U	0.03 U	0.03 U	0.03 U	0.155	0.118	0.23	0.03 U
Acenaphthene	7.9	µg/g	--	0.05 U	0.39	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.054	0.05 U	0.05 U	0.05 U
Acenaphthylene	0.15	µg/g	--	0.108	0.112	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Anthracene	0.67	µg/g	--	0.108	0.833	--	0.071	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.086	0.181	0.05 U	0.05 U
Benzo(a)anthracene	0.5	µg/g	--	0.865	2.42	--	0.334	--	0.072	0.065	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.194	1.41	0.098	0.05 U
Benzo(a)pyrene	0.3	µg/g	--	0.749	1.98	--	0.27	--	0.059	0.056	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.143	1.3	0.1	0.05 U
Benzo(b&j)fluoranthene	0.78	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.78	µg/g	--	0.928	2.62	--	0.351	--	0.112	0.092	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.295 J	1.89	0.231	0.05 U
Benzo(g,h,i)perylene	6.6	µg/g	--	0.37	0.939	--	0.142	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.136	0.932	0.13	0.05 U
Benzo(k)fluoranthene	0.78	µg/g	--	0.3	0.864	--	0.121	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.077	0.553	0.064	0.05 U
Chrysene	7	µg/g	--	0.685	2.08	--	0.292	--	0.081	0.077	--	0.05 U	0.05 U	0.058	0.05 U	0.054	0.056	0.246	1.51	0.159	0.05 U
Dibenzo(a,h)anthracene	0.1	µg/g	--	0.105	0.266	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.261	0.05 U	0.05 U
Fluoranthene	0.69	µg/g	--	1.43	5.64	--	0.662	--	0.115	0.1	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.398 J	2.15	0.16	0.05 U
Fluorene	62	µg/g	--	0.05 U	0.37	--	0.05 U	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.38	µg/g	--	0.376	1	--	0.14	--	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.11	0.884	0.104	0.05 U
Naphthalene	0.6	µg/g	--	0.041	0.672	--	0.041	--	0.058	0.062	--	0.041	0.03	0.013 U	0.013 U	0.013 U	0.018	0.138	0.095	0.182	0.013 U
Phenanthrene	6.2	µg/g	--	0.325	5.09	--	0.361	--	0.093	0.089	--	0.064	0.061	0.057	0.046 U	0.077	0.071	0.397	0.611	0.233	0.046 U
Pyrene	78	µg/g	--	1.28	4.39	--	0.549	--	0.096	0.082	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.319 J	2.06	0.131	0.05 U
PCBs																					
Aroclor 1242	NV	µg/g	--	--	--	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/g	--	--	--	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/g	--	--	--	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/g	--	--	--	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.35	µg/g	--	--	--	0.02 U	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	55	µg/g	5 U	--	--	--	--	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U
Petroleum Hydrocarbons F1 (C6-C10)	55	µg/g	5 U	--	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	98	µg/g	--	--	--	--	12	--	11	10 U	--	--	--	16	16	19	10 U	10 U	10 U	--	10 U
Petroleum Hydrocarbons F2 (C10-C16)	98	µg/g	12	--	--	--	12	10 U	11	10 U	--	--	--	16	16	19	10 U	10 U	10 U	--	10 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	300	µg/g	--	--	--	--	112	--	59	50 U	--	--	--	117	119	112	61	59	57	--	50 U
Petroleum Hydrocarbons F3 (C16-C34)	300	µg/g	197	--	--	--	115	61	59	50 U	--	--	--	117	119	112	61	61	68	--	50 U
Petroleum Hydrocarbons F4 (C34-C50)	2800	µg/g	92	--	--	--	50 U	50 U	50 U	50 U	--	--	--	54	54	50 U	50 U	50 U	50 U	--	50 U
F4G-SG (GHH-Silica)	2800	µg/g	310	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Gravimetric Heavy Hydrocarbons	2800	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/g	301	--	--	--	127	72 U	72 U	72 U	--	--	--	188	189	131	72 U	72 U	72 U	--	72 U

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	TP18-315	TP18-315	TP18-315	TP18-316	TP18-316	TP18-317	TP18-318	TP18-318	TP18-319	TP18-319	TP18-319	TP20-320	TP20-320	TP20-321	TP20-321	TP20-322	TP20-322	TP20-323	TP20-324
		Sample ID	TP18-315-1	TP18-315-2	TP18-315-5	TP18-316-1	TP18-316-2	TP18-317-5	TP18-318-2	TP18-DUP2	TP18-319-2	TP18-319-3	TP18-319-6	TP20-320-2.5-3'	DUP2	TP20-321-2.75-3.25'	TP20-321-4.5-5'	TP20-322-2-2.5'	DUP1	TP20-323-2-2.5'	TP20-324-1-1.5'
		Start Depth (m)	0.1	0.3	1.22	0	0.3	1.21	0.3	0.3	0.3	0.61	1.52	0.762	0.762	0.8382	1.3716	0.6096	0.6096	0.6096	0.3048
		End Depth (m)	0.3	0.61	1.32	0.3	0.6	1.21	0.61	0.61	0.61	0.91	1.83	0.9144	0.9144	0.9906	1.524	0.762	0.762	0.762	0.4572
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	FD	N	N
		Sample Date	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020
Analyte	Table 6 SCS [a]	Unit																			
SVOCs (other)																					
2-Chloronaphthalene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Hexanone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Bromophenyl Phenyl Ether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chlorophenyl Phenylether	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethoxy) methane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-N-Butylphthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isophorone	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrobenzene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodi-N-propylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitrosodiphenylamine	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	0.058	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,1-Trichloroethane	0.38	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,2,2-Tetrachloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1,2-Trichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1-Dichloroethane	0.47	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,1-Dichloroethene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dibromoethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichlorobenzene	1.2	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichloroethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,2-Dichloropropane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,3-Dichlorobenzene	4.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,3-Dichloropropene	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	0.042 U	--	0.042 U
1,4-Dichlorobenzene	0.083	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
1,4-Dioxane	1.8	mg/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
4-Methyl-2-Pentanone	1.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
Acetone	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
Bromodichloromethane	1.5	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Bromoform	0.27	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Bromomethane	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Carbon tetrachloride	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chlorobenzene	2.4	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chlorodibromomethane	2.3	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Chloroform	0.05	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
cis-1,2-Dichloroethene	1.9	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
cis-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U
Dichlorodifluoromethane	16	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Dichloromethane	0.1	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Methyl tert-butyl ether (MTBE)	0.75	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
n-Hexane	2.8	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Styrene	0.7	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Tetrachloroethene	0.28	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
trans-1,2-Dichloroethene	0.084	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
trans-1,3-Dichloropropene	NV	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	0.03 U
Trichloroethylene	0.061	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	0.01 U
Trichlorofluoromethane	4	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	0.05 U
Vinyl Chloride	0.02	µg/g	--	--	--	--	--	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--	0.02 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, Ministry of the Environment.* April 15.

[b] Parameters withouth MECP standards were screened against available Ontario Typical Ranges calcualted from values listed Region 2 from Table 8.2 (Soil - Old Urban Parks) in the *"Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario", Ministry of the Environment, April 15, 2011.*

Table 6-5. Summary of Analytical Results in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	TP18-315	TP18-315	TP18-315	TP18-316	TP18-316	TP18-317	TP18-318	TP18-318	TP18-319	TP18-319	TP18-319	TP20-320	TP20-320	TP20-321	TP20-321	TP20-322	TP20-322	TP20-323	TP20-324
		Sample ID	TP18-315-1	TP18-315-2	TP18-315-5	TP18-316-1	TP18-316-2	TP18-317-5	TP18-318-2	TP18-DUP2	TP18-319-2	TP18-319-3	TP18-319-6	TP20-320-2.5-3'	DUP2	TP20-321-2.75-3.25'	TP20-321-4.5-5'	TP20-322-2-2.5'	DUP1	TP20-323-2-2.5'	TP20-324-1-1.5'
		Start Depth (m)	0.1	0.3	1.22	0	0.3	1.21	0.3	0.3	0.3	0.61	1.52	0.762	0.762	0.8382	1.3716	0.6096	0.6096	0.6096	0.3048
		End Depth (m)	0.3	0.61	1.32	0.3	0.6	1.21	0.61	0.61	0.61	0.91	1.83	0.9144	0.9144	0.9906	1.524	0.762	0.762	0.762	0.4572
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	FD	N	N	N	FD	N	N
		Sample Date	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	06 Jul 2018	06 Jul 2018	06 Jul 2018	05 Jul 2018	05 Jul 2018	05 Jul 2018	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020	20 Feb 2020
Analyte	Table 6 SCS [a]	Unit																			

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

Value exceeds the Ontario Typical Range.

% = percent

-- = not analyzed

µg/g = microgram(s) per gram

ABNs = acid, base and neutral compounds

BH = borehole

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

DUP = duplicate

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mg/kg = milligram(s) per kilogram

mg/l = milligram(s) per litre

mS/cm = milliSiemen(s) per centimetre

MW = monitoring well

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

pg/g = picogram(s) per gram

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-6. Maximum Detected Concentrations in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte Group	Analyte	Unit	Maximum Detected Concentration	Sample Qualifier	Location	Sample Name	Sample Type	Sample Date	Start Depth (mbgs)	End Depth (mbgs)	SDG
ABN	1,1'-Biphenyl	µg/g	0.237		MW17-110S	MW17-110S-0-2	N	10/16/2017	0.00	0.61	L2010780
BTEX	Benzene	µg/g	0.26		BH07-66	BH07-66 SS-1A	N	2/9/2007	0.05	1.22	07T209831
BTEX	Ethylbenzene	µg/g	4.1		BH07-66	BH07-66 SS-1A	N	2/9/2007	0.05	1.22	07T209831
BTEX	Toluene	µg/g	1.2		TP13-11	DUP2	FD	12/3/2013	0.10	0.30	B3K9090
BTEX	Xylene, o	µg/g	1.32		BH20-214	BH20-214-0.5-2	N	2/21/2020	0.15	0.61	L2419793
BTEX	Xylenes, m & p	µg/g	1.27		BH20-214	BH20-214-0.5-2	N	2/21/2020	0.15	0.61	L2419793
BTEX	Xylenes, Total	µg/g	3.9		BH07-66	BH07-66 SS-1A	N	2/9/2007	0.05	1.22	07T209831
Chemistry	Phosphorus	µg/g	2100		TP13-11	TP11-6	N	12/3/2013	0.10	0.30	B3K9090
Chemistry	Sodium Absorption Ratio	SAR	2		BH07-40	BH07-40SS-1A	N	2/8/2007	0.30	1.22	07T209831
Dioxins/Furans	Mid Point PCDD/F TEQ (WHO 2005)	pg/g	5.19		TP17-300	TP17-300-0-1	N	10/4/2017	0.00	0.30	L2003037
Metals	Barium	µg/g	277		BH07-57	Dup#5	FD	2/8/2007	0.05	1.22	07T209831
Metals	Beryllium	µg/g	4		12	12-2 (OW7-SW7-2)	N	1/22/1991	0.40	1.00	P&R_E.O.90K26
Metals	Boron	µg/g	23		TP13-08	TP8-4	N	12/3/2013	0.10	0.30	B3K9090
Metals	Cadmium	µg/g	83.4		MW17-108S	MW17-108S-8-9	N	10/11/2017	2.44	2.67	L2007635
Metals	Chromium	µg/g	84.7		K	K-1	N	1/22/1991	0.00	0.70	91-4281/P&R_E.O.90K2
Metals	Cobalt	µg/g	393		C11	C11-1	N	2/8/1991	0.34	0.40	91-4346/P&R_E.O.90K2
Metals	Copper	µg/g	2460		I	I-1	N	1/22/1991	0.50	0.50	91-4281/P&R_E.O.90K2
Metals	Lead	µg/g	10100		BH07-65	BH07-65 SS-1A	N	2/9/2007	0.05	0.61	07T209831
Metals	Molybdenum	µg/g	35		K	K-1	N	1/22/1991	0.00	0.70	91-4281/P&R_E.O.90K2
Metals	Nickel	µg/g	117		BH07-51	BH07-51 SS-1	N	2/8/2007	0.00	1.22	07T209831
Metals	Selenium	µg/g	1.9		BH20-214	BH20-214-0.5-2	N	2/21/2020	0.15	0.61	L2419793
Metals	Silver	µg/g	7.8		C11	C11-1	N	2/8/1991	0.34	0.40	91-4346/P&R_E.O.90K2
Metals	Thallium	µg/g	6		AN21	AN21-2	N	1/22/1991	0.90	1.70	91-4281/P&R_E.O.90K2
Metals	Uranium	µg/g	2.6		TP13-11	TP11-6	N	12/3/2013	0.10	0.30	B3K9090
Metals	Vanadium	µg/g	100		MW17-100S	MW17-100S-4.5-6	N	10/12/2017	1.37	1.83	L2007635
Metals	Zinc	µg/g	67200		MW17-108S	MW17-108S-8-9	N	10/11/2017	2.44	2.67	L2007635
Metals, Ca & Mg	Calcium	µg/g	222000		TP20-320	TP20-320-2.5-3'	N	2/20/2020	0.76	0.91	L2419793
Metals, Ca & Mg	Magnesium	µg/g	120000		TP13-06	TP6-4	N	12/2/2013	0.10	0.30	B3K9090
Metals, HF	Antimony	µg/g	18.6		BH07-56	BH07-56 SS-1A	N	2/9/2007	0.05	0.91	07T209831
Metals, HF	Arsenic	µg/g	23		BH07-67	BH07-67 SS1A	N	2/9/2007	0.05	0.91	07T209831
Metals, Na	Sodium	µg/g	510		TP13-08	TP8-4	N	12/3/2013	0.10	0.30	B3K9090
Metals, Other	Aluminum	µg/g	16000		A	A-1	N	1/22/1991	0.30	1.00	91-4543/91-4281
Metals, Other	Bismuth	µg/g	150		TP13-11	DUP2	FD	12/3/2013	0.10	0.30	B3K9090
Metals, Other	Iron	µg/g	128000		I	I-1	N	1/22/1991	0.50	0.50	91-4281/P&R_E.O.90K2
Metals, Other	Manganese	µg/g	1810		I	I-1	N	1/22/1991	0.50	0.50	91-4281/P&R_E.O.90K2
Metals, Other	Potassium	µg/g	2000		TP13-08	TP8-4	N	12/3/2013	0.10	0.30	B3K9090
Metals, Other	Strontium	µg/g	190		TP13-11	TP11-6	N	12/3/2013	0.10	0.30	B3K9090
Metals, Other	Tin	µg/g	9.6		TP13-08	DUP1	FD	12/3/2013	0.10	0.30	B3K9090
Metals, Other	Titanium	µg/g	532		12SE10	12SE10-2 (OW7SE10-2)	N	1/22/1991	0.40	1.40	91-4543
Metals, Other	Zirconium	µg/g	19		I	I-1	N	1/22/1991	0.50	0.50	91-4281/P&R_E.O.90K2
ORPs	Boron (HWS)	µg/g	0.87		BH17-200	BH17-200-3-3.5	N	10/10/2017	0.91	1.07	L2007635
ORPs	Chloride (Cl)	µg/g	122		BH07-53	Dup#1	FD	2/8/2007	1.22	1.47	07T209831

Table 6-6. Maximum Detected Concentrations in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte Group	Analyte	Unit	Maximum Detected Concentration	Sample Qualifier	Location	Sample Name	Sample Type	Sample Date	Start Depth (mbgs)	End Depth (mbgs)	SDG
ORPs	Chromium, Hexavalent (Cr6+)	µg/g	0.32		MW17-100S	MW17-100S-4.5-6	N	10/12/2017	1.37	1.83	L2007635
ORPs	Chromium, Hexavalent (Cr6+)	µg/g	0.32		MW18-129D	DUP2 JUL23	FD	7/23/2018	0.76	1.37	L2136825
ORPs	Electrical Conductivity	mS/cm	2.19		TP20-320	DUP2	FD	2/20/2020	0.76	0.91	L2419793
ORPs	Mercury	µg/g	0.319		BH07-57	BH07-57 SS-1A	N	2/8/2007	0.05	1.22	07T209831
ORPs	pH	pH UNITS	9		7	7-2	N	1/22/1991	0.40	0.90	91-4281/P&R_E.O.90K2
PAH	2-(1-)Methylnaphthalene	µg/g	4.93		TP17-300	DUP 4	FD	10/4/2017	0.30	0.61	L2003037
PAH	Acenaphthene	µg/g	94		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Acenaphthylene	µg/g	1		TP13-08	DUP1	FD	12/3/2013	0.10	0.30	B3K9090
PAH	Anthracene	µg/g	160		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Benzo(a)anthracene	µg/g	200		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Benzo(a)pyrene	µg/g	130		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Benzo(b)fluoranthene	µg/g	190		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Benzo(g,h,i)perylene	µg/g	70		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Benzo(k)fluoranthene	µg/g	66		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Chrysene	µg/g	180		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Dibenzo(a,h)anthracene	µg/g	26		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Fluoranthene	µg/g	660		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Fluorene	µg/g	150		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Indeno(1,2,3-Cd)Pyrene	µg/g	80		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Naphthalene	µg/g	220		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Phenanthrene	µg/g	900		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PAH	Pyrene	µg/g	470		OW07-34D	OW07-34SS1	N	2/22/2007	0.00	1.22	07T211735
PCB	Aroclor 1248	µg/g	1.65		TP17-300	DUP 3	FD	10/4/2017	0.00	0.30	L2003037
PCB	Aroclor 1254	µg/g	0.16		TP13-08	TP8-4	N	12/3/2013	0.10	0.30	B3K9090
PCB	Aroclor 1260	µg/g	0.2		TP13-08	TP8-4	N	12/3/2013	0.10	0.30	B3K9090
PCB	PCB, Total	µg/g	1.65		TP17-300	DUP 3	FD	10/4/2017	0.00	0.30	L2003037
PHC	Petroleum Hydrocarbons F1 (C6-C10)	µg/g	36.6		BH20-214	BH20-214-0.5-2	N	2/21/2020	0.15	0.61	L2419793
PHC	Petroleum Hydrocarbons F2 (C10-C16)	µg/g	3600		BH07-46	BH07-46 SS-2	N	2/8/2007	1.22	1.68	07T209831
PHC	Petroleum Hydrocarbons F3 (C16-C34)	µg/g	23000		BH07-40	BH07-40SS-1A	N	2/8/2007	0.30	1.22	07T209831
PHC	Petroleum Hydrocarbons F4 (C34-C50)	µg/g	7300		BH07-67	BH07-67 SS1A	N	2/9/2007	0.05	0.91	07T209831
VOC	1,1,1-Trichloroethane	µg/g	0.01		OW07-37	OW07-37SS-1A	N	2/22/2007	0.61	1.22	07T211735
VOC	Acetone	µg/g	0.68		TP13-01	TP1-5	N	12/2/2013	0.10	0.30	B3K9090
VOC	n-Hexane	µg/g	0.861	J	MW17-107S	MW17-107S-0.5-2	N	10/12/2017	0.15	0.61	L2007635
VOC	Trichloroethylene	µg/g	35.4		BH18-207i	BH18-207I-0.5-2.5	N	2/21/2020	0.15	0.76	L2419793

Notes:

µg/g = microgram(s) per gram

F = fraction

mbgs = metre(s) below ground surface

N = normal sample

SDG = sample delivery group

Table 6-7c. Contaminants of Concern Identified in Soil

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Soil COCs	
2-(1-)Methylnaphthalene	Fluoranthene
Acenaphthene	Fluorene
Acenaphthylene	Indeno(1,2,3-Cd)Pyrene
Anthracene	Iron
Antimony	Lead
Arsenic	Magnesium
Benzene	Mercury
Benzo(a)anthracene	Molybdenum
Benzo(a)pyrene	Naphthalene
Benzo(b)fluoranthene	Nickel
Benzo(g,h,i)perylene	PCB, Total
Benzo(k)fluoranthene	PHC F2 (C10-C16)
Bismuth	PHC F3 (C16-C34)
Cadmium	PHC F4 (C34-C50)
Calcium	Phenanthrene
Chrysene	Pyrene
Cobalt	Thallium
Copper	Trichloroethylene
Dibenzo(a,h)anthracene	Vanadium
Electrical Conductivity	Xylenes, Total
Ethylbenzene	Zinc

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW17-100S**			**MW17-101D**				**MW17-101S**			**MW17-102D**			**MW17-103D**		**MW17-103S**	
		Sample ID	MW17-100S	MW17-100S	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	DUP3	MW17-101S	MW17-101S	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103S	MW17-103S
		Start Depth (m)	3.38	3.38	3.38	6.30	6.30	6.30	6.30	1.22	1.22	1.22	13.76	13.76	13.76	7.32	7.32	2.44	2.44
		End Depth (m)	4.90	4.90	4.90	7.82	7.82	7.82	7.82	4.27	4.27	4.27	15.29	15.29	15.29	8.84	8.84	3.96	3.96
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	31 Oct 2017	31 Jul 2018	24 Feb 2020	01 Nov 2017	21 Mar 2018	13 Apr 2018	28 Feb 2020	01 Nov 2017	01 Nov 2017	28 Feb 2020	02 Nov 2017	21 Dec 2018	26 Feb 2020	02 Nov 2017	03 Mar 2020	02 Nov 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
ABNs																			
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.57 U	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2 U	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--
BTEX																			
Benzene	0.5	µg/L	0.5 U	--	0.5 UJ	**1.17**	--	--	**0.7**	--	**0.89**	0.5 U	**1.18**	**1.44**	**1.3**	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	24	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.3 U	--	0.3 UJ	0.3 U	--	--	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	--	0.4 UJ	0.4 U	--	--	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorophenyls																			
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--
Chemistry																			
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.817**	--	--	**1.5**	--	--	--	--	**1.04**	--	--	--	--	--	--	**0.864**	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	**7.25**	--	--	**7.59**	--	--	--	--	**7.44**	--	--	--	--	--	--	**7.63**	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																			
Antimony	6	µg/L	**0.26**	--	--	**0.53**	0.1 U	0.1 U	--	--	0.1 U	--	--	--	--	--	--	**1.07**	--
Arsenic	25	µg/L	**5.88**	--	--	**44.8**	**6.87**	**6.19**	--	--	**0.29**	--	--	--	--	--	--	**1.06**	--
Barium	1000	µg/L	**67.7**	--	--	**136**	--	--	--	--	**77.5**	--	--	--	--	--	--	**45.2**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW17-100S**			**MW17-101D**				**MW17-101S**			**MW17-102D**			**MW17-103D**		**MW17-103S**	
		Sample ID	MW17-100S	MW17-100S	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	DUP3	MW17-101S	MW17-101S	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103S	MW17-103S
		Start Depth (m)	3.38	3.38	3.38	6.30	6.30	6.30	6.30	1.22	1.22	1.22	13.76	13.76	13.76	7.32	7.32	2.44	2.44
		End Depth (m)	4.90	4.90	4.90	7.82	7.82	7.82	7.82	4.27	4.27	4.27	15.29	15.29	15.29	8.84	8.84	3.96	3.96
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	31 Oct 2017	31 Jul 2018	24 Feb 2020	01 Nov 2017	21 Mar 2018	13 Apr 2018	28 Feb 2020	01 Nov 2017	01 Nov 2017	28 Feb 2020	02 Nov 2017	21 Dec 2018	26 Feb 2020	02 Nov 2017	03 Mar 2020	02 Nov 2017	03 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**																	
Beryllium	4	µg/L	0.1 U	--	--	0.1 U	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--
Boron	5000	µg/L	**81**	--	--	**71**	--	--	--	--	**59**	--	--	--	--	--	--	**86**	--
Cadmium	2.1	µg/L	**0.121**	--	--	0.01 U	--	--	--	--	0.01 U	--	--	--	--	--	--	**0.083**	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	0.5 U	--	--	0.5 U	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--
Cobalt	3.8	µg/L	**1.05**	--	--	**0.23**	--	--	--	--	0.1 U	--	--	--	--	--	--	**0.45**	--
Copper	69	µg/L	**0.95**	--	--	0.2 U	--	--	--	--	0.2 U	--	--	--	--	--	--	**0.45**	--
Lead	10	µg/L	0.05 U	--	--	**0.52**	--	--	--	--	0.05 U	--	--	--	--	--	--	**0.102**	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	**1.26**	--	--	**9.78**	--	--	--	--	**0.195**	--	--	--	--	--	--	**2.46**	--
Nickel	100	µg/L	**6.88**	--	--	**6.93**	--	--	--	--	0.5 U	--	--	--	--	--	--	**4.73**	--
Selenium	10	µg/L	**0.497**	--	--	**0.375**	0.05 U	**0.097**	--	--	**6.26**	--	--	--	--	--	--	**0.725**	--
Silver	1.2	µg/L	0.05 U	--	--	0.05 U	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--
Sodium	490000	µg/L	**7480**	--	--	**75800**	--	--	--	--	**7710**	--	--	--	--	--	--	**6540**	--
Thallium	2	µg/L	**0.046**	--	--	0.01 U	--	--	--	--	0.01 U	--	--	--	--	--	--	**0.055**	--
Uranium	20	µg/L	**1.57**	--	--	**8.19**	--	--	--	--	**3.07**	--	--	--	--	--	--	**2.35**	--
Vanadium	6.2	µg/L	0.5 U	--	--	0.5 U	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--
Zinc	890	µg/L	**458**	--	--	**46.1**	--	--	--	--	1 U	--	--	--	--	--	--	**315**	--
Non-Regulated Metals																			
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																			
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	--	--	1 U	--	--	--	--	1 U	--	--	--	--	--	--	1 U	--
Chloride (Cl)	790000	µg/L	**2350**	--	--	**142000**	--	--	--	--	**8980**	--	--	--	--	--	--	**6860**	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.01 U	--	--	0.01 U	--	--	--	--	0.01 U	--	--	--	--	--	--	0.01 U	--
PAHs																			
1-Methylnaphthalene	NV	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	**0.142**	--	--	--	--	--	--	0.02 U	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.028 U	--	0.028 U	--	--	--	--	**0.174**	--	--	--	--	--	--	0.028 U	--
2-Methylnaphthalene	NV	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	**0.032**	--	--	--	--	--	--	0.02 U	--
Acenaphthene	4.1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	**0.618**	--	--	--	--	--	--	0.02 U	--
Acenaphthylene	1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.1 U	--	--	--	--	--	--	0.02 U	--
Anthracene	1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.9 U	--	--	--	--	--	--	0.02 U	--
Benzo(a)anthracene	1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Benzo(a)pyrene	0.01	µg/L	--	0.01 U	--	0.01 U	--	--	--	--	0.01 U	--	--	--	--	--	--	0.01 U	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Benzo(g,h,i)perylene	0.2	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Benzo(k)fluoranthene	0.1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Chrysene	0.1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Fluoranthene	0.41	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW17-100S			MW17-101D				MW17-101S			MW17-102D			MW17-103D		MW17-103S	
		Sample ID	MW17-100S	MW17-100S	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	DUP3	MW17-101S	MW17-101S	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103S	MW17-103S
		Start Depth (m)	3.38	3.38	3.38	6.30	6.30	6.30	6.30	1.22	1.22	1.22	13.76	13.76	13.76	7.32	7.32	2.44	2.44
		End Depth (m)	4.90	4.90	4.90	7.82	7.82	7.82	7.82	4.27	4.27	4.27	15.29	15.29	15.29	8.84	8.84	3.96	3.96
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	31 Oct 2017	31 Jul 2018	24 Feb 2020	01 Nov 2017	21 Mar 2018	13 Apr 2018	28 Feb 2020	01 Nov 2017	01 Nov 2017	28 Feb 2020	02 Nov 2017	21 Dec 2018	26 Feb 2020	02 Nov 2017	03 Mar 2020	02 Nov 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
Fluorene	120	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	**0.892**	--	--	--	--	--	--	0.02 U	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	--	--	--	0.02 U	--
Naphthalene	7	µg/L	--	0.05 U	--	0.05 U	--	--	--	--	0.14 U	--	--	--	--	--	--	0.05 U	--
Phenanthrene	1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	0.03 U	--	--	--	--	--	--	0.02 U	--
Pyrene	4.1	µg/L	--	0.02 U	--	0.02 U	--	--	--	--	**0.044**	--	--	--	--	--	--	0.02 U	--
PCBs																			
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																			
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	--	--	25 U	--	--	--	--	25 U	--	25 U	--	--	--	--	25 U	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	--	--	25 U	--	--	--	--	25 U	--	25 U	--	--	--	--	25 U	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	100 U	--	--	--	--	**120**	--	--	--	--	--	--	100 U	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	--	100 U	--	--	--	--	**120**	--	100 U	--	--	--	--	100 U	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	250 U	--	--	--	--	250 U	--	--	--	--	--	--	250 U	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	--	--	250 U	--	--	--	--	250 U	--	250 U	--	--	--	--	250 U	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	--	--	250 U	--	--	--	--	250 U	--	250 U	--	--	--	--	250 U	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	370 U	--	--	370 U	--	--	--	--	370 U	--	370 U	--	--	--	--	370 U	--
SVOCs																			
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																			
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	**4.92**	**2.94**
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	**1.72**	--	**1.47**	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	--	0.2 UJ	0.2 U	--	--	0.2 U	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	20 U	--	--	--	20 U	20 U	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	--	20 UJ	20 U	--	--	20 U	--	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	20 U	--	20 UJ	20 U	--	--	20 U	--	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U
Acetone	2700	µg/L	30 U	--	30 UJ	30 U	--	--	30 U	--	30 U	30 U	30 U	--	30 U	30 U	30 U	30 U	30 U
Bromodichloromethane	16	µg/L	2 U	--	2 UJ	2 U	--	--	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U
Bromoform	5	µg/L	5 U	--	5 UJ	5 U	--	--	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U
Bromomethane	0.89	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	--	0.2 UJ	0.2 U	--	--	0.2 U	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	2 U	--	2 UJ	2 U	--	--	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW17-100S**			**MW17-101D**				**MW17-101S**			**MW17-102D**			**MW17-103D**		**MW17-103S**	
		Sample ID	MW17-100S	MW17-100S	MW17-100S	MW17-101D	MW17-101D	MW17-101D	MW17-101D	DUP3	MW17-101S	MW17-101S	MW17-102D	MW17-102D	MW17-102D	MW17-103D	MW17-103D	MW17-103S	MW17-103S
		Start Depth (m)	3.38	3.38	3.38	6.30	6.30	6.30	6.30	1.22	1.22	1.22	13.76	13.76	13.76	7.32	7.32	2.44	2.44
		End Depth (m)	4.90	4.90	4.90	7.82	7.82	7.82	7.82	4.27	4.27	4.27	15.29	15.29	15.29	8.84	8.84	3.96	3.96
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	31 Oct 2017	31 Jul 2018	24 Feb 2020	01 Nov 2017	21 Mar 2018	13 Apr 2018	28 Feb 2020	01 Nov 2017	01 Nov 2017	28 Feb 2020	02 Nov 2017	21 Dec 2018	26 Feb 2020	02 Nov 2017	03 Mar 2020	02 Nov 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
Chloroform	2	µg/L	1 U	--	1 UJ	**1.1**	--	--	1 U	--	1 U	1 U	**1.5**	--	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	--	0.5 UJ	**1.44**	--	--	**1.8**	--	**0.67**	0.5 U	**5.36**	--	**5.4**	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	--	0.3 UJ	0.3 U	--	--	0.3 U	--	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	--	2 UJ	2 U	--	--	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U
Dichloromethane	26	µg/L	5 U	--	5 UJ	5 U	--	--	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	--	2 UJ	2 U	--	--	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U
n-Hexane	5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	--	0.3 UJ	0.3 U	--	--	0.3 U	--	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	0.5 U	--	0.5 UJ	0.5 U	--	--	0.5 U	--	**0.6**	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	5 U	--	5 UJ	5 U	--	--	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 U	--	0.5 UJ	**0.91**	--	--	**1.24**	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW17-104D				MW17-104S		MW17-105D			MW17-105S		MW17-106D		MW17-106S			MW17-107S		
Sample ID			MW17-104D	MW17-104D	DUP1	MW17-104D	MW17-104S	MW17-104S	DUP2	MW17-105D	MW17-105D	MW17-105S	MW17-105S	MW17-106D	MW17-106D	MW17-106S	DUP1	MW17-106S	DUP4	MW17-107S	MW17-107S
Start Depth (m)			6.10	6.10	6.10	6.10	1.22	1.22	6.93	6.93	6.93	3.20	3.20	7.01	7.01	3.05	3.05	3.05	2.72	2.72	2.72
End Depth (m)			7.62	7.62	7.62	7.62	3.66	3.66	8.46	8.46	8.46	4.72	4.72	8.53	8.53	4.57	4.57	4.57	4.85	4.85	4.85
Sample Type			N	N	FD	N	N	N	FD	N	N	N	N	N	N	N	FD	N	FD	N	N
Sample Date			01 Nov 2017	31 Jul 2018	31 Jul 2018	02 Mar 2020	01 Nov 2017	02 Mar 2020	31 Oct 2017	31 Oct 2017	28 Feb 2020	31 Oct 2017	28 Feb 2020	01 Nov 2017	24 Feb 2020	01 Nov 2017	24 Feb 2020	24 Feb 2020	01 Nov 2017	01 Nov 2017	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.57 U	0.57 U	0.57 U	0.57 U	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U	1 U	1 U	1 U	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 UJ	0.4 UJ	0.4 U	0.4 U	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2 U	2 U	2 U	2 U	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	**3.07**	**3.05**	**1.8**	**66.8**	**31.1**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.5 U	--	--	0.5 U	**0.65**	0.5 U	0.5 U	0.5 U	0.5 U	**8.42**	**1.42**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Toluene	24	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**1.57**	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.3 U	--	--	0.3 U	**2.47**	**2.26**	0.3 U	0.3 U	0.3 U	**1.17**	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 UJ	--	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	--	--	0.4 U	**0.63**	**0.85**	**0.7**	**0.72**	0.4 U	**37.4**	**11**	0.4 U	0.4 UJ	0.4 U	0.4 UJ	0.4 UJ	--	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 U	--	--	0.5 U	**3.1**	**3.11**	**0.7**	**0.72**	0.5 U	**38.6**	**11**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	0.3 U	0.3 U	0.3 U	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	0.3 U	0.3 U	0.3 U	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.725**	--	--	--	**0.758**	--	**1.09**	**1.08**	--	**1.01**	--	--	--	**0.746**	--	--	--	**0.831**	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	**7.65**	--	--	--	**7.69**	--	**7.61**	**7.5**	--	**7.61**	--	--	--	**7.48**	--	--	--	**7.76**	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	**2.05**	--	--	--	0.1 U	--	**0.11**	**0.11**	--	0.1 U	--	--	--	**0.26**	--	--	--	**0.28**	--
Arsenic	25	µg/L	**10.6**	--	--	--	**1.06**	--	**20.6**	**20.5**	--	**12.6**	--	--	--	**1.3**	--	--	--	**2.02**	--
Barium	1000	µg/L	**60.2**	--	--	--	**60.7**	--	**246**	**251**	--	**142**	--	--	--	**34.9**	--	--	--	**88.7**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-104D				MW17-104S		MW17-105D			MW17-105S		MW17-106D		MW17-106S			MW17-107S		
			Sample ID	MW17-104D	MW17-104D	DUP1	MW17-104D	MW17-104S	MW17-104S	DUP2	MW17-105D	MW17-105D	MW17-105S	MW17-105S	MW17-106D	MW17-106D	MW17-106S	DUP1	MW17-106S	DUP4	MW17-107S	MW17-107S
			Start Depth (m)	6.10	6.10	6.10	6.10	1.22	1.22	6.93	6.93	6.93	3.20	3.20	7.01	7.01	3.05	3.05	3.05	2.72	2.72	2.72
			End Depth (m)	7.62	7.62	7.62	7.62	3.66	3.66	8.46	8.46	8.46	4.72	4.72	8.53	8.53	4.57	4.57	4.57	4.85	4.85	4.85
			Sample Type	N	N	FD	N	N	N	FD	N	N	N	N	N	N	N	FD	N	FD	N	N
			Sample Date	01 Nov 2017	31 Jul 2018	31 Jul 2018	02 Mar 2020	01 Nov 2017	02 Mar 2020	31 Oct 2017	31 Oct 2017	28 Feb 2020	31 Oct 2017	28 Feb 2020	01 Nov 2017	24 Feb 2020	01 Nov 2017	24 Feb 2020	24 Feb 2020	01 Nov 2017	01 Nov 2017	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																				
Beryllium	4	µg/L	0.1 U	--	--	--	0.1 U	--		0.1 U	0.1 U	--	0.1 U	--	--	--	0.1 U	--	--	--	0.1 U	--
Boron	5000	µg/L	**40**	--	--	--	**24**	--		**87**	**87**	--	**76**	--	--	--	**68**	--	--	--	**85**	--
Cadmium	2.1	µg/L	0.01 U	--	--	--	0.01 U	--		0.01 U	0.01 U	--	0.01 U	--	--	--	**0.043**	--	--	--	**0.133**	--
Calcium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	0.5 U	--	--	--	0.5 U	--		0.5 U	0.5 U	--	0.5 U	--	--	--	0.5 U	--	--	--	0.5 U	--
Cobalt	3.8	µg/L	**0.19**	--	--	--	**0.11**	--		**0.22**	**0.22**	--	**0.17**	--	--	--	**0.17**	--	--	--	**0.47**	--
Copper	69	µg/L	0.2 U	--	--	--	0.2 U	--		0.2 U	0.2 U	--	**0.38**	--	--	--	**0.48**	--	--	--	**0.85**	--
Lead	10	µg/L	**0.093**	--	--	--	0.05 U	--		**0.336**	**0.342**	--	**0.094**	--	--	--	0.05 U	--	--	--	**0.167**	--
Magnesium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	**23.4**	--	--	--	**0.234**	--		**3.56**	**3.54**	--	**3.17**	--	--	--	**1.19**	--	--	--	**2.42**	--
Nickel	100	µg/L	**4.41**	--	--	--	0.5 U	--		**2.02**	**2.02**	--	**1.98**	--	--	--	**3.19**	--	--	--	**2.92**	--
Selenium	10	µg/L	**0.274**	--	--	--	**0.216**	--		0.05 U	0.05 U	--	0.05 U	--	--	--	**0.128**	--	--	--	**0.859**	--
Silver	1.2	µg/L	0.05 U	--	--	--	0.05 U	--		0.05 U	0.05 U	--	0.05 U	--	--	--	0.05 U	--	--	--	0.05 U	--
Sodium	490000	µg/L	**8890**	--	--	--	**2220**	--		**34800**	**34800**	--	**28000**	--	--	--	**6370**	--	--	--	**7800**	--
Thallium	2	µg/L	**0.022**	--	--	--	0.01 U	--		**0.018**	**0.021**	--	**0.029**	--	--	--	**0.12**	--	--	--	**0.086**	--
Uranium	20	µg/L	**17**	--	--	--	**0.361**	--		**3.38**	**3.52**	--	**2.51**	--	--	--	**1.92**	--	--	--	**1.4**	--
Vanadium	6.2	µg/L	0.5 U	--	--	--	0.5 U	--		0.5 U	0.5 U	--	0.5 U	--	--	--	0.5 U	--	--	--	0.5 U	--
Zinc	890	µg/L	**58.2**	--	--	--	1 U	--		**28.8**	**28.6**	--	**46.7**	--	--	--	**322**	--	--	--	**200**	--
Non-Regulated Metals																						
Aluminum	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	--	--	--	1 U	--		1 U	1 U	--	1 U	--	--	--	1 U	--	--	--	1 U	--
Chloride (Cl)	790000	µg/L	**7530**	--	--	--	**2350**	--		**60400**	**60300**	--	**52300**	--	--	--	**4920**	--	--	--	**7910**	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.01 U	--	--	--	0.01 U	--		0.01 U	0.01 U	--	0.01 U	--	--	--	0.01 U	--	--	--	0.01 U	--
PAHs																						
1-Methylnaphthalene	NV	µg/L	**0.05**	0.02 U	0.02 U	--	**13.9**	--		--	--	--	**0.231**	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
2-(1-)Methylnaphthalene	3.2	µg/L	**0.075**	0.028 U	0.028 U	--	**19.8**	--		--	--	--	**0.56**	--	--	--	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	--
2-Methylnaphthalene	NV	µg/L	**0.026**	0.02 U	0.02 U	--	**5.92**	--		--	--	--	**0.329**	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Acenaphthene	4.1	µg/L	**0.072**	0.02 U	0.02 U	--	**3.67**	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Acenaphthylene	1	µg/L	**0.02**	0.02 U	0.02 U	--	**0.44**	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Anthracene	1	µg/L	0.045 U	0.02 U	0.02 U	--	**0.159**	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Benzo(a)anthracene	1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Benzo(a)pyrene	0.01	µg/L	**0.015**	0.01 U	0.01 U	--	0.01 U	--		--	--	--	0.01 U	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Benzo(g,h,i)perylene	0.2	µg/L	**0.021**	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Chrysene	0.1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Fluoranthene	0.41	µg/L	0.02 U	0.02 U	0.02 U	--	**0.026**	--		--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			MW17-104D				MW17-104S		MW17-105D			MW17-105S		MW17-106D		MW17-106S			MW17-107S		
Sample ID			MW17-104D	MW17-104D	DUP1	MW17-104D	MW17-104S	MW17-104S	DUP2	MW17-105D	MW17-105D	MW17-105S	MW17-105S	MW17-106D	MW17-106D	MW17-106S	DUP1	MW17-106S	DUP4	MW17-107S	MW17-107S
Start Depth (m)			6.10	6.10	6.10	6.10	1.22	1.22	6.93	6.93	6.93	3.20	3.20	7.01	7.01	3.05	3.05	3.05	2.72	2.72	2.72
End Depth (m)			7.62	7.62	7.62	7.62	3.66	3.66	8.46	8.46	8.46	4.72	4.72	8.53	8.53	4.57	4.57	4.57	4.85	4.85	4.85
Sample Type			N	N	FD	N	N	N	FD	N	N	N	N	N	N	N	FD	N	FD	N	N
Sample Date			01 Nov 2017	31 Jul 2018	31 Jul 2018	02 Mar 2020	01 Nov 2017	02 Mar 2020	31 Oct 2017	31 Oct 2017	28 Feb 2020	31 Oct 2017	28 Feb 2020	01 Nov 2017	24 Feb 2020	01 Nov 2017	24 Feb 2020	24 Feb 2020	01 Nov 2017	01 Nov 2017	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
Fluorene	120	µg/L	**0.073**	0.02 U	0.02 U	--	**2.15**	--	--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	**0.024**	0.02 U	0.02 U	--	0.02 U	--	--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Naphthalene	7	µg/L	0.05 U	0.05 U	0.05 U	--	15 U	--	--	--	--	**1.28**	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Phenanthrene	1	µg/L	0.02 U	0.02 U	0.02 U	--	**1.39**	--	--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
Pyrene	4.1	µg/L	**0.026**	0.02 U	0.02 U	--	**0.061**	--	--	--	--	0.02 U	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	--
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	--	--	--	**58**	--	25 U	25 U	--	**198**	--	25 U	--	25 U	--	--	--	25 U	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	--	--	--	**61**	--	25 U	25 U	--	**313**	--	25 U	--	25 U	--	--	--	25 U	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	100 U	--	--	--	**760**	--	--	--	--	100 U	--	--	--	100 U	--	--	--	100 U	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	--	--	**760**	--	100 U	100 U	--	100 U	--	100 U	--	100 U	--	--	--	100 U	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	250 U	--	--	--	250 U	--	--	--	--	250 U	--	--	--	250 U	--	--	--	250 U	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	--	--	--	250 U	--	250 U	250 U	--	250 U	--	250 U	--	250 U	--	--	--	250 U	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	--	--	--	250 U	--	250 U	250 U	--	250 U	--	250 U	--	250 U	--	--	--	250 U	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	370 U	--	--	--	**830**	--	370 U	370 U	--	370 U	--	370 U	--	370 U	--	--	--	370 U	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**19.5**	**8.34**
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**21.4**	**13.4**
1,1-Dichloroethene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**1.01**	**0.62**
1,2-Dibromoethane	0.2	µg/L	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 UJ	--	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 UJ	20 UJ	--	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	20 U	--	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 UJ	20 UJ	--	20 U	20 U
Acetone	2700	µg/L	30 U	--	--	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 UJ	30 U	30 UJ	30 UJ	--	30 U	30 U
Bromodichloromethane	16	µg/L	2 U	--	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 UJ	--	2 U	2 U
Bromoform	5	µg/L	5 U	--	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	--	5 U	5 U
Bromomethane	0.89	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 UJ	--	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	2 U	--	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 UJ	--	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-104D				MW17-104S		MW17-105D			MW17-105S		MW17-106D		MW17-106S			MW17-107S		
			Sample ID	MW17-104D	MW17-104D	DUP1	MW17-104D	MW17-104S	MW17-104S	DUP2	MW17-105D	MW17-105D	MW17-105S	MW17-105S	MW17-106D	MW17-106D	MW17-106S	DUP1	MW17-106S	DUP4	MW17-107S	MW17-107S
			Start Depth (m)	6.10	6.10	6.10	6.10	1.22	1.22	6.93	6.93	6.93	3.20	3.20	7.01	7.01	3.05	3.05	3.05	2.72	2.72	2.72
			End Depth (m)	7.62	7.62	7.62	7.62	3.66	3.66	8.46	8.46	8.46	4.72	4.72	8.53	8.53	4.57	4.57	4.57	4.85	4.85	4.85
			Sample Type	N	N	FD	N	N	N	FD	N	N	N	N	N	N	N	FD	N	FD	N	N
			Sample Date	01 Nov 2017	31 Jul 2018	31 Jul 2018	02 Mar 2020	01 Nov 2017	02 Mar 2020	31 Oct 2017	31 Oct 2017	28 Feb 2020	31 Oct 2017	28 Feb 2020	01 Nov 2017	24 Feb 2020	01 Nov 2017	24 Feb 2020	24 Feb 2020	01 Nov 2017	01 Nov 2017	26 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																				
Chloroform	2	µg/L	1 U	--	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 UJ	--	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	**5.62**	**5.57**	**1.8**	**10.9**	**3.49**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**1.47**	**1.78**
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 UJ	--	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	--	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 UJ	--	2 U	2 U
Dichloromethane	26	µg/L	5 U	--	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	--	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	--	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 UJ	--	2 U	2 U
n-Hexane	5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**7.46**	**0.57**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**0.68**	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 UJ	--	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.5**	**0.85**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	**1.26**	**1.43**
Trichlorofluoromethane	150	µg/L	5 U	--	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 UJ	--	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 U	--	--	0.5 U	0.5 U	0.5 U	**3.97**	**3.88**	**1.23**	**5.63**	**0.94**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	--	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-108S			MW17-109S			MW17-110S		MW17-111S		MW18-105G		MW18-107D		MW18-112D		
			Sample ID	DUP 1	MW17-108S	MW17-1085	DUP5	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW18-105G	MW18-105G	MW18-107D	MW18-107D	MW18-112D	MW18-112D	MW18-112D
			Start Depth (m)	1.93	1.93	1.93	2.79	2.79	2.79	3.00	3.00	3.43	3.43	16.97	16.97	18.59	18.59	6.40	6.40	6.40
			End Depth (m)	4.98	4.98	4.98	4.32	4.32	4.32	4.52	4.52	4.95	4.95	18.49	18.49	20.11	20.11	7.92	7.92	7.92
			Sample Type	FD	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	31 Oct 2017	31 Oct 2017	20 Mar 2018	02 Nov 2017	02 Nov 2017	02 Mar 2020	02 Nov 2017	02 Mar 2020	02 Nov 2017	25 Feb 2020	11 Dec 2018	28 Feb 2020	30 Jul 2018	26 Feb 2020	02 Aug 2018	10 Dec 2018	25 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
ABNs																				
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																				
Benzene	0.5	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	0.5 U	--	**3.19**	**8.46**	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ	
Toluene	24	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ	
Xylene, o	NV	µg/L	0.3 U	0.3 U	0.3 U	--	**0.5**	**0.69**	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 U	**0.42**	0.3 U	--	0.3 U	0.3 UJ	
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	0.4 U	--	**1.1**	**0.89**	0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 U	0.4 U	**0.57**	0.4 U	--	0.4 U	0.4 UJ	
Xylenes, Total	72	µg/L	0.5 U	0.5 U	0.5 U	--	**1.6**	**1.58**	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**0.99**	0.5 U	--	0.5 U	0.5 UJ	
Chlorophenyls																				
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																				
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**1.09**	**1.08**	--	--	**1.67**	--	**0.89**	--	**0.68**	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	**7.35**	**7.32**	--	--	**7.44**	--	**7.53**	--	**7.81**	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																				
Antimony	6	µg/L	**0.1**	**0.1**	--	--	1 U	--	**0.22**	--	**0.14**	--	--	--	--	--	**0.67**	--	--	
Arsenic	25	µg/L	**1.1**	**1.13**	--	--	1 U	--	**2.61**	--	**3.15**	--	--	--	--	--	**32.7**	--	--	
Barium	1000	µg/L	**180**	**184**	--	--	**48.3**	--	**42.8**	--	**82.4**	--	--	--	--	--	**109**	--	--	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-108S			MW17-109S			MW17-110S		MW17-111S		MW18-105G		MW18-107D		MW18-112D		
			Sample ID	DUP 1	MW17-108S	MW17-1085	DUP5	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW18-105G	MW18-105G	MW18-107D	MW18-107D	MW18-112D	MW18-112D	MW18-112D
			Start Depth (m)	1.93	1.93	1.93	2.79	2.79	2.79	3.00	3.00	3.43	3.43	16.97	16.97	18.59	18.59	6.40	6.40	6.40
			End Depth (m)	4.98	4.98	4.98	4.32	4.32	4.32	4.52	4.52	4.95	4.95	18.49	18.49	20.11	20.11	7.92	7.92	7.92
			Sample Type	FD	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	31 Oct 2017	31 Oct 2017	20 Mar 2018	02 Nov 2017	02 Nov 2017	02 Mar 2020	02 Nov 2017	02 Mar 2020	02 Nov 2017	25 Feb 2020	11 Dec 2018	28 Feb 2020	30 Jul 2018	26 Feb 2020	02 Aug 2018	10 Dec 2018	25 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Beryllium	4	µg/L	0.1 U	0.1 U	--	--	1 U	--	0.1 U	--	0.1 U	--	--	--	--	--	0.1 U	--	--	
Boron	5000	µg/L	**113**	**113**	--	--	100 U	--	**118**	--	**76**	--	--	--	--	--	**53**	--	--	
Cadmium	2.1	µg/L	0.01 U	0.01 U	--	--	0.1 U	--	**0.02**	--	**0.119**	--	--	--	--	--	0.01 U	--	--	
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chromium	50	µg/L	0.5 U	0.5 U	--	--	5 U	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	--	--	
Cobalt	3.8	µg/L	0.1 U	0.1 U	--	--	1 U	--	**1.54**	--	**0.37**	--	--	--	--	--	0.1 U	--	--	
Copper	69	µg/L	0.2 U	0.2 U	--	--	2 U	--	**1.61**	--	**0.4**	--	--	--	--	--	**1.56**	--	--	
Lead	10	µg/L	0.05 U	0.05 U	--	--	0.5 U	--	**0.154**	--	**0.263**	--	--	--	--	--	**0.239**	--	--	
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Molybdenum	70	µg/L	**0.594**	**0.61**	--	--	0.5 U	--	**2.58**	--	**3.25**	--	--	--	--	--	**5.5**	--	--	
Nickel	100	µg/L	0.5 U	0.5 U	--	--	5 U	--	**6.48**	--	**2**	--	--	--	--	--	**1.39**	--	--	
Selenium	10	µg/L	**0.165**	**0.201**	--	--	**1.03**	--	**0.231**	--	**0.126**	--	--	--	--	--	**0.169**	--	--	
Silver	1.2	µg/L	0.05 U	0.05 U	--	--	0.5 U	--	0.05 U	--	0.05 U	--	--	--	--	--	0.05 U	--	--	
Sodium	490000	µg/L	**9360**	**9670**	--	--	5000 U	--	**8290**	--	**7430**	--	--	--	--	--	--	--	--	
Thallium	2	µg/L	0.01 U	0.01 U	--	--	0.1 U	--	**0.081**	--	**0.115**	--	--	--	--	--	0.01 U	--	--	
Uranium	20	µg/L	**0.557**	**0.569**	--	--	**4.92**	--	**2.76**	--	**2.36**	--	--	--	--	--	**2.09**	--	--	
Vanadium	6.2	µg/L	0.5 U	0.5 U	--	--	5 U	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	--	--	
Zinc	890	µg/L	**1.1**	**1.3**	--	--	10 U	--	**459**	--	**304**	--	--	--	--	--	**5.8**	--	--	
Non-Regulated Metals																				
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
ORPs																				
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	1 U	--	--	1 U	--	1 U	--	1 U	--	--	--	--	--	--	--	--	
Chloride (Cl)	790000	µg/L	**8920**	**9000**	--	--	**8310**	--	**5880**	--	**12900**	--	--	--	--	--	--	--	--	
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Mercury	0.1	µg/L	0.01 U	0.01 U	--	--	0.01 U	--	0.01 U	--	0.01 U	--	--	--	--	--	--	--	--	
PAHs																				
1-Methylnaphthalene	NV	µg/L	**0.026**	**0.022**	0.02 U	--	**3.98**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
2-(1-)Methylnaphthalene	3.2	µg/L	**0.048 J**	0.028 UJ	0.028 U	--	**4.47**	--	0.028 U	--	--	--	--	--	--	--	--	--	--	
2-Methylnaphthalene	NV	µg/L	**0.023**	0.02 U	0.02 U	--	**0.493**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Acenaphthene	4.1	µg/L	0.04 U	0.035 U	**0.026 J**	--	**3.37**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Acenaphthylene	1	µg/L	0.02 U	0.02 U	0.02 U	--	**0.553**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Anthracene	1	µg/L	**0.023**	0.02 U	0.02 U	--	**0.314**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Benzo(a)anthracene	1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	--	0.01 U	--	0.01 U	--	--	--	--	--	--	--	--	--	--	
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Chrysene	0.1	µg/L	**0.023**	**0.022**	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Fluoranthene	0.41	µg/L	**0.022**	0.02 U	0.02 U	--	**0.03**	--	0.02 U	--	--	--	--	--	--	--	--	--	--	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW17-108S			MW17-109S			MW17-110S		MW17-111S		MW18-105G		MW18-107D		MW18-112D		
			Sample ID	DUP 1	MW17-108S	MW17-1085	DUP5	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW18-105G	MW18-105G	MW18-107D	MW18-107D	MW18-112D	MW18-112D	MW18-112D
			Start Depth (m)	1.93	1.93	1.93	2.79	2.79	2.79	3.00	3.00	3.43	3.43	16.97	16.97	18.59	18.59	6.40	6.40	6.40
			End Depth (m)	4.98	4.98	4.98	4.32	4.32	4.32	4.52	4.52	4.95	4.95	18.49	18.49	20.11	20.11	7.92	7.92	7.92
			Sample Type	FD	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	31 Oct 2017	31 Oct 2017	20 Mar 2018	02 Nov 2017	02 Nov 2017	02 Mar 2020	02 Nov 2017	02 Mar 2020	02 Nov 2017	25 Feb 2020	11 Dec 2018	28 Feb 2020	30 Jul 2018	26 Feb 2020	02 Aug 2018	10 Dec 2018	25 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																		
Fluorene	120	µg/L		**0.162**	**0.136**	**0.122**	--	**3.06**	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L		0.02 U	0.02 U	0.02 U	--	0.02 U	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L		0.05 U	0.05 U	0.05 U	--	0.8 U	--	0.05 U	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L		**0.03**	**0.025**	0.02 U	--	**0.953**	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L		**0.05**	**0.047**	**0.034**	--	**0.084**	--	0.02 U	--	--	--	--	--	--	--	--	--	--
PCBs																				
Aroclor 1016	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L		--	--	--	0.2 U	0.1 U	--	--	--	0.02 U	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L		--	--	--	0.02 U	0.02 U	--	--	--	0.02 U	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L		--	--	--	0.02 U	0.02 U	--	--	--	0.02 U	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L		--	--	--	0.02 U	0.02 U	--	--	--	0.02 U	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L		--	--	--	0.2 U	0.11 U	--	--	--	0.04 U	--	--	--	--	--	--	--	--
PHCs																				
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L		25 U	25 U	25 U	--	**33**	--	25 U	--	25 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L		25 U	25 U	25 U	--	**38**	--	25 U	--	25 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L		100 U	100 U	100 U	--	100 U	--	100 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L		100 U	100 U	100 U	--	100 U	--	100 U	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L		**450**	**470**	250 U	--	250 U	--	250 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L		**450**	**470**	250 U	--	250 U	--	250 U	--	250 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L		250 U	250 U	250 U	--	250 U	--	250 U	--	250 U	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L		**450**	**470**	370 U	--	370 U	--	370 U	--	370 U	--	--	--	--	--	--	--	--
SVOCs																				
2-Hexanone	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																				
1,1,1,2-Tetrachloroethane	1.1	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,1,1-Trichloroethane	23	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	**4.51**	**5.29 J**	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,1,2,2-Tetrachloroethane	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,1,2-Trichloroethane	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,1-Dichloroethane	5	µg/L		**0.72**	**0.74**	**0.61**	--	0.5 U	0.5 U	0.5 U	0.5 U	**2.64**	**2.04 J**	**1.04**	**0.78**	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,1-Dichloroethene	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,2-Dibromoethane	0.2	µg/L		0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 UJ
1,2-Dichlorobenzene	3	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,2-Dichloroethane	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,2-Dichloropropane	0.58	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,3-Dichlorobenzene	59	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,3-Dichloropropene	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,4-Dichlorobenzene	0.5	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
1,4-Dioxane	50	µg/L		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L		20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 U	20 U	20 U	--	20 U	20 UJ
4-Methyl-2-Pentanone	640	µg/L		20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 U	20 U	20 U	--	20 U	20 UJ
Acetone	2700	µg/L		30 U	30 U	30 U	--	30 U	30 U	30 U	30 U	30 U	30 UJ	30 U	30 U	30 U	30 U	--	30 U	30 UJ
Bromodichloromethane	16	µg/L		2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	--	2 U	2 UJ
Bromoform	5	µg/L		5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	--	5 U	5 UJ
Bromomethane	0.89	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
Carbon tetrachloride	0.2	µg/L		0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 UJ
Chlorobenzene	30	µg/L		0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
Chlorodibromomethane	25	µg/L		2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	--	2 U	2 UJ

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW17-108S**			**MW17-109S**			**MW17-110S**		**MW17-111S**		**MW18-105G**		**MW18-107D**		**MW18-112D**		
		Sample ID	DUP 1	MW17-108S	MW17-1085	DUP5	MW17-109S	MW17-109S	MW17-110S	MW17-110S	MW17-111S	MW17-111S	MW18-105G	MW18-105G	MW18-107D	MW18-107D	MW18-112D	MW18-112D	MW18-112D
		Start Depth (m)	1.93	1.93	1.93	2.79	2.79	2.79	3.00	3.00	3.43	3.43	16.97	16.97	18.59	18.59	6.40	6.40	6.40
		End Depth (m)	4.98	4.98	4.98	4.32	4.32	4.32	4.52	4.52	4.95	4.95	18.49	18.49	20.11	20.11	7.92	7.92	7.92
		Sample Type	FD	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	31 Oct 2017	31 Oct 2017	20 Mar 2018	02 Nov 2017	02 Nov 2017	02 Mar 2020	02 Nov 2017	02 Mar 2020	02 Nov 2017	25 Feb 2020	11 Dec 2018	28 Feb 2020	30 Jul 2018	26 Feb 2020	02 Aug 2018	10 Dec 2018	25 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
Chloroform	2	µg/L	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 U	**1.3**	1 U	--	1 U	1 UJ
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	**2.04**	**2.11**	**1.23**	**0.82**	--	0.5 U	0.5 UJ
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 UJ
Dichlorodifluoromethane	590	µg/L	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	--	2 U	2 UJ
Dichloromethane	26	µg/L	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	--	5 U	5 UJ
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 U	2 U	2 U	--	2 U	2 UJ
n-Hexane	5	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	**0.52**	0.5 U	--	0.5 U	0.5 UJ
Styrene	5.4	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 UJ
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	**0.5**	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ
Trichlorofluoromethane	150	µg/L	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 U	5 U	5 U	--	5 U	5 UJ
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 UJ

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-112G				MW18-112S		MW18-113D				MW18-113S				MW18-114D				
Sample ID			MW-112 G	MW18-112G	MW18-112G	MW18-112G	MW18-112S	MW18-112S	MW18-113D	MW18-113D	MW18-113D	MW18-113D	MW18-113S	DUP3	MW18-113S	MW18-113S	MW18-114D	MW18-114D	MW18-114D	GW-DUP4	MW18-114D
Start Depth (m)			19.35	19.35	19.35	19.35	3.42	3.42	18.29	18.29	18.29	18.29	3.37	3.37	3.37	3.37	19.20	19.20	19.20	19.20	19.20
End Depth (m)			20.88	20.88	20.88	20.88	4.95	4.95	19.81	19.81	19.81	19.81	4.90	4.90	4.90	4.90	20.73	20.73	20.73	20.73	20.73
Sample Type			N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N
Sample Date			22 Nov 2018	29 Nov 2018	03 Dec 2018	25 Feb 2020	02 Aug 2018	25 Feb 2020	11 Dec 2018	17 Dec 2018	21 Dec 2018	24 Feb 2020	03 Aug 2018	03 Aug 2018	24 Feb 2020	11 Mar 2020	10 Dec 2018	11 Dec 2018	21 Dec 2018	27 Mar 2019	27 Mar 2019
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	**0.86**	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
Toluene	24	µg/L	**1.74**	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	**0.52**	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	**0.93**	--	--	--
Xylene, o	NV	µg/L	**0.48**	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 U	--	0.3 U	0.3 UJ	--	--	0.3 UJ	0.3 U	--	**0.32**	--	--	--
Xylenes, m & p	NV	µg/L	**0.87**	0.4 U	0.4 U	0.4 UJ	--	0.4 UJ	0.4 U	--	0.4 U	0.4 UJ	--	--	0.4 UJ	0.4 U	--	**0.64**	--	--	--
Xylenes, Total	72	µg/L	**1.35**	0.5 U	--	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	**0.96**	--	--	--
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	**3.5**	--	--	--	**0.51**	--	--	**0.42**	--	--	**3.07**	**3.04**	--	--	**6.2**	--	**1.54**	**0.1**	**0.12**
Arsenic	25	µg/L	**2.5**	--	--	--	**42.5**	--	--	**17.1**	--	--	**16.4**	**15.9**	--	--	**23**	--	**24.8**	**8.96**	**9.11**
Barium	1000	µg/L	--	--	--	--	**60.5**	--	--	--	--	--	**52.5**	**50.4**	--	--	**60.5**	--	**48**	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-112G				MW18-112S		MW18-113D				MW18-113S				MW18-114D				
Sample ID			MW-112 G	MW18-112G	MW18-112G	MW18-112G	MW18-112S	MW18-112S	MW18-113D	MW18-113D	MW18-113D	MW18-113D	MW18-113S	DUP3	MW18-113S	MW18-113S	MW18-114D	MW18-114D	MW18-114D	GW-DUP4	MW18-114D
Start Depth (m)			19.35	19.35	19.35	19.35	3.42	3.42	18.29	18.29	18.29	18.29	3.37	3.37	3.37	3.37	19.20	19.20	19.20	19.20	19.20
End Depth (m)			20.88	20.88	20.88	20.88	4.95	4.95	19.81	19.81	19.81	19.81	4.90	4.90	4.90	4.90	20.73	20.73	20.73	20.73	20.73
Sample Type			N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N
Sample Date			22 Nov 2018	29 Nov 2018	03 Dec 2018	25 Feb 2020	02 Aug 2018	25 Feb 2020	11 Dec 2018	17 Dec 2018	21 Dec 2018	24 Feb 2020	03 Aug 2018	03 Aug 2018	24 Feb 2020	11 Mar 2020	10 Dec 2018	11 Dec 2018	21 Dec 2018	27 Mar 2019	27 Mar 2019
Analyte	**Table 6 SCS [a]**	**Unit**																			
Beryllium	4	µg/L	--	--	--	--	0.1 U	--	--	--	--	--	0.1 U	0.1 U	--	--	1 U	--	0.1 U	--	--
Boron	5000	µg/L	--	--	--	--	**43**	--	--	--	--	--	**64**	**63**	--	--	**110**	--	**89**	--	--
Cadmium	2.1	µg/L	--	--	--	--	0.01 U	--	--	--	--	--	**0.041**	**0.041**	--	--	0.05 U	--	0.01 U	--	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U	--	--	**13.3**	--	0.5 U	--	--
Cobalt	3.8	µg/L	--	--	--	--	**0.26**	--	--	--	--	--	**0.51**	**0.49**	--	--	1 U	--	0.1 U	--	--
Copper	69	µg/L	--	--	--	--	**0.42**	--	--	--	--	--	**0.48 J**	**1.04 J**	--	--	**4.3**	--	0.2 U	--	--
Lead	10	µg/L	--	--	--	--	**1.04**	--	--	--	--	--	**3.78 J**	**2.65 J**	--	--	**9.88**	--	**0.343**	--	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	--	--	--	--	**2.18**	--	--	--	--	--	**4.46**	**4.29**	--	--	**52.4**	--	**43.1**	--	--
Nickel	100	µg/L	--	--	--	--	**1.51**	--	--	--	--	--	**8.58**	**8.34**	--	--	5 U	--	**2.7**	--	--
Selenium	10	µg/L	**2.7**	--	--	--	**0.255**	--	--	**0.115**	--	--	**0.273**	**0.262**	--	--	**0.64**	--	**0.177**	**0.264**	**0.254**
Silver	1.2	µg/L	--	--	--	--	0.05 U	--	--	--	--	--	0.05 U	0.05 U	--	--	0.5 U	--	0.05 U	--	--
Sodium	490000	µg/L	--	--	--	--	--	--	--	--	--	--	**135000**	**127000**	--	--	--	--	--	--	--
Thallium	2	µg/L	--	--	--	--	0.01 U	--	--	--	--	--	0.01 U	0.01 U	--	--	0.1 U	--	0.01 U	--	--
Uranium	20	µg/L	--	--	--	--	**2.85**	--	--	--	--	--	**11.8**	**11.2**	--	--	**4.85**	--	**5.35**	--	--
Vanadium	6.2	µg/L	--	--	--	--	**1.32**	--	--	--	--	--	0.5 U	0.5 U	--	--	5 U	--	0.5 U	--	--
Zinc	890	µg/L	--	--	--	--	**13.5**	--	--	--	--	--	**515**	**509**	--	--	**62**	--	**13.6**	--	--
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-112G				MW18-112S		MW18-113D				MW18-113S				MW18-114D				
		Sample ID	MW-112 G	MW18-112G	MW18-112G	MW18-112G	MW18-112S	MW18-112S	MW18-113D	MW18-113D	MW18-113D	MW18-113D	MW18-113S	DUP3	MW18-113S	MW18-113S	MW18-114D	MW18-114D	MW18-114D	GW-DUP4	MW18-114D
		Start Depth (m)	19.35	19.35	19.35	19.35	3.42	3.42	18.29	18.29	18.29	18.29	3.37	3.37	3.37	3.37	19.20	19.20	19.20	19.20	19.20
		End Depth (m)	20.88	20.88	20.88	20.88	4.95	4.95	19.81	19.81	19.81	19.81	4.90	4.90	4.90	4.90	20.73	20.73	20.73	20.73	20.73
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N
		Sample Date	22 Nov 2018	29 Nov 2018	03 Dec 2018	25 Feb 2020	02 Aug 2018	25 Feb 2020	11 Dec 2018	17 Dec 2018	21 Dec 2018	24 Feb 2020	03 Aug 2018	03 Aug 2018	24 Feb 2020	11 Mar 2020	10 Dec 2018	11 Dec 2018	21 Dec 2018	27 Mar 2019	27 Mar 2019
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 UJ	--	0.2 UJ	0.2 U	--	0.2 U	0.2 UJ	--	--	0.2 UJ	0.2 U	--	0.2 U	--	--	--
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	20 U	20 UJ	--	20 UJ	20 U	--	20 U	20 UJ	--	--	20 UJ	20 U	--	20 U	--	--	--
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	20 U	20 UJ	--	20 UJ	20 U	--	20 U	20 UJ	--	--	20 UJ	20 U	--	20 U	--	--	--
Acetone	2700	µg/L	30 U	30 U	30 U	30 UJ	--	30 UJ	30 U	--	30 U	30 UJ	--	--	30 UJ	30 U	--	30 U	--	--	--
Bromodichloromethane	16	µg/L	**7.3**	2 U	2 U	2 UJ	--	2 UJ	2 U	--	2 U	2 UJ	--	--	2 UJ	2 U	--	2 U	--	--	--
Bromoform	5	µg/L	5 U	5 U	5 U	5 UJ	--	5 UJ	5 U	--	5 U	5 UJ	--	--	5 UJ	5 U	--	5 U	--	--	--
Bromomethane	0.89	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 UJ	--	0.2 UJ	0.2 U	--	0.2 U	0.2 UJ	--	--	0.2 UJ	0.2 U	--	0.2 U	--	--	--
Chlorobenzene	30	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--
Chlorodibromomethane	25	µg/L	**7.4**	2 U	2 U	2 UJ	--	2 UJ	2 U	--	2 U	2 UJ	--	--	2 UJ	2 U	--	2 U	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW18-112G				MW18-112S		MW18-113D				MW18-113S				MW18-114D				
			Sample ID	MW-112 G	MW18-112G	MW18-112G	MW18-112G	MW18-112S	MW18-112S	MW18-113D	MW18-113D	MW18-113D	MW18-113D	MW18-113S	DUP3	MW18-113S	MW18-113S	MW18-114D	MW18-114D	MW18-114D	GW-DUP4	MW18-114D
			Start Depth (m)	19.35	19.35	19.35	19.35	3.42	3.42	18.29	18.29	18.29	18.29	3.37	3.37	3.37	3.37	19.20	19.20	19.20	19.20	19.20
			End Depth (m)	20.88	20.88	20.88	20.88	4.95	4.95	19.81	19.81	19.81	19.81	4.90	4.90	4.90	4.90	20.73	20.73	20.73	20.73	20.73
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N
			Sample Date	22 Nov 2018	29 Nov 2018	03 Dec 2018	25 Feb 2020	02 Aug 2018	25 Feb 2020	11 Dec 2018	17 Dec 2018	21 Dec 2018	24 Feb 2020	03 Aug 2018	03 Aug 2018	24 Feb 2020	11 Mar 2020	10 Dec 2018	11 Dec 2018	21 Dec 2018	27 Mar 2019	27 Mar 2019
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	**5.8**	1 U	1 U	1 UJ	--	1 UJ	1 U	--	1 U	1 UJ	--	--	1 UJ	1 U	--	**1.1**	--	--	--	
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	**2.22**	**1.55**	**1.57 J**	--	0.5 UJ	**1.33**	--	**1.75**	**1.02 J**	--	--	0.5 UJ	0.5 U	--	**1.87**	--	--	--	
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 U	--	0.3 U	0.3 UJ	--	--	0.3 UJ	0.3 U	--	0.3 U	--	--	--	
Dichlorodifluoromethane	590	µg/L	2 U	2 U	2 U	2 UJ	--	2 UJ	2 U	--	2 U	2 UJ	--	--	2 UJ	2 U	--	2 U	--	--	--	
Dichloromethane	26	µg/L	5 U	5 U	5 U	5 UJ	--	5 UJ	5 U	--	5 U	5 UJ	--	--	5 UJ	5 U	--	5 U	--	--	--	
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	2 U	2 UJ	--	2 UJ	2 U	--	2 U	2 UJ	--	--	2 UJ	2 U	--	2 U	--	--	--	
n-Hexane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	**0.72**	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	**0.77**	--	--	--	
Styrene	5.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--	
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--	
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--	
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 U	--	0.3 U	0.3 UJ	--	--	0.3 UJ	0.3 U	--	0.3 U	--	--	--	
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	**0.58**	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--	
Trichlorofluoromethane	150	µg/L	5 U	5 U	5 U	5 UJ	--	5 UJ	5 U	--	5 U	5 UJ	--	--	5 UJ	5 U	--	5 U	--	--	--	
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 U	--	0.5 U	0.5 UJ	--	--	0.5 UJ	0.5 U	--	0.5 U	--	--	--	

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location		**MW18-114S**			**MW18-115D**		**MW18-115S**				**MW18-116D**		**MW18-116S**		**MW18-117S**			
		Sample ID	MW18-114D	MW18-114S	MW18-114S	MW18-114S	MW18-115D	MW18-115D	MW18-115S	DUP2	MW18-115S	MW18-115S	MW18-116D	MW18-116D	MW18-116S	MW18-116S	MW18-117S	MW18-117S	DUP1	MW18-117S
		Start Depth (m)	19.20	3.37	3.37	3.37	19.20	19.20	3.20	3.20	3.20	3.20	6.50	6.50	2.51	2.51	3.35	3.35	3.35	3.35
		End Depth (m)	20.73	4.90	4.90	4.90	20.73	20.73	4.72	4.72	4.72	4.72	8.02	8.02	4.03	4.03	4.87	4.87	4.87	4.87
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N
		Sample Date	24 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	12 Dec 2018	24 Feb 2020	02 Aug 2018	24 Feb 2020	24 Feb 2020	11 Mar 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	11 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
ABNs																				
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																				
Benzene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Toluene	24	µg/L	0.5 UJ	--	**0.87 J**	**1.12**	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	**0.56**	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.3 UJ	--	0.3 UJ	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.4 UJ	--	0.4 UJ	0.4 U	0.4 U	0.4 UJ	--	0.4 UJ	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	--	0.4 UJ	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Chlorophenyls																				
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																				
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																				
Antimony	6	µg/L	--	**0.29**	--	--	**0.12**	--	**0.28**	--	--	--	**0.57**	--	**0.84**	--	**1.03**	--	--	--
Arsenic	25	µg/L	--	**13.7**	--	--	**0.8**	--	**6.74**	--	--	--	**1.19**	--	**0.55**	--	**1.14**	--	--	--
Barium	1000	µg/L	--	**62.2**	--	--	**51.9**	--	**38.8**	--	--	--	**50.3**	--	**40.8**	--	**39.5**	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location				MW18-114S			MW18-115D		MW18-115S				MW18-116D		MW18-116S		MW18-117S			
Sample ID			MW18-114D	MW18-114S	MW18-114S	MW18-114S	MW18-115D	MW18-115D	MW18-115S	DUP2	MW18-115S	MW18-115S	MW18-116D	MW18-116D	MW18-116S	MW18-116S	MW18-117S	MW18-117S	DUP1	MW18-117S
Start Depth (m)			19.20	3.37	3.37	3.37	19.20	19.20	3.20	3.20	3.20	3.20	6.50	6.50	2.51	2.51	3.35	3.35	3.35	3.35
End Depth (m)			20.73	4.90	4.90	4.90	20.73	20.73	4.72	4.72	4.72	4.72	8.02	8.02	4.03	4.03	4.87	4.87	4.87	4.87
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N
Sample Date			24 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	12 Dec 2018	24 Feb 2020	02 Aug 2018	24 Feb 2020	24 Feb 2020	11 Mar 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	11 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Beryllium	4	µg/L	--	0.1 U	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	0.1 U	--	--	--
Boron	5000	µg/L	--	**53**	--	--	**70**	--	**62**	--	--	--	**54**	--	**55**	--	**52**	--	--	--
Cadmium	2.1	µg/L	--	**0.291**	--	--	0.01 U	--	0.01 U	--	--	--	**0.36**	--	**0.635**	--	**0.223**	--	--	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	--	0.5 U	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	0.5 U	--	--	--
Cobalt	3.8	µg/L	--	**0.74**	--	--	0.1 U	--	**1.1**	--	--	--	**0.63**	--	**0.14**	--	**0.26**	--	--	--
Copper	69	µg/L	--	**1.1**	--	--	0.2 U	--	**0.48**	--	--	--	**2.07**	--	**12.5**	--	**1.69**	--	--	--
Lead	10	µg/L	--	**0.127**	--	--	0.05 U	--	**0.552**	--	--	--	**2**	--	**0.159**	--	**0.332**	--	--	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	--	**4.23**	--	--	**10.2**	--	**2.03**	--	--	--	**4.52**	--	**3.42**	--	**1.74**	--	--	--
Nickel	100	µg/L	--	**2.01**	--	--	**1.02**	--	**7.18**	--	--	--	**5.67**	--	**5.33**	--	**3.27**	--	--	--
Selenium	10	µg/L	--	**0.323**	--	--	**5.83**	--	**0.107**	--	--	--	**0.778**	--	**0.536**	--	**0.926**	--	--	--
Silver	1.2	µg/L	--	0.05 U	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--
Sodium	490000	µg/L	--	--	--	--	**127000**	--	--	--	--	--	**138000**	--	**110000**	--	**5180**	--	--	--
Thallium	2	µg/L	--	**0.042**	--	--	0.01 U	--	**0.016**	--	--	--	**0.043**	--	**0.233**	--	**0.077**	--	--	--
Uranium	20	µg/L	--	**3.14**	--	--	**3.91**	--	**2.64**	--	--	--	**7.03**	--	**5.5**	--	**2.07**	--	--	--
Vanadium	6.2	µg/L	--	**0.65**	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	0.5 U	--	--	--
Zinc	890	µg/L	--	**163**	--	--	1 U	--	**505**	--	--	--	**734**	--	**436**	--	**338**	--	--	--
Non-Regulated Metals																				
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																				
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																				
1-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	--	--	--	--	0.028 U	0.028 U	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	--	--	--	--	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location		**MW18-114S**			**MW18-115D**		**MW18-115S**				**MW18-116D**		**MW18-116S**		**MW18-117S**			
		Sample ID	MW18-114D	MW18-114S	MW18-114S	MW18-114S	MW18-115D	MW18-115D	MW18-115S	DUP2	MW18-115S	MW18-115S	MW18-116D	MW18-116D	MW18-116S	MW18-116S	MW18-117S	MW18-117S	DUP1	MW18-117S
		Start Depth (m)	19.20	3.37	3.37	3.37	19.20	19.20	3.20	3.20	3.20	3.20	6.50	6.50	2.51	2.51	3.35	3.35	3.35	3.35
		End Depth (m)	20.73	4.90	4.90	4.90	20.73	20.73	4.72	4.72	4.72	4.72	8.02	8.02	4.03	4.03	4.87	4.87	4.87	4.87
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N
		Sample Date	24 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	12 Dec 2018	24 Feb 2020	02 Aug 2018	24 Feb 2020	24 Feb 2020	11 Mar 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	11 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**																		
Fluorene	120	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--
PCBs																				
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																				
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	--	--	--	25 UJ	25 UJ	--	--	--	--	--	--	25 UJ	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	--	--	--	25 UJ	25 UJ	--	--	--	--	--	--	25 UJ	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	100 UJ	100 UJ	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	--	--	--	100 UJ	100 UJ	--	--	--	--	--	--	100 UJ	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	250 UJ	250 UJ	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	--	--	--	250 UJ	250 UJ	--	--	--	--	--	--	250 UJ	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	--	--	--	250 UJ	250 UJ	--	--	--	--	--	--	250 UJ	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	370 UJ	370 UJ	--	--	--	--	--	--	370 UJ	--	--
SVOCs																				
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																				
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	**0.82**	**0.98**	**1.07**	**0.72**	--	0.5 UJ	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	**1.6**	**0.79**	**0.52**	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 UJ	--	0.2 UJ	0.2 U	0.2 U	0.2 UJ	--	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 UJ	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 UJ	--	20 UJ	20 U	20 U	20 UJ	--	20 UJ	20 UJ	20 U	20 U	20 U	20 U	20 U	--	20 UJ	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	20 UJ	--	20 UJ	20 U	20 U	20 UJ	--	20 UJ	20 UJ	20 U	20 U	20 U	20 U	20 U	--	20 UJ	20 U	20 U
Acetone	2700	µg/L	30 UJ	--	30 UJ	30 U	30 U	30 UJ	--	30 UJ	30 UJ	30 U	30 U	30 U	30 U	30 U	--	30 UJ	30 U	30 U
Bromodichloromethane	16	µg/L	2 UJ	--	2 UJ	2 U	2 U	2 UJ	--	2 UJ	2 UJ	2 U	2 U	2 U	2 U	2 U	--	2 UJ	2 U	2 U
Bromoform	5	µg/L	5 UJ	--	5 UJ	5 U	5 U	5 UJ	--	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	--	5 UJ	5 U	5 U
Bromomethane	0.89	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 UJ	--	0.2 UJ	0.2 U	0.2 U	0.2 UJ	--	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 UJ	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	2 UJ	--	2 UJ	2 U	2 U	2 UJ	--	2 UJ	2 UJ	2 U	2 U	2 U	2 U	2 U	--	2 UJ	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location		MW18-114S		MW18-115D		MW18-115S				MW18-116D		MW18-116S		MW18-117S			
			Sample ID	MW18-114D	MW18-114S	MW18-114S	MW18-114S	MW18-115D	MW18-115D	MW18-115S	DUP2	MW18-115S	MW18-115S	MW18-116D	MW18-116D	MW18-116S	MW18-116S	MW18-117S	MW18-117S	DUP1	MW18-117S
			Start Depth (m)	19.20	3.37	3.37	3.37	19.20	19.20	3.20	3.20	3.20	3.20	6.50	6.50	2.51	2.51	3.35	3.35	3.35	3.35
			End Depth (m)	20.73	4.90	4.90	4.90	20.73	20.73	4.72	4.72	4.72	4.72	8.02	8.02	4.03	4.03	4.87	4.87	4.87	4.87
			Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	FD	N
			Sample Date	24 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	12 Dec 2018	24 Feb 2020	02 Aug 2018	24 Feb 2020	24 Feb 2020	11 Mar 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	11 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
Chloroform	2	µg/L	1 UJ	--	1 UJ	1 U	1 U	1 UJ	--	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	--	1 UJ	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**1.71 J**	--	0.5 UJ	0.5 U	**1.63**	**0.83 J**	--	0.5 UJ	0.5 UJ	0.5 U	**0.71**	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.3 UJ	--	0.3 UJ	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 UJ	--	2 UJ	2 U	2 U	2 UJ	--	2 UJ	2 UJ	2 U	2 U	2 U	2 U	2 U	--	2 UJ	2 U	2 U
Dichloromethane	26	µg/L	5 UJ	--	5 UJ	5 U	5 U	5 UJ	--	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	--	5 UJ	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 UJ	--	2 UJ	2 U	2 U	2 UJ	--	2 UJ	2 UJ	2 U	2 U	2 U	2 U	2 U	--	2 UJ	2 U	2 U
n-Hexane	5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 UJ	--	0.3 UJ	0.3 U	0.3 U	0.3 UJ	--	0.3 UJ	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	**0.85**	**0.57**	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	5 UJ	--	5 UJ	5 U	5 U	5 UJ	--	5 UJ	5 UJ	5 U	5 U	5 U	5 U	5 U	--	5 UJ	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 UJ	--	0.5 UJ	0.5 U	0.5 U	0.5 UJ	--	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-118S		MW18-119D		MW18-119S		MW18-120D		MW18-121D			MW18-121S		MW18-122D		MW18-122G		MW18-123D	
		Sample ID	MW18-118S	MW18-118S	MW18-119D	MW18-119D	MW18-119S	MW18-119S	MW18-120D	MW18-120D	MW18-121D	DUP4	MW18-121D	MW18-121S	MW18-121S	MW18-122D	MW18-122D	MW18-122G	MW18-122G	MW18-123D	MW18-123D
		Start Depth (m)	3.25	3.25	16.89	16.89	3.45	3.45	18.59	18.59	16.33	16.33	16.33	3.12	3.12	12.44	12.44	19.51	19.51	18.79	18.79
		End Depth (m)	4.77	4.77	18.42	18.42	4.97	4.97	20.11	20.11	17.85	17.85	17.85	4.64	4.64	13.96	13.96	21.03	21.03	20.32	20.32
		Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	02 Aug 2018	24 Feb 2020	10 Dec 2018	25 Feb 2020	03 Aug 2018	25 Feb 2020	30 Jul 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020	26 Feb 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	25 Feb 2020	10 Dec 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Toluene	24	µg/L	0.5 U	0.5 UJ	**0.72**	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**0.53**	0.5 U	0.5 U	**0.62**	0.5 U	0.5 U	0.5 UJ	**0.51**	0.5 UJ	**0.84**	0.5 U
Xylene, o	NV	µg/L	0.3 U	0.3 UJ	**0.59**	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	**0.33**	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 UJ	**0.9**	0.4 UJ	0.4 U	0.4 UJ	0.4 U	0.4 UJ	**0.43**	0.4 U	0.4 U	**0.45**	0.4 U	0.4 U	0.4 UJ	**0.43**	0.4 UJ	**0.45**	0.4 U
Xylenes, Total	72	µg/L	0.5 U	0.5 UJ	**1.49**	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**0.78**	0.5 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	**0.3**	--	--	--	**1.73**	--	**0.5**	--	--	--	--	**0.54**	--	--	--	--	--	--	--
Arsenic	25	µg/L	**18**	--	--	--	**1.05**	--	**1.74**	--	--	--	--	**3.24**	--	--	--	--	--	--	--
Barium	1000	µg/L	**41**	--	--	--	**50.5**	--	**67.8**	--	--	--	--	**116**	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-118S**		**MW18-119D**		**MW18-119S**		**MW18-120D**		**MW18-121D**			**MW18-121S**		**MW18-122D**		**MW18-122G**		**MW18-123D**	
		Sample ID	MW18-118S	MW18-118S	MW18-119D	MW18-119D	MW18-119S	MW18-119S	MW18-120D	MW18-120D	MW18-121D	DUP4	MW18-121D	MW18-121S	MW18-121S	MW18-122D	MW18-122D	MW18-122G	MW18-122G	MW18-123D	MW18-123D
		Start Depth (m)	3.25	3.25	16.89	16.89	3.45	3.45	18.59	18.59	16.33	16.33	16.33	3.12	3.12	12.44	12.44	19.51	19.51	18.79	18.79
		End Depth (m)	4.77	4.77	18.42	18.42	4.97	4.97	20.11	20.11	17.85	17.85	17.85	4.64	4.64	13.96	13.96	21.03	21.03	20.32	20.32
		Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	02 Aug 2018	24 Feb 2020	10 Dec 2018	25 Feb 2020	03 Aug 2018	25 Feb 2020	30 Jul 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020	26 Feb 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	25 Feb 2020	10 Dec 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
Beryllium	4	µg/L	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	--	0.1 U	--	--	--	--	--	--	--
Boron	5000	µg/L	**67**	--	--	--	**90**	--	**67**	--	--	--	--	**98**	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	**0.011**	--	--	--	**0.185**	--	0.01 U	--	--	--	--	**0.139**	--	--	--	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	--	0.5 U	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	**0.76**	--	--	--	**0.12**	--	**0.24**	--	--	--	--	**0.41**	--	--	--	--	--	--	--
Copper	69	µg/L	**0.55**	--	--	--	**1.09**	--	**0.95**	--	--	--	--	**1.01**	--	--	--	--	--	--	--
Lead	10	µg/L	**0.061**	--	--	--	**0.075**	--	**0.067**	--	--	--	--	**0.156**	--	--	--	--	--	--	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	**2.07**	--	--	--	**2.8**	--	**5.96**	--	--	--	--	**1.5**	--	--	--	--	--	--	--
Nickel	100	µg/L	**5.27**	--	--	--	**1.91**	--	**9.03**	--	--	--	--	**2.83**	--	--	--	--	--	--	--
Selenium	10	µg/L	**0.262**	--	--	--	**0.412**	--	**0.178**	--	--	--	--	**0.656**	--	--	--	--	--	--	--
Silver	1.2	µg/L	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	--	0.05 U	--	--	--	--	--	--	--
Sodium	490000	µg/L	**58200**	--	--	--	**7730**	--	**183000**	--	--	--	--	**5800**	--	--	--	--	--	--	--
Thallium	2	µg/L	**0.019**	--	--	--	**0.159**	--	0.01 U	--	--	--	--	**0.294**	--	--	--	--	--	--	--
Uranium	20	µg/L	**1.93**	--	--	--	**2.83**	--	**7.24**	--	--	--	--	**1.87**	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	--	0.5 U	--	--	--	--	--	--	--
Zinc	890	µg/L	**154**	--	--	--	**214**	--	**3**	--	--	--	--	**217**	--	--	--	--	--	--	--
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	0.028 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-118S		MW18-119D		MW18-119S		MW18-120D		MW18-121D			MW18-121S		MW18-122D		MW18-122G		MW18-123D	
		Sample ID	MW18-118S	MW18-118S	MW18-119D	MW18-119D	MW18-119S	MW18-119S	MW18-120D	MW18-120D	MW18-121D	DUP4	MW18-121D	MW18-121S	MW18-121S	MW18-122D	MW18-122D	MW18-122G	MW18-122G	MW18-123D	MW18-123D
		Start Depth (m)	3.25	3.25	16.89	16.89	3.45	3.45	18.59	18.59	16.33	16.33	16.33	3.12	3.12	12.44	12.44	19.51	19.51	18.79	18.79
		End Depth (m)	4.77	4.77	18.42	18.42	4.97	4.97	20.11	20.11	17.85	17.85	17.85	4.64	4.64	13.96	13.96	21.03	21.03	20.32	20.32
		Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
		Sample Date	02 Aug 2018	24 Feb 2020	10 Dec 2018	25 Feb 2020	03 Aug 2018	25 Feb 2020	30 Jul 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020	26 Feb 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	25 Feb 2020	10 Dec 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
Fluorene	120	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**19.2**	**12.4 J**	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	**3.64**	**0.81**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**16.1**	**5.83 J**	0.5 U	0.5 UJ	**1.82**	**1.33**	**1.16**	**3.75**	0.5 U	**6.43**	**5.89 J**	0.5 U	0.5 UJ	**0.89**	**0.77**
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**0.77**	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 UJ	20 U	20 UJ	20 U	20 UJ	20 U	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 UJ	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 UJ	20 U	20 UJ	20 U	20 UJ	20 U	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 UJ	20 U	20 UJ	20 U	20 U
Acetone	2700	µg/L	30 U	30 UJ	30 U	30 UJ	30 U	30 UJ	30 U	30 UJ	30 U	30 U	30 U	30 U	30 U	30 U	30 UJ	30 U	30 UJ	30 U	30 U
Bromodichloromethane	16	µg/L	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 U	2 U
Bromoform	5	µg/L	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 U	5 U
Bromomethane	0.89	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	0.2 UJ	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW18-118S		MW18-119D		MW18-119S		MW18-120D		MW18-121D			MW18-121S		MW18-122D		MW18-122G		MW18-123D	
			Sample ID	MW18-118S	MW18-118S	MW18-119D	MW18-119D	MW18-119S	MW18-119S	MW18-120D	MW18-120D	MW18-121D	DUP4	MW18-121D	MW18-121S	MW18-121S	MW18-122D	MW18-122D	MW18-122G	MW18-122G	MW18-123D	MW18-123D
			Start Depth (m)	3.25	3.25	16.89	16.89	3.45	3.45	18.59	18.59	16.33	16.33	16.33	3.12	3.12	12.44	12.44	19.51	19.51	18.79	18.79
			End Depth (m)	4.77	4.77	18.42	18.42	4.97	4.97	20.11	20.11	17.85	17.85	17.85	4.64	4.64	13.96	13.96	21.03	21.03	20.32	20.32
			Sample Type	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N
			Sample Date	02 Aug 2018	24 Feb 2020	10 Dec 2018	25 Feb 2020	03 Aug 2018	25 Feb 2020	30 Jul 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020	26 Feb 2020	03 Aug 2018	26 Feb 2020	03 Aug 2018	25 Feb 2020	10 Dec 2018	25 Feb 2020	30 Jul 2018	26 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	1 U	1 UJ	1 U	1 UJ	**1.1**	1 UJ	1 U	1 UJ	**1.5**	1 U	1 U	1 U	1 U	1 U	1 U	1 UJ	1 U	1 UJ	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 UJ	**1.67**	**0.66 J**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**3.17**	**2.12**	**2.09**	0.5 U	0.5 U	**1.72**	**1.82 J**	0.5 U	**0.53 J**	**2.78**	**2.05**
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 U	2 U
Dichloromethane	26	µg/L	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 UJ	2 U	2 UJ	2 U	2 U
n-Hexane	5	µg/L	0.5 U	0.5 UJ	**1.62**	**0.71 J**	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	**0.72**	0.5 UJ	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.3 U	0.3 UJ	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 UJ	5 U	5 UJ	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 UJ	**0.67**	**0.62**	**0.63**	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 UJ	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-123S**		**MW18-124S**			**MW18-125S**		**MW18-126D**			**MW18-127S**		**MW18-128D**			**MW18-129D**	
		Sample ID	MW18-123S	MW18-123S	MW18-124S	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-126D	DUP2	MW18-126D	MW18-127S	MW18-127S	MW18-128D	MW18-128D	MW18-128D	MW18-129D	MW18-129D
		Start Depth (m)	3.40	3.40	3.55	3.55	3.55	4.26	4.26	6.45	6.45	6.45	3.42	3.42	18.74	18.74	18.74	7.97	7.97
		End Depth (m)	4.92	4.92	5.08	5.08	5.08	5.79	5.79	7.97	7.97	7.97	4.95	4.95	20.26	20.26	20.26	9.49	9.49
		Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
		Sample Date	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	02 Aug 2018	27 Feb 2020	02 Aug 2018	02 Aug 2018	27 Feb 2020	03 Aug 2018	03 Mar 2020	30 Jul 2018	17 Oct 2018	03 Mar 2020	30 Jul 2018	28 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
ABNs																			
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																			
Benzene	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	**4.57**	**3.14**
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	24	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	**0.66**	0.5 U	**0.79**	**0.54**	**1.55**	**0.57**	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	--	0.4 UJ	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	**0.42**	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
Chlorophenyls																			
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																			
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																			
Antimony	6	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Arsenic	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**20.7**	--
Barium	1000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**166**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-123S**		**MW18-124S**			**MW18-125S**		**MW18-126D**			**MW18-127S**		**MW18-128D**			**MW18-129D**	
		Sample ID	MW18-123S	MW18-123S	MW18-124S	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-126D	DUP2	MW18-126D	MW18-127S	MW18-127S	MW18-128D	MW18-128D	MW18-128D	MW18-129D	MW18-129D
		Start Depth (m)	3.40	3.40	3.55	3.55	3.55	4.26	4.26	6.45	6.45	6.45	3.42	3.42	18.74	18.74	18.74	7.97	7.97
		End Depth (m)	4.92	4.92	5.08	5.08	5.08	5.79	5.79	7.97	7.97	7.97	4.95	4.95	20.26	20.26	20.26	9.49	9.49
		Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
		Sample Date	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	02 Aug 2018	27 Feb 2020	02 Aug 2018	02 Aug 2018	27 Feb 2020	03 Aug 2018	03 Mar 2020	30 Jul 2018	17 Oct 2018	03 Mar 2020	30 Jul 2018	28 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																	
Beryllium	4	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Boron	5000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**76**	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.21**	--
Copper	69	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--
Lead	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.06**	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.35**	--
Nickel	100	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.76**	--
Selenium	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--
Sodium	490000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**35000**	--
Thallium	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.032**	--
Uranium	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.26**	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--
Zinc	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**156**	--
Non-Regulated Metals																			
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																			
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																			
1-Methylnaphthalene	NV	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	0.028 U	--	--	0.028 U	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	0.02 U	--	--	**0.041 J**	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	0.01 U	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	0.02 U	--	--	2 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	0.02 U	--	--	2 U	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW18-123S		MW18-124S			MW18-125S		MW18-126D			MW18-127S		MW18-128D			MW18-129D	
			Sample ID	MW18-123S	MW18-123S	MW18-124S	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-126D	DUP2	MW18-126D	MW18-127S	MW18-127S	MW18-128D	MW18-128D	MW18-128D	MW18-129D	MW18-129D
			Start Depth (m)	3.40	3.40	3.55	3.55	3.55	4.26	4.26	6.45	6.45	6.45	3.42	3.42	18.74	18.74	18.74	7.97	7.97
			End Depth (m)	4.92	4.92	5.08	5.08	5.08	5.79	5.79	7.97	7.97	7.97	4.95	4.95	20.26	20.26	20.26	9.49	9.49
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	02 Aug 2018	27 Feb 2020	02 Aug 2018	02 Aug 2018	27 Feb 2020	03 Aug 2018	03 Mar 2020	30 Jul 2018	17 Oct 2018	03 Mar 2020	30 Jul 2018	28 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																		
Fluorene	120	µg/L	--	--	0.02 U	--	--	**0.029**	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	0.02 U	--	--	**0.021**	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--
PCBs																				
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	**0.037**	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	0.04 U	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																				
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	--	25 U	--	25 U	25 U	--	25 U	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	--	25 U	--	25 U	25 U	--	25 U	--	**60**	--	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	--	100 U	--	100 U	100 U	--	100 U	--	100 U	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	--	250 U	--	250 U	250 U	--	250 U	--	250 U	--	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	--	250 U	--	250 U	250 U	--	250 U	--	250 U	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	370 U	--	370 U	370 U	--	370 U	--	370 U	--	--	--	--	--
SVOCs																				
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																				
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.62**	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	**0.69**	**0.77**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	**1.13**	**0.93**	0.5 U	0.5 U	
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	--	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
2-Butanone	1800	µg/L	20 U	20 U	--	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	--	20 UJ	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	
Acetone	2700	µg/L	30 U	30 U	--	30 UJ	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	--	30 U	30 U	30 U	30 U	
Bromodichloromethane	16	µg/L	2 U	2 U	--	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	
Bromoform	5	µg/L	5 U	5 U	--	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	
Bromomethane	0.89	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	--	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	
Chlorobenzene	30	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	
Chlorodibromomethane	25	µg/L	2 U	2 U	--	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	MW18-123S		MW18-124S			MW18-125S		MW18-126D			MW18-127S		MW18-128D			MW18-129D	
			Sample ID	MW18-123S	MW18-123S	MW18-124S	MW18-124S	MW18-124S	MW18-125S	MW18-125S	MW18-126D	DUP2	MW18-126D	MW18-127S	MW18-127S	MW18-128D	MW18-128D	MW18-128D	MW18-129D	MW18-129D
			Start Depth (m)	3.40	3.40	3.55	3.55	3.55	4.26	4.26	6.45	6.45	6.45	3.42	3.42	18.74	18.74	18.74	7.97	7.97
			End Depth (m)	4.92	4.92	5.08	5.08	5.08	5.79	5.79	7.97	7.97	7.97	4.95	4.95	20.26	20.26	20.26	9.49	9.49
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	03 Aug 2018	26 Feb 2020	02 Aug 2018	24 Feb 2020	11 Mar 2020	02 Aug 2018	27 Feb 2020	02 Aug 2018	02 Aug 2018	27 Feb 2020	03 Aug 2018	03 Mar 2020	30 Jul 2018	17 Oct 2018	03 Mar 2020	30 Jul 2018	28 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Chloroform	2	µg/L	1 U	1 U	--	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**3.43**	0.5 U	--	0.5 UJ	0.5 U	**0.75**	**1.57**	**1.34**	**1.37**	**0.57**	0.5 U	0.5 U	--	**3.8**	**3.53**	**3.52**	**3.67**
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	--	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U
Dichloromethane	26	µg/L	5 U	5 U	--	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	--	2 UJ	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U
n-Hexane	5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.55 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	**0.72**	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	0.3 UJ	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	**2.64**	**1.19**	--	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	**0.85**	**0.63**	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	5 U	5 U	--	5 UJ	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	--	0.5 UJ	0.5 U	**0.71**	**0.88**	**1.03**	**0.99**	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	**4.93**	**5.63**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-130D			MW18-131S			MW18-132D				MW18-133D			MW18-134D			MW18-134S	
Sample ID			MW18-130D	MW18-130D	MW18-130D	MW18-131S	MW18-131S	MW18-131S	MW18-132D	DUP1	MW18-132D	MW18-132D	MW18-133D	MW18-133D	MW18-133D	DUP2	MW18-134D	MW18-134D	MW18-134S	MW18-134S
Start Depth (m)			6.40	6.40	6.40	3.20	3.20	3.20	7.97	7.97	7.97	7.97	17.17	17.17	17.17	6.40	6.40	6.40	2.74	2.74
End Depth (m)			7.92	7.92	7.92	4.72	4.72	4.72	9.49	9.49	9.49	9.49	18.69	18.69	18.69	7.92	7.92	7.92	4.27	4.27
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N
Sample Date			31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	12 Dec 2018	12 Dec 2018	27 Feb 2020	12 Dec 2018	27 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
ABNs																				
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																				
Benzene	0.5	µg/L	--	**0.74**	**0.77**	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	**2.95**	**3.19**	**6.34**	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	24	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, o	NV	µg/L	--	0.3 U	0.3 U	--	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	--	0.4 U	0.4 U	--	0.4 U	0.4 U	--	0.4 U	0.4 U	0.4 U	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorophenyls																				
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																				
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																				
Antimony	6	µg/L	**0.19**	--	--	**0.2**	--	--	**0.22**	--	--	--	**0.29**	--	--	--	--	--	--	--
Arsenic	25	µg/L	**8.33**	--	--	**0.48**	--	--	**5.13**	--	--	--	**9.46**	--	--	--	--	--	--	--
Barium	1000	µg/L	**88.7**	--	--	**38.8**	--	--	**202**	--	--	--	**102**	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-130D			MW18-131S			MW18-132D				MW18-133D			MW18-134D			MW18-134S	
Sample ID			MW18-130D	MW18-130D	MW18-130D	MW18-131S	MW18-131S	MW18-131S	MW18-132D	DUP1	MW18-132D	MW18-132D	MW18-133D	MW18-133D	MW18-133D	DUP2	MW18-134D	MW18-134D	MW18-134S	MW18-134S
Start Depth (m)			6.40	6.40	6.40	3.20	3.20	3.20	7.97	7.97	7.97	7.97	17.17	17.17	17.17	6.40	6.40	6.40	2.74	2.74
End Depth (m)			7.92	7.92	7.92	4.72	4.72	4.72	9.49	9.49	9.49	9.49	18.69	18.69	18.69	7.92	7.92	7.92	4.27	4.27
Sample Type			N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N
Sample Date			31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	12 Dec 2018	12 Dec 2018	27 Feb 2020	12 Dec 2018	27 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Beryllium	4	µg/L	0.1 U	--	--	0.1 U	--	--	0.1 U	--	--	--	0.1 U	--	--	--	--	--	--	--
Boron	5000	µg/L	**63**	--	--	**52**	--	--	**72**	--	--	--	**66**	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	0.01 U	--	--	**0.014**	--	--	0.01 U	--	--	--	0.01 U	--	--	--	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	0.5 U	--	--	0.5 U	--	--	0.5 U	--	--	--	0.5 U	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	**0.82**	--	--	**1.03**	--	--	**0.15**	--	--	--	**0.16**	--	--	--	--	--	--	--
Copper	69	µg/L	**0.92**	--	--	**4.09**	--	--	**0.86**	--	--	--	**3.93**	--	--	--	--	--	--	--
Lead	10	µg/L	**0.378**	--	--	**0.079**	--	--	**1.16**	--	--	--	**1.92**	--	--	--	--	--	--	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	**2.73**	--	--	**1.43**	--	--	**3.02**	--	--	--	**3.81**	--	--	--	--	--	--	--
Nickel	100	µg/L	**7.3**	--	--	**7.68**	--	--	**1.79**	--	--	--	**3.22**	--	--	--	--	--	--	--
Selenium	10	µg/L	**0.09**	--	--	**0.375**	--	--	0.05 U	--	--	--	**0.134**	--	--	--	--	--	--	--
Silver	1.2	µg/L	0.05 U	--	--	0.05 U	--	--	0.05 U	--	--	--	0.05 U	--	--	--	--	--	--	--
Sodium	490000	µg/L	**25400**	--	--	**13400**	--	--	**41500**	--	--	--	**96900**	--	--	--	--	--	--	--
Thallium	2	µg/L	**0.082**	--	--	**0.614**	--	--	**0.028**	--	--	--	0.01 U	--	--	--	--	--	--	--
Uranium	20	µg/L	**4.98**	--	--	**3.41**	--	--	**3.78**	--	--	--	**4.08**	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	0.5 U	--	--	0.5 U	--	--	0.5 U	--	--	--	0.5 U	--	--	--	--	--	--	--
Zinc	890	µg/L	**803**	--	--	**1160**	--	--	**212**	--	--	--	**473**	--	--	--	--	--	--	--
Non-Regulated Metals																				
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																				
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																				
1-Methylnaphthalene	NV	µg/L	--	--	--	--	**0.263**	--	--	--	--	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	--	**0.263**	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	--	--	**0.077**	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	MW18-130D			MW18-131S			MW18-132D				MW18-133D			MW18-134D			MW18-134S	
		Sample ID	MW18-130D	MW18-130D	MW18-130D	MW18-131S	MW18-131S	MW18-131S	MW18-132D	DUP1	MW18-132D	MW18-132D	MW18-133D	MW18-133D	MW18-133D	DUP2	MW18-134D	MW18-134D	MW18-134S	MW18-134S
		Start Depth (m)	6.40	6.40	6.40	3.20	3.20	3.20	7.97	7.97	7.97	7.97	17.17	17.17	17.17	6.40	6.40	6.40	2.74	2.74
		End Depth (m)	7.92	7.92	7.92	4.72	4.72	4.72	9.49	9.49	9.49	9.49	18.69	18.69	18.69	7.92	7.92	7.92	4.27	4.27
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N
		Sample Date	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	12 Dec 2018	12 Dec 2018	27 Feb 2020	12 Dec 2018	27 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																		
Fluorene	120	µg/L	--	--	--	--	**0.097**	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	--	--	--	--	**0.088**	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	--	--	**0.099**	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
PCBs																				
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																				
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	25 U	--	--	--	--	--	25 U	25 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	25 U	--	25 U	--	--	--	25 U	25 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	100 U	--	100 U	--	--	--	100 U	100 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	250 U	--	250 U	--	--	--	250 U	250 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	250 U	--	250 U	--	--	--	250 U	250 U	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	370 U	--	370 U	--	--	--	370 U	370 U	--	--	--	--	--	--	--	--	--
SVOCs																				
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																				
1,1,1,2-Tetrachloroethane	1.1	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	**1.27**	**0.97**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	--	0.2 U	0.2 U	--	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	--	20 U	20 U	--	20 U	20 U	--	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	--	20 U	20 U	--	20 U	20 U	--	20 U	20 U	20 U	--	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	2700	µg/L	--	30 U	30 U	--	30 U	30 U	--	30 U	30 U	30 U	--	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Bromodichloromethane	16	µg/L	--	2 U	2 U	--	2 U	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromoform	5	µg/L	--	5 U	5 U	--	5 U	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	0.89	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	--	0.2 U	0.2 U	--	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	30	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	--	2 U	2 U	--	2 U	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-130D**			**MW18-131S**			**MW18-132D**				**MW18-133D**			**MW18-134D**			**MW18-134S**	
		Sample ID	MW18-130D	MW18-130D	MW18-130D	MW18-131S	MW18-131S	MW18-131S	MW18-132D	DUP1	MW18-132D	MW18-132D	MW18-133D	MW18-133D	MW18-133D	DUP2	MW18-134D	MW18-134D	MW18-134S	MW18-134S
		Start Depth (m)	6.40	6.40	6.40	3.20	3.20	3.20	7.97	7.97	7.97	7.97	17.17	17.17	17.17	6.40	6.40	6.40	2.74	2.74
		End Depth (m)	7.92	7.92	7.92	4.72	4.72	4.72	9.49	9.49	9.49	9.49	18.69	18.69	18.69	7.92	7.92	7.92	4.27	4.27
		Sample Type	N	N	N	N	N	N	N	FD	N	N	N	N	N	FD	N	N	N	N
		Sample Date	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	17 Oct 2018	02 Mar 2020	31 Jul 2018	17 Oct 2018	02 Mar 2020	12 Dec 2018	12 Dec 2018	27 Feb 2020	12 Dec 2018	27 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Chloroform	2	µg/L	--	1 U	1 U	--	1 U	1 U	--	1 U	1 U	1 U	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	--	**42.2**	**31.1**	--	**2.43**	**1.28**	--	**19.3**	**19**	**12.8**	--	**3.63**	**2.97**	**1.55**	**1.59**	**1.09**	0.5 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	--	0.3 U	0.3 U	--	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	--	2 U	2 U	--	2 U	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Dichloromethane	26	µg/L	--	5 U	5 U	--	5 U	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	--	2 U	2 U	--	2 U	2 U	--	2 U	2 U	2 U	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U
n-Hexane	5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	--	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	--	**1.42**	**0.92**	--	0.5 U	0.5 U	--	**0.54**	**0.54**	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	--	0.3 U	0.3 U	--	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	--	0.5 U	0.5 U	--	**4.7**	**3.15**	--	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	--	5 U	5 U	--	5 U	5 U	--	5 U	5 U	5 U	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	--	**5.41**	**6.93**	--	0.5 U	0.5 U	--	**4.51**	**4.41**	**3.05**	--	0.5 U	0.5 U	**0.51**	**0.54**	**0.89**	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-135D**		**MW18-135S**		**MW18-136D**		**MW18-136G**		**MW19-137S**		**OW02**								
		Sample ID	MW18-135D	MW18-135D	DUP1	MW18-135S	MW18-136D	MW18-136D	MW18-136G	MW18-136G	MW19-137S	MW19-137S	OW2	OW2	OW 2	OW 2	OW2	OW2	OW2	OW2	OW2
		Start Depth (m)	9.75	9.75	4.27	4.27	11.58	11.58	23.80	23.80	2.21	2.21	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
		End Depth (m)	11.28	11.28	5.79	5.79	13.11	13.11	25.32	25.32	5.25	5.25	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	11 Dec 2018	03 Mar 2020	11 Dec 2018	11 Dec 2018	11 Dec 2018	27 Feb 2020	11 Dec 2018	27 Feb 2020	27 Feb 2020	11 Mar 2020	24 Mar 2010	07 Oct 2010	17 Jun 2011	19 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016
Analyte	**Table 6 SCS** [a]	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	0.05 U	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	0.5 U	**0.78**	**0.8**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Toluene	24	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylene, o	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**460000**	**420000**	**430000**	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1700**	**1600**	**1300**	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**360000**	**370000**	**370000**	**340000**	**460000**	**420000**	**430000**	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50 U	50 U	**55**	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**4600**	**3600**	**4200**	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	--	--	--	--	--	--	**0.71**	**0.98**	**0.72**	**0.75**	**0.87**	**0.83**	**0.84**	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**500000**	**440000**	**450000**	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	--	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--
pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	**7.61**	**7.58**	**7.61**	**7.54**	**7.59**	**7.61**	**7.49**	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	**12**	10 U	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**40000**	**180000**	**31000**	**59000**	**47000**	**39000**	**33000**	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**520000**	**470000**	**480000**	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	25	µg/L	--	--	1 U	1 U	--	--	--	--	--	--	1 U	1 U	1 U	**1.3**	--	--	--	--	--
Barium	1000	µg/L	--	--	**81.9**	**80.1**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			MW18-135D		MW18-135S		MW18-136D		MW18-136G		MW19-137S		OW02							
Sample ID			MW18-135D	MW18-135D	DUP1	MW18-135S	MW18-136D	MW18-136D	MW18-136G	MW18-136G	MW19-137S	MW19-137S	OW2	OW2	OW 2	OW 2	OW2	OW2	OW2	OW2
Start Depth (m)			9.75	9.75	4.27	4.27	11.58	11.58	23.80	23.80	2.21	2.21	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
End Depth (m)			11.28	11.28	5.79	5.79	13.11	13.11	25.32	25.32	5.25	5.25	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
Sample Type			N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			11 Dec 2018	03 Mar 2020	11 Dec 2018	11 Dec 2018	11 Dec 2018	27 Feb 2020	11 Dec 2018	27 Feb 2020	27 Feb 2020	11 Mar 2020	24 Mar 2010	07 Oct 2010	17 Jun 2011	19 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016
Analyte	**Table 6 SCS [a]**	**Unit**																		
Beryllium	4	µg/L	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	5000	µg/L	--	--	100 U	100 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**100000**	**150000**	**110000**	**110000**	**130000**	**120000**	**120000**	--	--
Chromium	50	µg/L	--	--	5 U	5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	--	--	1 U	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	69	µg/L	--	--	2 U	2 U	--	--	--	--	--	--	--	--	--	--	20 U	20 U	20 U	--	--
Lead	10	µg/L	--	--	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**30000**	**37000**	**33000**	**31000**	**41000**	**37000**	**38000**	--	--
Molybdenum	70	µg/L	--	--	**0.71**	**0.94**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	100	µg/L	--	--	5 U	5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	10	µg/L	--	--	**2.28**	**2.31**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	1.2	µg/L	--	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	490000	µg/L	--	--	**3990**	**4030**	--	--	--	--	--	--	**4000**	**5900**	**4500**	**7400**	**5000**	**4800**	**4400**	--	--
Thallium	2	µg/L	--	--	0.1 U	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	20	µg/L	--	--	**1.61**	**1.63**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	--	--	5 U	5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	890	µg/L	--	--	10 U	10 U	--	--	--	--	--	--	**260**	**480**	**320**	**600**	**490**	**480**	**400**	--	--
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**350**	**630**	**350**	**300**	--	--	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**30**	**180**	**520**	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**30**	**280**	**270**	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**1400**	**9300**	**2400**	**3700**	**2000**	**3000**	**3000**	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	--	--	--	--	--	--	**5000**	**4500**	**3900**	**5700**	**4900**	**3600**	**3700**	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	0.02 U	--	**0.352**	**0.348**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-(1-)Methylnaphthalene	3.2	µg/L	0.028 U	--	**0.374**	**0.371**	--	--	--	--	--	--	--	--	--	--	0.071 U	0.071 U	0.071 U	0.071 U	0.071 U
2-Methylnaphthalene	NV	µg/L	0.02 U	--	**0.022**	**0.023**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	4.1	µg/L	0.02 U	--	**1.03**	**1.04**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthylene	1	µg/L	0.02 U	--	**0.128**	**0.13**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Anthracene	1	µg/L	0.02 U	--	**0.072**	**0.073**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)anthracene	1	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)pyrene	0.01	µg/L	0.01 U	--	0.01 U	0.01 U	--	--	--	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chrysene	0.1	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Fluoranthene	0.41	µg/L	0.02 U	--	**0.025**	**0.026**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-135D**		**MW18-135S**		**MW18-136D**		**MW18-136G**		**MW19-137S**		**OW02**							
		Sample ID	MW18-135D	MW18-135D	DUP1	MW18-135S	MW18-136D	MW18-136D	MW18-136G	MW18-136G	MW19-137S	MW19-137S	OW2	OW2	OW 2	OW 2	OW2	OW2	OW2	OW2
		Start Depth (m)	9.75	9.75	4.27	4.27	11.58	11.58	23.80	23.80	2.21	2.21	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
		End Depth (m)	11.28	11.28	5.79	5.79	13.11	13.11	25.32	25.32	5.25	5.25	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	11 Dec 2018	03 Mar 2020	11 Dec 2018	11 Dec 2018	11 Dec 2018	27 Feb 2020	11 Dec 2018	27 Feb 2020	27 Feb 2020	11 Mar 2020	24 Mar 2010	07 Oct 2010	17 Jun 2011	19 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016
Analyte	**Table 6 SCS** [a]	**Unit**																		
Fluorene	120	µg/L	0.02 U	--	**1.39**	**1.4**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	--	0.02 U	0.02 U	--	--	--	--	--	--	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Naphthalene	7	µg/L	0.05 U	--	0.47 U	0.47 U	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	0.02 U	--	**0.127**	**0.119**	--	--	--	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Pyrene	4.1	µg/L	0.02 U	--	**0.068**	**0.069**	--	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	--	25 U	25 U	--	--	--	--	25 U	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	--	25 U	25 U	--	--	--	--	25 U	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	100 U	--	**180**	**190**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	**180**	**190**	--	--	--	--	100 U	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	250 U	--	250 U	250 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	--	250 U	250 U	--	--	--	--	250 U	--	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	--	250 U	250 U	--	--	--	--	250 U	--	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	370 U	--	370 U	370 U	--	--	--	--	370 U	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.94**	**0.69**	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.28 U	0.28 U	0.28 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	10 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2700	µg/L	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	16	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U
Bromoform	5	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Chlorodibromomethane	25	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**MW18-135D**		**MW18-135S**		**MW18-136D**		**MW18-136G**		**MW19-137S**		**OW02**							
		Sample ID	MW18-135D	MW18-135D	DUP1	MW18-135S	MW18-136D	MW18-136D	MW18-136G	MW18-136G	MW19-137S	MW19-137S	OW2	OW2	OW 2	OW 2	OW2	OW2	OW2	OW2
		Start Depth (m)	9.75	9.75	4.27	4.27	11.58	11.58	23.80	23.80	2.21	2.21	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
		End Depth (m)	11.28	11.28	5.79	5.79	13.11	13.11	25.32	25.32	5.25	5.25	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
		Sample Type	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	11 Dec 2018	03 Mar 2020	11 Dec 2018	11 Dec 2018	11 Dec 2018	27 Feb 2020	11 Dec 2018	27 Feb 2020	27 Feb 2020	11 Mar 2020	24 Mar 2010	07 Oct 2010	17 Jun 2011	19 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016
Analyte	**Table 6 SCS** [a]	**Unit**																		
Chloroform	2	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
cis-1,2-Dichloroethene	1.6	µg/L	**0.89**	**0.79**	0.5 U	0.5 U	**1.65**	**0.86**	**3.14**	**2.46**	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	--	0.5 U	1 U
Dichloromethane	26	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
n-Hexane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	--	0.5 U	1 U
Styrene	5.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**8.22**	**0.55**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U
Trichlorofluoromethane	150	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	**0.84**	**0.64**	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location			**OW03-I**								**OW03-II**						
		Sample ID	OW02	OW02	OW3-I	OW3-I	OW3-I	OW3-I	OW3-I	OW03-I	OW03-1	OW03-I	OW3-II	OW3-II	OW3-II	OW3-II	OW3-II	OW03-II	OW03-II
		Start Depth (m)	0.91	0.91	1.07	1.07	1.07	1.07	1.07	1.07	1.44	1.22	6.33	6.33	6.33	6.33	6.33	6.33	6.33
		End Depth (m)	3.96	3.96	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	7.85	7.85	7.85	7.85	7.85	7.85	7.85
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	05 Sep 2017	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	27 Mar 2019	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
ABNs																			
1,1'-Biphenyl	0.5	µg/L	0.4 U	--	0.05 U	--	0.05 U	--	--	0.4 U	--	--	--	--	0.05 U	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	0.57 U	--	--	--	--	--	--	0.57 U	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	1 U	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	0.4 U	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	2 U	--	--	--	--	--	--	2 U	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	0.2 U	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	0.2 U	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
BTEX																			
Benzene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Toluene	24	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.3 U	0.3 U	--	--	--	--	--	0.3 U	--	0.3 U	--	--	--	--	--	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	--	--	--	--	--	0.4 U	--	0.4 U	--	--	--	--	--	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Chlorophenyls																			
2,4,5-Trichlorophenol	8.9	µg/L	0.2 U	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	0.2 U	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	0.3 U	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	0.3 U	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
Chemistry																			
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	**470000**	**490000**	**470000**	--	--	--	--	--	**370000**	**380000**	**390000**	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	**1400**	**1600**	1000 U	--	--	--	--	--	**1200**	**1400**	**1300**	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	**470000**	**490000**	**480000**	--	--	--	--	--	**370000**	**380000**	**390000**	--	--	--	--
Ammonia	NV	µg/L	--	--	50 U	50 U	50 U	--	--	--	--	--	**740**	50 U	**140**	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	**3900**	**3600**	**3700**	--	--	--	--	--	**2700**	**2400**	**2700**	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.724**	--	**0.9**	**0.91**	**0.9**	--	--	**0.847**	--	--	**0.78**	**0.8**	**0.82**	--	--	**0.815**	--
Hardness (as CaCO3)	NV	µg/L	--	--	**510000**	**520000**	**490000**	--	--	--	--	--	**430000**	**430000**	**430000**	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	100 U	100 U	100 U	--	--	--	--	--	100 U	100 U	100 U	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	10 U	10 U	10 U	--	--	--	--	--	10 U	10 U	10 U	--	--	--	--
pH	NV	pH UNITS	**7.28**	--	**7.51**	**7.54**	**7.34**	--	--	**7.24**	--	--	**7.53**	**7.59**	**7.55**	--	--	**7.41**	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	**11**	**13**	**12**	--	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	**44000**	**29000**	**25000**	--	--	--	--	--	**66000**	**57000**	**57000**	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	**540000**	**540000**	**520000**	--	--	--	--	--	**480000**	**480000**	**480000**	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																			
Antimony	6	µg/L	**0.34**	--	--	--	--	--	--	**0.27**	--	--	--	--	--	--	--	0.1 U	--
Arsenic	25	µg/L	**1**	--	--	--	--	--	--	**0.41**	--	--	--	--	--	--	--	**16.5**	--
Barium	1000	µg/L	**45.5**	--	--	--	--	--	--	**49.5**	--	--	--	--	--	--	--	**63.6**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location		OW03-I								OW03-II						
			Sample ID	OW02	OW02	OW3-I	OW3-I	OW3-I	OW3-I	OW3-I	OW03-I	OW03-1	OW03-I	OW3-II	OW3-II	OW3-II	OW3-II	OW3-II	OW03-II	OW03-II
			Start Depth (m)	0.91	0.91	1.07	1.07	1.07	1.07	1.07	1.07	1.44	1.22	6.33	6.33	6.33	6.33	6.33	6.33	6.33
			End Depth (m)	3.96	3.96	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	7.85	7.85	7.85	7.85	7.85	7.85	7.85
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	05 Sep 2017	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	27 Mar 2019	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																		
Beryllium	4	µg/L	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	0.1 U	--
Boron	5000	µg/L	**82**	--	--	--	--	--	--	--	**105**	--	--	--	--	--	--	--	**121**	--
Cadmium	2.1	µg/L	**0.012**	--	--	--	--	--	--	--	**0.766**	--	--	--	--	--	--	--	0.01 U	--
Calcium	NV	µg/L	--	--	**150000**	**160000**	**150000**	--	--	--	--	--	**120000**	**120000**	**120000**	--	--	--	--	--
Chromium	50	µg/L	0.5 U	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	0.5 U	--
Cobalt	3.8	µg/L	**0.82**	--	--	--	--	--	--	--	**0.13**	--	--	--	--	--	--	--	0.1 U	--
Copper	69	µg/L	**0.85**	--	20 U	20 U	20 U	--	--	--	**3.77**	--	--	20 U	20 U	20 U	--	--	0.2 U	--
Lead	10	µg/L	0.05 U	--	--	--	--	--	--	--	**0.962**	--	--	--	--	--	--	--	0.05 U	--
Magnesium	NV	µg/L	--	--	**31000**	**31000**	**28000**	--	--	--	--	--	--	**31000**	**31000**	**31000**	--	--	--	--
Molybdenum	70	µg/L	**1.86**	--	--	--	--	--	--	--	**0.638**	--	--	--	--	--	--	--	**4.47**	--
Nickel	100	µg/L	**7.14**	--	--	--	--	--	--	--	**5.57**	--	--	--	--	--	--	--	**2.33**	--
Selenium	10	µg/L	**0.11**	--	--	--	--	--	--	--	**0.103**	--	--	--	--	--	--	--	0.05 U	--
Silver	1.2	µg/L	0.05 U	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	0.05 U	--
Sodium	490000	µg/L	**6050**	--	**3300**	**3900**	**3700**	--	--	--	**3550**	--	--	**7300**	**7900**	**7300**	--	--	**6620**	--
Thallium	2	µg/L	**0.084**	--	--	--	--	--	--	--	**0.042**	--	--	--	--	--	--	--	**0.013**	--
Uranium	20	µg/L	**2.5**	--	--	--	--	--	--	--	**3.11**	--	--	--	--	--	--	--	**1.59**	--
Vanadium	6.2	µg/L	0.5 U	--	--	--	--	--	--	--	**0.51**	--	--	--	--	--	--	--	0.5 U	--
Zinc	890	µg/L	**154**	--	**390**	**440**	**350**	--	--	--	**562**	--	--	10 U	**30**	**20**	--	--	**22.5**	--
Non-Regulated Metals																				
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	--	20 U	20 U	**30**	--	--	--	--	--	--	**4900**	**3000**	**2900**	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	10 U	10 U	10 U	--	--	--	--	--	--	**80**	**50**	**60**	--	--	--	--
Potassium	NV	µg/L	--	--	**3000**	**3000**	**3000**	--	--	--	--	--	--	**8000**	**7000**	**7000**	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																				
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	1 U	--
Chloride (Cl)	790000	µg/L	**7510**	--	**4000**	**3000**	**3100**	--	--	--	**2640**	--	--	**4100**	**3900**	**3900**	--	--	**3420**	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.01 U	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	0.01 U	--
PAHs																				
1-Methylnaphthalene	NV	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	**0.058**	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
2-(1-)Methylnaphthalene	3.2	µg/L	0.028 U	--	0.071 U	0.071 U	0.071 U	0.071 U	**0.12**	0.028 U	**0.032**	--	0.071 U	0.071 U	0.071 U	0.071 U	0.071 U	0.028 U	--	
2-Methylnaphthalene	NV	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	**0.066**	0.02 U	**0.032**	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Acenaphthene	4.1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Acenaphthylene	1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Anthracene	1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Benzo(a)anthracene	1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Benzo(a)pyrene	0.01	µg/L	0.01 U	--	0.01 U	0.01 U	**0.011**	0.01 U	**0.02**	0.01 U	0.01 U	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	--	--	--	--	--	--	0.02 U	0.02 U	--	--	--	--	--	--	0.02 U	--	
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Chrysene	0.1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	
Fluoranthene	0.41	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	**0.067**	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location			OW03-I								OW03-II						
		Sample ID	OW02	OW02	OW3-I	OW3-I	OW3-I	OW3-I	OW3-I	OW03-I	OW03-1	OW03-I	OW3-II	OW3-II	OW3-II	OW3-II	OW3-II	OW03-II	OW03-II
		Start Depth (m)	0.91	0.91	1.07	1.07	1.07	1.07	1.07	1.07	1.44	1.22	6.33	6.33	6.33	6.33	6.33	6.33	6.33
		End Depth (m)	3.96	3.96	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	7.85	7.85	7.85	7.85	7.85	7.85	7.85
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	05 Sep 2017	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	27 Mar 2019	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
Fluorene	120	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--
Naphthalene	7	µg/L	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.066**	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--
Phenanthrene	1	µg/L	0.02 U	--	0.03 U	0.05 U	**0.035**	0.03 U	**0.096**	0.02 U	0.02 U	--	0.03 U	0.03 U	0.03 U	**0.05**	0.03 U	0.02 U	--
Pyrene	4.1	µg/L	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	**0.06**	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--
PCBs																			
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																			
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	--	--	--	--	--	--	25 U	--	--	--	--	--	--	--	25 U	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	--	--	--	--	--	--	25 U	--	--	--	--	--	--	--	25 U	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	100 U	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	250 U	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	130 U	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	130 U	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	130 U	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	130 U	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	250 U	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	370 U	--	--	--	--	--	--	--	--	--
SVOCs																			
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--
VOCs																			
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	--	--	--	--	--	0.2 U	--	0.2 U	--	--	--	--	--	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	--	--	--	--	--	20 U	--	20 U	--	--	--	--	--	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	--	--	--	--	--	20 U	--	20 U	--	--	--	--	--	20 U	20 U
Acetone	2700	µg/L	30 U	30 U	--	--	--	--	--	30 U	--	30 U	--	--	--	--	--	30 U	30 U
Bromodichloromethane	16	µg/L	2 U	2 U	--	--	--	--	--	2 U	--	2 U	--	--	--	--	--	2 U	2 U
Bromoform	5	µg/L	5 U	5 U	--	--	--	--	--	5 U	--	5 U	--	--	--	--	--	5 U	5 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	--	--	--	--	--	0.2 U	--	0.2 U	--	--	--	--	--	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	2 U	2 U	--	--	--	--	--	2 U	--	2 U	--	--	--	--	--	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

					OW03-I								OW03-II						
Location																			
Sample ID			OW02	OW02	OW3-I	OW3-I	OW3-I	OW3-I	OW3-I	OW03-I	OW03-1	OW03-I	OW3-II	OW3-II	OW3-II	OW3-II	OW3-II	OW03-II	OW03-II
Start Depth (m)			0.91	0.91	1.07	1.07	1.07	1.07	1.07	1.07	1.44	1.22	6.33	6.33	6.33	6.33	6.33	6.33	6.33
End Depth (m)			3.96	3.96	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	7.85	7.85	7.85	7.85	7.85	7.85	7.85
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			05 Sep 2017	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	27 Mar 2019	03 Mar 2020	12 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	06 Sep 2017	03 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																	
Chloroform	2	µg/L	1 U	1 U	--	--	--	--	--	1 U	--	1 U	--	--	--	--	--	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	--	--	--	--	0.3 U	--	0.3 U	--	--	--	--	--	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	--	--	--	--	--	2 U	--	2 U	--	--	--	--	--	2 U	2 U
Dichloromethane	26	µg/L	5 U	5 U	--	--	--	--	--	5 U	--	5 U	--	--	--	--	--	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	--	--	--	--	--	2 U	--	2 U	--	--	--	--	--	2 U	2 U
n-Hexane	5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Styrene	5.4	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	--	--	--	--	0.3 U	--	0.3 U	--	--	--	--	--	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	5 U	5 U	--	--	--	--	--	5 U	--	5 U	--	--	--	--	--	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--	--	--	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**OW07-31**			**OW07-32**					**OW07-33**						
		Sample ID	OW07- 31	OW07-31	OW07-31	OW07- 32	OW07-32	GW-DUP2	OW07-32	OW07-32	OW07- 33	OW07-33	DUP1	OW07-33	DUP1	OW07-33	OW07-33
		Start Depth (m)	1.50	1.50	1.50	3.17	3.17	3.17	3.17	3.17	3.10	3.10	3.10	3.10	3.10	3.10	3.10
		End Depth (m)	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.15	6.15	6.15	6.15	6.15	6.15	6.15
		Sample Type	N	N	N	N	N	FD	N	N	N	N	FD	N	FD	N	N
		Sample Date	29 Mar 2007	05 Sep 2017	21 Mar 2018	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	31 Aug 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	13 Apr 2018	27 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**															
ABNs																	
1,1'-Biphenyl	0.5	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	0.3 U	0.4 U	--	0.3 U	--	--	--	--	0.3 U	0.4 U	0.4 U	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	0.57 U	--	--	--	--	--	--	--	0.57 U	0.57 U	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	0.5 U	--	--	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	1 U	--	--	--	--	--	--	--	1 U	1 U	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
4-Chloroaniline	10	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	0.4 U	--	--	--	--	--	--	--	0.4 U	0.4 U	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	2 U	--	--	--	--	--	--	--	2 U	2 U	--	--	--	--
Diethylphthalate	30	µg/L	--	0.2 U	--	--	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--
Dimethylphthalate	30	µg/L	--	0.2 U	--	--	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--
Phenol	890	µg/L	--	0.5 U	--	--	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--
BTEX																	
Benzene	0.5	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U
Ethylbenzene	2.4	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U
Toluene	24	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U
Xylene, o	NV	µg/L	0.1 U	0.3 U	--	0.1 U	0.3 U	--	--	0.3 U	0.1 U	0.3 U	0.3 U	--	--	--	0.3 U
Xylenes, m & p	NV	µg/L	0.2 U	0.4 U	--	0.2 U	0.4 U	--	--	0.4 U	0.2 U	0.4 U	0.4 U	--	--	--	0.4 U
Xylenes, Total	72	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U
Chlorophenyls																	
2,4,5-Trichlorophenol	8.9	µg/L	--	0.2 U	--	--	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	0.2 U	--	--	--	--	--	--	--	0.2 U	0.2 U	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	0.3 U	--	--	--	--	--	--	--	0.3 U	0.3 U	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	0.3 U	--	--	--	--	--	--	--	0.3 U	0.3 U	--	--	--	--
Pentachlorophenol	30	µg/L	--	0.5 U	--	--	--	--	--	--	--	0.5 U	0.5 U	--	--	--	--
Chemistry																	
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.819**	**1.53**	--	**0.712**	**1.03**	--	--	--	**0.769**	**1.16**	**1.16**	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	**550**	--	--	**1200**	--	--	--	--	**460**	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	50 U	--	--	50 U	--	--	--	--	50 U	--	--	--	--	--	--
pH	NV	pH UNITS	--	**7.42**	--	--	**7.53**	--	--	--	--	**7.34 J**	**7.34**	--	--	--	--
pH (Laboratory)	NV	pH UNITS	**7.25**	--	--	**7.42**	--	--	--	--	**7.52**	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																	
Antimony	6	µg/L	1 U	0.1 U	**0.14**	1 U	**0.41**	--	--	--	1 U	**0.38**	**0.39**	**0.23**	**0.25**	**0.23**	--
Arsenic	25	µg/L	**2.15**	**45.7**	**33.9**	0.6 U	**0.73**	--	--	--	**0.7**	**0.67**	**0.7**	**0.42**	**0.41**	**0.46**	--
Barium	1000	µg/L	**34.5**	**72.8**	**50.6**	**27.8**	**47.5**	--	--	--	**42.1**	**51.3**	**51.9**	**41.7**	**45.8**	**45.3**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-31			OW07-32					OW07-33						
			Sample ID	OW07- 31	OW07-31	OW07-31	OW07- 32	OW07-32	GW-DUP2	OW07-32	OW07-32	OW07- 33	OW07-33	DUP1	OW07-33	DUP1	OW07-33	OW07-33
			Start Depth (m)	1.50	1.50	1.50	3.17	3.17	3.17	3.17	3.17	3.10	3.10	3.10	3.10	3.10	3.10	3.10
			End Depth (m)	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.15	6.15	6.15	6.15	6.15	6.15	6.15
			Sample Type	N	N	N	N	N	FD	N	N	N	N	FD	N	FD	N	N
			Sample Date	29 Mar 2007	05 Sep 2017	21 Mar 2018	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	31 Aug 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	13 Apr 2018	27 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																
Beryllium	4	µg/L	1 U	0.1 U	0.1 U	1 U	0.1 U	--	--	--	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	--	
Boron	5000	µg/L	**238**	**53**	**52**	**132**	**74**	--	--	--	**109**	**64**	**65**	**56**	**52**	**53**	--	
Cadmium	2.1	µg/L	0.5 U	**0.017**	**0.018**	**0.51**	**0.613**	--	--	--	0.5 U	**0.673**	**0.691**	**0.712**	**0.765**	**0.779**	--	
Calcium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chromium	50	µg/L	**2.87**	**0.53**	0.5 U	**0.98**	0.5 U	--	--	--	**1.18**	0.5 U	0.5 U	0.5 U	0.5 U	**0.51**	--	
Cobalt	3.8	µg/L	0.5 U	**0.38**	**0.51**	**0.64**	**2.29**	--	--	--	**0.51**	**1.08**	**1.07**	**1.28**	**1.27**	**1.28**	--	
Copper	69	µg/L	**8.96**	**0.24**	**0.39**	**5.47**	**6.58**	--	--	--	**3.82**	**5.7**	**5.73**	**4.33**	**4.54**	**4.63**	--	
Lead	10	µg/L	**0.68**	**0.244**	**0.299**	**1.8**	**1.08**	--	--	--	**4.07**	**15**	**15.6**	**8.92**	**7.68**	**7.37**	--	
Magnesium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Molybdenum	70	µg/L	**2.36**	**1.78**	**1.67**	**2.28**	**3.48**	--	--	--	**2.48**	**3.2**	**3.16**	**2.98**	**2.75**	**2.76**	--	
Nickel	100	µg/L	**4.53**	**1.39**	**1.37**	**9.15**	**10.1**	--	--	--	**6.58**	**5.5**	**5.48**	**4.68**	**4.7**	**4.72**	--	
Selenium	10	µg/L	**2.63**	**0.26**	**0.318**	**2.36**	**0.292**	--	--	--	**2.02**	**0.506**	**0.509**	**0.422**	**0.485**	**0.48**	--	
Silver	1.2	µg/L	0.2 U	0.05 U	0.05 U	0.2 U	0.05 U	--	--	--	0.2 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	
Sodium	490000	µg/L	--	**165000**	**97500**	--	**72900**	--	--	--	--	**99800**	**99800**	**122000**	**128000**	**129000**	--	
Thallium	2	µg/L	0.3 U	**0.014**	**0.012**	**0.49**	**0.984**	--	--	--	0.3 U	**0.111**	**0.114**	**0.108**	**0.093**	**0.088**	--	
Uranium	20	µg/L	--	**1.23**	**1.77**	--	**4.71**	--	--	--	--	**5.05**	**5.18**	**4.23**	**4.43**	**4.25**	--	
Vanadium	6.2	µg/L	**0.91**	**1.66**	**1.14**	0.4 U	0.5 U	--	--	--	0.4 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	
Zinc	890	µg/L	**116**	**47**	**73.3**	**1290**	**1270**	--	--	--	**755**	**637**	**639**	**655**	**680**	**685**	--	
Non-Regulated Metals																		
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Potassium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
ORPs																		
Chromium, Hexavalent (Cr6+)	25	µg/L	5 U	1 U	--	5 U	1 U	--	--	--	5 U	1 U	1 U	--	--	--	--	
Chloride (Cl)	790000	µg/L	--	**327000**	--	--	**123000**	--	--	--	--	**181000**	**182000**	--	--	--	--	
Cyanide, Free	52	µg/L	2 U	--	--	2 U	--	--	--	--	2 U	--	--	--	--	--	--	
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Mercury	0.1	µg/L	0.02 U	0.01 U	--	0.02 U	0.01 U	--	--	--	0.02 U	0.01 U	0.01 U	--	--	--	--	
PAHs																		
1-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--	
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.028 U	--	--	0.028 U	--	--	--	--	0.028 U	0.028 U	--	--	--	--	
2-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--	
Acenaphthene	4.1	µg/L	0.1 U	0.02 U	--	0.1 U	0.02 U	--	--	--	0.1 U	0.02 U	0.02 U	--	--	--	--	
Acenaphthylene	1	µg/L	0.11 U	0.02 U	--	0.11 U	0.02 U	--	--	--	0.11 U	0.02 U	0.02 U	--	--	--	--	
Anthracene	1	µg/L	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	0.02 U	--	--	--	--	
Benzo(a)anthracene	1	µg/L	0.08 U	0.02 U	--	0.08 U	0.02 U	--	--	--	0.08 U	0.02 U	0.02 U	--	--	--	--	
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--	
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Benzo(b)fluoranthene	0.1	µg/L	**0.04**	0.02 U	--	0.03 U	0.02 U	--	--	--	0.03 U	0.02 U	0.02 U	--	--	--	--	
Benzo(g,h,i)perylene	0.2	µg/L	**0.1**	0.02 U	--	0.06 U	0.02 U	--	--	--	**0.06**	0.02 U	0.02 U	--	--	--	--	
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	0.02 U	--	--	--	--	
Chrysene	0.1	µg/L	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	0.02 U	--	--	--	--	
Dibenzo(a,h)anthracene	0.2	µg/L	**0.1**	0.02 U	--	0.09 U	0.02 U	--	--	--	0.09 U	0.02 U	0.02 U	--	--	--	--	
Fluoranthene	0.41	µg/L	0.12 U	0.02 U	--	0.12 U	0.02 U	--	--	--	0.12 U	0.02 U	0.02 U	--	--	--	--	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-31			OW07-32					OW07-33						
			Sample ID	OW07- 31	OW07-31	OW07-31	OW07- 32	OW07-32	GW-DUP2	OW07-32	OW07-32	OW07- 33	OW07-33	DUP1	OW07-33	DUP1	OW07-33	OW07-33
			Start Depth (m)	1.50	1.50	1.50	3.17	3.17	3.17	3.17	3.17	3.10	3.10	3.10	3.10	3.10	3.10	3.10
			End Depth (m)	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.15	6.15	6.15	6.15	6.15	6.15	6.15
			Sample Type	N	N	N	N	N	FD	N	N	N	N	FD	N	FD	N	N
			Sample Date	29 Mar 2007	05 Sep 2017	21 Mar 2018	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	31 Aug 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	13 Apr 2018	27 Feb 2020
Analyte	**Table 6 SCS** [a]	**Unit**																
Fluorene	120	µg/L	0.09 U	0.02 U	--	0.09 U	0.02 U	--	--	--	0.09 U	0.02 U	0.02 U	--	--	--	--	
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	**0.1**	0.02 U	--	**0.04**	0.02 U	--	--	--	**0.05**	0.02 U	0.02 U	--	--	--	--	
Naphthalene	7	µg/L	0.12 U	0.05 U	--	0.12 U	0.05 U	--	--	--	0.12 U	0.05 U	0.05 U	--	--	--	--	
Phenanthrene	1	µg/L	0.11 U	0.02 U	--	0.11 U	0.02 U	--	--	--	0.11 U	0.02 U	0.02 U	--	--	--	--	
Pyrene	4.1	µg/L	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	0.02 U	--	--	--	--	
PCBs																		
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Aroclor 1242	NV	µg/L	--	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	--	--	--	
Aroclor 1248	NV	µg/L	--	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	--	--	--	
Aroclor 1254	NV	µg/L	--	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	--	--	--	
Aroclor 1260	NV	µg/L	--	--	--	--	--	0.02 U	0.02 U	--	--	0.02 U	0.02 U	--	--	--	--	
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PCB, Total	0.2	µg/L	0.1 U	--	--	0.1 U	--	0.04 U	0.04 U	--	0.1 U	0.04 U	0.04 U	--	--	--	--	
PHCs																		
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	100 U	25 U	--	100 U	25 U	--	--	--	100 U	25 U	25 U	--	--	--	--	
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	100 U	25 U	--	100 U	25 U	--	--	--	100 U	25 U	25 U	--	--	--	--	
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	100 U	100 U	--	--	--	--	
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	--	100 U	100 U	--	--	--	100 U	100 U	100 U	--	--	--	--	
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	250 U	250 U	--	--	--	--	
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	500 U	250 U	--	500 U	250 U	--	--	--	500 U	250 U	250 U	--	--	--	--	
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	130 U	--	--	130 U	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	130 U	--	--	130 U	--	--	--	--	--	--	--	--	--	--	
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	500 U	250 U	--	500 U	250 U	--	--	--	500 U	250 U	250 U	--	--	--	--	
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	370 U	370 U	--	--	--	--	
SVOCs																		
2-Hexanone	NV	µg/L	0.3 U	--	--	0.3 U	--	--	--	--	0.3 U	--	--	--	--	--	--	
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chloroethane	NV	µg/L	0.2 U	--	--	0.2 U	--	--	--	--	0.2 U	--	--	--	--	--	--	
Chloromethane	NV	µg/L	0.4 U	--	--	0.4 U	--	--	--	--	0.4 U	--	--	--	--	--	--	
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
VOCs																		
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,1,1-Trichloroethane	23	µg/L	0.3 U	0.5 U	--	**4.9**	**1.36**	--	--	0.5 U	**8**	**1.92**	**1.82**	--	--	--	**1.18**	
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,1,2-Trichloroethane	0.5	µg/L	--	0.5 U	--	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	--	--	--	0.5 U	
1,1-Dichloroethane	5	µg/L	0.3 U	0.5 U	--	**2.4**	**1.58**	--	--	0.5 U	**5.3**	**1.71**	**1.55**	--	--	--	**0.94**	
1,1-Dichloroethene	0.5	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	--	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	
1,2-Dichlorobenzene	3	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,2-Dichloroethane	0.5	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,2-Dichloropropane	0.58	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,3-Dichlorobenzene	59	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,3-Dichloropropene	0.5	µg/L	--	0.5 U	--	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	--	--	--	0.5 U	
1,4-Dichlorobenzene	0.5	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U	
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	20 U	20 U	--	--	--	--	
2-Butanone	1800	µg/L	0.3 U	20 U	--	0.3 U	20 U	--	--	20 U	0.3 U	20 U	20 U	--	--	--	20 U	
4-Methyl-2-Pentanone	640	µg/L	--	20 U	--	--	20 U	--	--	20 U	--	20 U	20 U	--	--	--	20 U	
Acetone	2700	µg/L	0.5 U	30 U	--	0.5 U	30 U	--	--	30 U	0.5 U	30 U	30 U	--	--	--	30 U	
Bromodichloromethane	16	µg/L	0.2 U	2 U	--	0.2 U	2 U	--	--	2 U	0.2 U	2 U	2 U	--	--	--	2 U	
Bromoform	5	µg/L	0.1 U	5 U	--	0.1 U	5 U	--	--	5 U	0.1 U	5 U	5 U	--	--	--	5 U	
Bromomethane	0.89	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U	
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	--	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	0.2 U	
Chlorobenzene	30	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U	
Chlorodibromomethane	25	µg/L	--	2 U	--	--	2 U	--	--	2 U	--	2 U	2 U	--	--	--	2 U	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-31			OW07-32					OW07-33						
			Sample ID	OW07- 31	OW07-31	OW07-31	OW07- 32	OW07-32	GW-DUP2	OW07-32	OW07-32	OW07- 33	OW07-33	DUP1	OW07-33	DUP1	OW07-33	OW07-33
			Start Depth (m)	1.50	1.50	1.50	3.17	3.17	3.17	3.17	3.17	3.10	3.10	3.10	3.10	3.10	3.10	3.10
			End Depth (m)	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.22	6.15	6.15	6.15	6.15	6.15	6.15	6.15
			Sample Type	N	N	N	N	N	FD	N	N	N	N	FD	N	FD	N	N
			Sample Date	29 Mar 2007	05 Sep 2017	21 Mar 2018	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	31 Aug 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	13 Apr 2018	27 Feb 2020
Analyte	**Table 6 SCS [a]**	**Unit**																
Chloroform	2	µg/L	0.2 U	1 U	--	0.2 U	1 U	--	--	1 U	0.2 U	1 U	1 U	--	--	--	1 U
cis-1,2-Dichloroethene	1.6	µg/L	0.2 U	0.5 U	--	**0.77**	**1.08**	--	--	0.5 U	0.2 U	**0.6 J**	**0.57 J**	--	--	--	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	0.3 U	--	0.2 U	0.3 U	--	--	0.3 U	0.2 U	0.3 U	0.3 U	--	--	--	0.3 U
Dichlorodifluoromethane	590	µg/L	--	2 U	--	--	2 U	--	--	2 U	--	2 U	2 U	--	--	--	2 U
Dichloromethane	26	µg/L	0.3 U	5 U	--	0.3 U	5 U	--	--	5 U	0.3 U	5 U	5 U	--	--	--	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	2 U	--	0.2 U	2 U	--	--	2 U	0.2 U	2 U	2 U	--	--	--	2 U
n-Hexane	5	µg/L	--	0.5 U	--	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U	--	--	--	0.5 U
Styrene	5.4	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U
Tetrachloroethene	0.5	µg/L	0.1 U	0.5 U	--	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U	--	--	--	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.2 U	0.5 U	--	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U	--	--	--	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	0.3 U	0.3 U	--	--	0.3 U	0.3 U	0.3 U	0.3 U	--	--	--	0.3 U
Trichloroethylene	0.5	µg/L	0.2 U	0.5 U	--	**1**	**0.92**	--	--	0.5 U	**0.56**	**0.89**	**0.86**	--	--	--	**0.55**
Trichlorofluoromethane	150	µg/L	0.4 U	5 U	--	0.4 U	5 U	--	--	5 U	0.4 U	5 U	5 U	--	--	--	5 U
Vinyl Chloride	0.5	µg/L	0.17 U	0.5 U	--	0.17 U	0.5 U	--	--	0.5 U	0.17 U	0.5 U	0.5 U	--	--	--	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**OW07-34D**								**OW07-34S**			**OW07-37**					**OW07-38S**		
		Sample ID	OW07- 34D	OW07-34(D)	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07- 34S	OW07-34S	OW07-34S	OW07- 37	OW07-37	GW-DUP3	OW07-37	OW07-37	OW07- 38S	OW07-38S	OW07-38S
		Start Depth (m)	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	1.55	1.55	1.55	3.10	3.10	3.13	3.13	3.10	1.79	1.79	1.79
		End Depth (m)	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	4.60	4.60	4.60	6.17	6.17	6.17	6.17	6.17	4.84	4.84	4.84
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
		Sample Date	29 Mar 2007	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	27 Feb 2020	29 Mar 2007	01 Sep 2017	27 Feb 2020	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	06 Sep 2017	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	0.05 U	--	0.05 U	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	0.3 U	--	--	--	--	--	--	--	0.3 U	--	--	0.3 U	0.4 U	--	--	--	0.3 U	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.57 U	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	2 U	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	**0.33**	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.1 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	**0.23**	0.5 U	0.5 U	**0.11**	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
Toluene	24	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.2 U	0.5 U	0.5 U	**1.1**	0.5 U	0.5 U	**0.22**	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.1 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.3 U	0.3 U	0.1 U	0.3 U	0.3 U	**0.12**	0.3 U	--	--	0.3 U	0.1 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.4 U	0.4 U	**0.42**	0.4 U	0.4 U	**0.21**	0.4 U	--	--	0.4 U	0.2 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	**0.42**	0.5 U	0.5 U	**0.33**	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	**300000**	**280000**	**250000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	**1700**	**1600**	1000 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	**300000**	**280000**	**250000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	NV	µg/L	--	**320**	**110**	**170**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	**12000**	**14000**	**12000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.812**	**1**	**0.89**	**0.97**	--	--	**1.1**	--	**0.633**	**0.966**	--	**0.663**	**1.3**	--	--	--	**0.785**	**0.815**	--
Hardness (as CaCO3)	NV	µg/L	--	**360000**	**320000**	**270000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	**190**	100 U	100 U	100 U	--	--	--	--	**1200**	--	--	**180**	--	--	--	--	**70**	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	50 U	10 U	10 U	10 U	--	--	--	--	50 U	--	--	50 U	--	--	--	--	50 U	--	--
pH	NV	pH UNITS	--	**7.78**	**7.77**	**7.52**	--	--	**7.34 J**	--	--	**7.36**	--	--	**7.37**	--	--	--	--	**7.61**	--
pH (Laboratory)	NV	pH UNITS	**7.71**	--	--	--	--	--	--	--	**8.03**	--	--	**7.7**	--	--	--	--	**7.8**	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	**50**	**32**	**26**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	**64000**	**40000**	**34000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	**580000**	**510000**	**530000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	1 U	--	--	--	--	--	**0.13**	--	1 U	**0.48**	--	1 U	**0.63**	**0.42**	**0.42**	--	1 U	**0.36**	--
Arsenic	25	µg/L	0.6 U	--	--	--	--	--	**3.62**	--	0.6 U	**0.81**	--	0.6 U	**0.34**	**0.21**	**0.24**	--	0.6 U	**0.32**	--
Barium	1000	µg/L	**41.6**	--	--	--	--	--	**52.2**	--	**18.4**	**58.7**	--	**31.4**	**38.7**	**27.1**	**27.4**	--	**39.2**	**36.7**	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location			OW07-34D								OW07-34S			OW07-37					OW07-38S		
Sample ID			OW07- 34D	OW07-34(D)	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07- 34S	OW07-34S	OW07-34S	OW07- 37	OW07-37	GW-DUP3	OW07-37	OW07-37	OW07- 38S	OW07-38S	OW07-38S
Start Depth (m)			6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	1.55	1.55	1.55	3.10	3.10	3.13	3.13	3.10	1.79	1.79	1.79
End Depth (m)			9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	4.60	4.60	4.60	6.17	6.17	6.17	6.17	6.17	4.84	4.84	4.84
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
Sample Date			29 Mar 2007	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	27 Feb 2020	29 Mar 2007	01 Sep 2017	27 Feb 2020	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	06 Sep 2017	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																			
Beryllium	4	µg/L	1 U	--	--	--	--	--	0.1 U	--	1 U	0.1 U	--	1 U	0.1 U	0.1 U	0.1 U	--	1 U	0.1 U	--
Boron	5000	µg/L	**122**	--	--	--	--	--	**59**	--	**111**	**81**	--	**72.9**	**65**	**46**	**46**	--	**104**	**135**	--
Cadmium	2.1	µg/L	0.5 U	--	--	--	--	--	**0.021**	--	0.5 U	**0.537**	--	**1.01**	**1.05**	**0.849**	**0.842**	--	0.5 U	**0.293**	--
Calcium	NV	µg/L	--	**110000**	**98000**	**85000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	50	µg/L	**1.37**	--	--	--	--	--	0.5 U	--	**0.75**	0.5 U	--	**3.08**	0.5 U	0.5 U	0.5 U	--	**2.29**	0.5 U	--
Cobalt	3.8	µg/L	**1.27**	--	--	--	--	--	0.1 U	--	**0.92**	**0.35**	--	0.5 U	**0.18**	0.1 U	0.1 U	--	0.5 U	0.1 U	--
Copper	69	µg/L	**3.34**	20 U	20 U	20 U	--	--	**0.25**	--	**1.87**	**4.36**	--	**6.75**	**14.4**	**9.96**	**9.99**	--	**3.12**	**1.56**	--
Lead	10	µg/L	0.5 U	--	--	--	--	--	**8.26**	--	0.5 U	**0.112**	--	0.5 U	**1.02**	**0.89**	**0.899**	--	0.5 U	**0.057**	--
Magnesium	NV	µg/L	--	**20000**	**17000**	**14000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molybdenum	70	µg/L	**2.94**	--	--	--	--	--	**4.19**	--	**9.28**	**2.73**	--	**2.33**	**4**	**2.84**	**2.85**	--	**0.94**	**0.966**	--
Nickel	100	µg/L	**7.09**	--	--	--	--	--	**3.96**	--	**7.99**	**5.53**	--	**7.38**	**6.43**	**4.78**	**4.86**	--	**6.17**	**7.3**	--
Selenium	10	µg/L	0.8 U	--	--	--	--	--	**0.211**	--	0.8 U	**0.218**	--	**1.78**	**0.869**	**3.87**	**3.73**	--	**3.1**	**0.395**	--
Silver	1.2	µg/L	0.2 U	--	--	--	--	--	0.05 U	--	0.2 U	0.05 U	--	0.2 U	0.05 U	0.05 U	0.05 U	--	0.2 U	0.05 U	--
Sodium	490000	µg/L	--	**75000**	**65000**	**86000**	--	--	**90600**	--	--	**62000**	--	--	**130000**	**106000**	**104000**	--	--	**6030**	--
Thallium	2	µg/L	0.3 U	--	--	--	--	--	**0.012**	--	0.3 U	**0.178**	--	0.3 U	**0.162**	**0.086**	**0.083**	--	0.3 U	**0.157**	--
Uranium	20	µg/L	--	--	--	--	--	--	**5.96**	--	--	**3.59**	--	--	**9.48**	**5.34**	**5.35**	--	--	**2.05**	--
Vanadium	6.2	µg/L	0.4 U	--	--	--	--	--	0.5 U	--	0.4 U	0.5 U	--	**0.92**	0.5 U	0.5 U	0.5 U	--	**1.11**	0.5 U	--
Zinc	890	µg/L	**516**	**770**	**730**	**620**	--	--	**626**	--	**212**	**552**	--	**1630**	**681**	**747**	**744**	--	**71**	**455**	--
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	**1500**	**1300**	**970**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	**110**	**90**	**70**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	**4000**	**4000**	**3000**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	5 U	--	--	--	--	--	1 U	--	5 U	1 U	--	5 U	1 U	--	--	--	5 U	1 U	--
Chloride (Cl)	790000	µg/L	--	**110000**	**99000**	**140000**	--	--	**161000**	--	--	**112000**	--	--	**215000**	--	--	--	--	**2880**	--
Cyanide, Free	52	µg/L	2 U	--	--	--	--	--	--	--	2 U	--	--	2 U	--	--	--	--	2 U	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.02 U	--	--	--	--	--	0.01 U	--	0.02 U	0.01 U	--	0.02 U	0.01 U	--	--	--	0.02 U	0.01 U	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.02 U	--	--	0.02 U	--	--	--	--	0.02 U	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	0.071 U	0.071 U	0.071 U	0.071 U	--	--	--	0.028 U	--	--	0.028 U	--	--	--	--	0.028 U	--
2-Methylnaphthalene	NV	µg/L	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	0.02 U	--	--	0.02 U	--	--	--	--	0.02 U	--
Acenaphthene	4.1	µg/L	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.1 U	0.02 U	--	0.1 U	0.02 U	--	--	--	0.1 U	0.02 U	--
Acenaphthylene	1	µg/L	0.11 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.11 U	0.02 U	--	0.11 U	0.02 U	--	--	--	0.11 U	0.02 U	--
Anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	--
Benzo(a)anthracene	1	µg/L	0.08 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.08 U	0.02 U	--	0.08 U	0.02 U	--	--	--	0.08 U	0.02 U	--
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	0.01 U	0.01 U	--	0.01 U	0.01 U	--	--	--	0.01 U	0.01 U	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	0.03 U	--	--	--	--	--	--	--	0.03 U	0.02 U	--	0.03 U	0.02 U	--	--	--	0.03 U	0.02 U	--
Benzo(g,h,i)perylene	0.2	µg/L	0.06 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.06 U	0.02 U	--	0.06 U	0.02 U	--	--	--	0.06 U	0.02 U	--
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	--
Chrysene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	--
Dibenzo(a,h)anthracene	0.2	µg/L	0.09 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.09 U	0.02 U	--	0.09 U	0.02 U	--	--	--	0.09 U	0.02 U	--
Fluoranthene	0.41	µg/L	0.12 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.12 U	0.02 U	--	0.12 U	0.02 U	--	--	--	0.12 U	0.02 U	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-34D								OW07-34S			OW07-37					OW07-38S		
			Sample ID	OW07- 34D	OW07-34(D)	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07- 34S	OW07-34S	OW07-34S	OW07- 37	OW07-37	GW-DUP3	OW07-37	OW07-37	OW07- 38S	OW07-38S	OW07-38S
			Start Depth (m)	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	1.55	1.55	1.55	3.10	3.10	3.13	3.13	3.10	1.79	1.79	1.79
			End Depth (m)	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	4.60	4.60	4.60	6.17	6.17	6.17	6.17	6.17	4.84	4.84	4.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
			Sample Date	29 Mar 2007	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	27 Feb 2020	29 Mar 2007	01 Sep 2017	27 Feb 2020	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	06 Sep 2017	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																				
Fluorene	120	µg/L	0.09 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.09 U	0.02 U	--	0.09 U	0.02 U	--	--	--	0.09 U	0.02 U	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	**0.04**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	**0.03**	0.02 U	--	0.03 U	0.02 U	--	--	--	0.03 U	0.02 U	--
Naphthalene	7	µg/L	0.12 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.12 U	0.05 U	--	0.12 U	0.05 U	--	--	--	0.12 U	0.05 U	--
Phenanthrene	1	µg/L	0.11 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	--	0.11 U	0.02 U	--	0.11 U	0.02 U	--	--	--	0.11 U	0.02 U	--
Pyrene	4.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.02 U	--	0.05 U	0.02 U	--	--	--	0.05 U	0.02 U	--
PCBs																						
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	0.1 U	--	--	--	--	--	--	--	0.1 U	0.04 U	--	0.1 U	--	--	--	--	0.1 U	0.04 U	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	100 U	--	--	--	--	--	25 U	--	100 U	25 U	--	100 U	25 U	--	--	--	100 U	25 U	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	100 U	--	--	--	--	--	25 U	--	100 U	25 U	--	100 U	25 U	--	--	--	100 U	25 U	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	100 U	--	--	100 U	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	--	--	--	--	100 U	--	100 U	100 U	--	100 U	100 U	--	--	--	100 U	100 U	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	250 U	--	--	250 U	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	500 U	--	--	--	--	--	250 U	--	500 U	250 U	--	500 U	250 U	--	--	--	500 U	250 U	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	130 U	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	130 U	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	500 U	--	--	--	--	--	250 U	--	500 U	250 U	--	500 U	250 U	--	--	--	500 U	250 U	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	370 U	--	--	370 U	--	--	370 U	--	--	--	--	--	--	--
SVOCs																						
2-Hexanone	NV	µg/L	0.3 U	--	--	--	--	--	--	--	0.3 U	--	--	0.3 U	--	--	--	--	0.3 U	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	0.2 U	5 U	--	0.2 U	--	--	--	--	0.2 U	--	--	0.2 U	--	--	--	--	0.2 U	--	--	--
Chloromethane	NV	µg/L	0.4 U	2.5 U	--	0.5 U	--	--	--	--	0.4 U	--	--	0.4 U	--	--	--	--	0.4 U	--	--	--
Perylene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	**4.5**	0.5 U	0.25 U	**0.23**	**0.38**	0.2 U	0.5 U	0.5 U	0.3 U	**1.19**	**1.03**	**4.1**	0.5 U	--	--	0.5 U	0.3 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	--	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	**9.5**	**1.3**	**0.91**	**0.88**	**1.4**	**0.64**	0.5 U	0.5 U	0.3 U	**2.11**	**1.07**	**1.2**	0.5 U	--	--	0.5 U	0.3 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	--	--	0.71 U	0.28 U	0.57 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	0.3 U	25 U	13 U	5 U	10 U	10 U	20 U	20 U	0.3 U	20 U	20 U	0.3 U	20 U	--	--	20 U	0.3 U	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	--	25 U	13 U	5 U	10 U	5 U	20 U	20 U	--	20 U	20 U	--	20 U	--	--	20 U	--	20 U	20 U
Acetone	2700	µg/L	0.5 U	50 U	25 U	10 U	20 U	10 U	30 U	30 U	0.5 U	30 U	30 U	0.5 U	30 U	--	--	30 U	0.5 U	30 U	30 U
Bromodichloromethane	16	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.5 U	2 U	2 U	0.2 U	2 U	2 U	0.2 U	2 U	--	--	2 U	0.2 U	2 U	2 U
Bromoform	5	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	1 U	5 U	5 U	0.1 U	5 U	5 U	0.1 U	5 U	--	--	5 U	0.1 U	5 U	5 U
Bromomethane	0.89	µg/L	0.2 U	2.5 U	1.3 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.1 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	--	1 U	0.5 U	0.2 U	0.4 U	0.5 U	2 U	2 U	--	2 U	2 U	--	2 U	--	--	2 U	--	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW07-34D								OW07-34S			OW07-37					OW07-38S		
			Sample ID	OW07- 34D	OW07-34(D)	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07-34D	OW07- 34S	OW07-34S	OW07-34S	OW07- 37	OW07-37	GW-DUP3	OW07-37	OW07-37	OW07- 38S	OW07-38S	OW07-38S
			Start Depth (m)	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	1.55	1.55	1.55	3.10	3.10	3.13	3.13	3.10	1.79	1.79	1.79
			End Depth (m)	9.17	9.17	9.17	9.17	9.17	9.17	9.17	9.17	4.60	4.60	4.60	6.17	6.17	6.17	6.17	6.17	4.84	4.84	4.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
			Sample Date	29 Mar 2007	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	27 Feb 2020	29 Mar 2007	01 Sep 2017	27 Feb 2020	29 Mar 2007	06 Sep 2017	27 Mar 2019	27 Mar 2019	03 Mar 2020	29 Mar 2007	06 Sep 2017	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	1 U	1 U	0.2 U	1 U	1 U	0.2 U	1 U	--	--	1 U	0.2 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**0.93**	**0.92**	**0.98**	**0.89**	**0.98**	**0.97**	**0.85**	**0.57**	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.3 U	0.3 U	0.3 U	0.2 U	0.3 U	0.3 U	0.2 U	0.3 U	--	--	0.3 U	0.2 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	--	--	1.3 U	--	1 U	1 U	2 U	2 U	--	2 U	2 U	--	2 U	--	--	2 U	--	2 U	2 U
Dichloromethane	26	µg/L	0.3 U	2.5 U	1.3 U	0.5 U	1 U	2 U	5 U	5 U	0.3 U	5 U	5 U	0.3 U	5 U	--	--	5 U	0.3 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	2 U	2 U	0.2 U	2 U	2 U	0.2 U	2 U	--	--	2 U	0.2 U	2 U	2 U
n-Hexane	5	µg/L	--	--	1.3 U	--	1 U	1 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	0.5 U	--	--	0.5 U	--	0.5 U	0.5 U
Styrene	5.4	µg/L	0.1 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.1 U	0.5 U	0.25 U	0.1 U	0.2 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	0.1 U	0.5 U	--	--	0.5 U	0.1 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.2 U	0.5 U	0.25 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	1 U	0.5 U	0.2 U	0.4 U	0.4 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	--	--	0.3 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	**0.97**	**0.7**	**0.5**	**0.46**	**0.55**	**0.32**	0.5 U	0.5 U	**0.52**	0.5 U	0.5 U	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	0.4 U	1 U	0.5 U	0.2 U	0.4 U	0.5 U	5 U	5 U	0.4 U	5 U	5 U	0.4 U	5 U	--	--	5 U	0.4 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.17 U	1 U	0.5 U	0.2 U	0.4 U	0.2 U	0.5 U	0.5 U	0.17 U	0.5 U	0.5 U	0.17 U	0.5 U	--	--	0.5 U	0.17 U	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW09-I											OW09-II							
			Sample ID	OW9-I	OW9-I	OW 9-I	OW 9-I	OW9-I	OW9-I	OW9-I	OW9-I	OW9-1	OW9-I	OW09-I	OW9-II	OW9-II	OW 9-II	OW 9-II	OW9-II	OW9-II	OW9-11	OW9-II
			Start Depth (m)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
			End Depth (m)	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015	24 Oct 2016	30 Aug 2017	28 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015
Analyte	**Table 6 SCS [a]**	**Unit**																				
ABNs																						
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.5	µg/L	0.1 U	1 U	0.2 U	**0.27**	0.2 U	0.25 U	2.5 U	1 U	**0.25**	0.5 U	0.5 U	**4.5**	**3.4**	**2.8**	**3.9**	**3.4**	**3.3**	**3.6**	**3.3**
Ethylbenzene	2.4	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
Toluene	24	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.2 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
Xylene, o	NV	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.3 U	0.3 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
Xylenes, m & p	NV	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.4 U	0.4 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
Xylenes, Total	72	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
Chlorophenyls																						
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	**340000**	**390000**	**420000**	--	--	--	--	--	--	--	--	**370000**	**350000**	**340000**	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	**1000**	**2100**	**2800**	--	--	--	--	--	--	--	--	**1700**	**2000**	**1900**	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	**250000**	**400000**	**320000**	**400000**	**340000**	**390000**	**420000**	--	--	--	--	**370000**	**360000**	**350000**	**320000**	**380000**	**350000**	**340000**	--
Ammonia	NV	µg/L	--	--	--	--	**61**	50 U	**72**	--	--	--	--	--	--	--	--	**390**	**310**	**420**	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	**14000**	**16000**	**19000**	--	--	--	--	--	--	--	--	**9300**	**8500**	**7800**	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.5**	**0.85**	**0.63**	**0.85**	**0.69**	**0.75**	**0.83**	--	--	**0.784**	--	**0.78**	**0.9**	**0.78**	**0.89**	**0.94**	**0.93**	**0.94**	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	**380000**	**430000**	**460000**	--	--	--	--	--	--	--	--	**440000**	**440000**	**440000**	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
pH	NV	pH UNITS	**7.74**	**7.43**	**7.66**	**7.3**	**7.5**	**7.76**	**7.85**	--	--	**7.35**	--	**7.43**	**7.37**	**7.48**	**7.35**	**7.67**	**7.78**	**7.78**	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	**13000**	**56000**	**22000**	**45000**	**32000**	**24000**	**34000**	--	--	--	--	**48000**	**84000**	**58000**	**93000**	**70000**	**75000**	**78000**	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	**400000**	**440000**	**490000**	--	--	--	--	--	--	--	--	**550000**	**550000**	**560000**	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	6	µg/L	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
Arsenic	25	µg/L	1 U	**1.1**	1 U	**1**	--	--	--	--	--	1 U	--	**16**	**23**	**20**	**22**	--	--	--	--
Barium	1000	µg/L	--	--	--	--	--	--	--	--	--	**101**	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			OW09-I											OW09-II							
Location																					
Sample ID			OW9-I	OW9-I	OW 9-I	OW 9-I	OW9-I	OW9-I	OW9-I	OW9-I	OW9-1	OW9-I	OW09-I	OW9-II	OW9-II	OW 9-II	OW 9-II	OW9-II	OW9-II	OW9-11	OW9-II
Start Depth (m)			1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
End Depth (m)			4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Sample Date			24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015	24 Oct 2016	30 Aug 2017	28 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
Boron	5000	µg/L	--	--	--	--	--	--	--	--	--	**110**	--	--	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	--	--	**0.21**	--	--	--	--	--	--	--	--	--
Calcium	NV	µg/L	**81000**	**140000**	**110000**	**140000**	**120000**	**140000**	**150000**	--	--	--	--	**120000**	**130000**	**130000**	**130000**	**140000**	**130000**	**130000**	--
Chromium	50	µg/L	--	--	--	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	--	--	**1.7**	--	--	--	--	--	--	--	--	--
Copper	69	µg/L	--	--	--	--	20 U	20 U	20 U	--	--	2 U	--	--	--	--	--	20 U	20 U	20 U	--
Lead	10	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.5 U	--	**4.2**	**10**	**16**	**11**	--	--	--	--
Magnesium	NV	µg/L	**16000**	**24000**	**19000**	**25000**	**19000**	**21000**	**22000**	--	--	--	--	**23000**	**28000**	**26000**	**27000**	**25000**	**25000**	**25000**	--
Molybdenum	70	µg/L	--	--	--	--	--	--	--	--	--	**0.54**	--	--	--	--	--	--	--	--	--
Nickel	100	µg/L	--	--	--	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--
Selenium	10	µg/L	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
Sodium	490000	µg/L	**2800**	**5900**	**3500**	**9900**	**3300**	**4600**	**4400**	--	--	**7500**	--	**10000**	**21000**	**13000**	**23000**	**29000**	**32000**	**36000**	--
Thallium	2	µg/L	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Uranium	20	µg/L	--	--	--	--	--	--	--	--	--	**0.46**	--	--	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--
Zinc	890	µg/L	**660**	**1800**	**1500**	**2000**	**1900**	**2500**	**2600**	**1700**	**2600**	**1180**	--	**530**	**710**	**690**	**690**	**720**	**690**	**680**	**610**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	1000 U	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	**1900**	**2300**	**2400**	**1900**	--	--	--	--	--	--	--	**940**	**820**	**850**	**830**	--	--	--	--
Iron	NV	µg/L	--	--	--	--	**100**	**310**	**240**	--	--	--	--	--	--	--	--	**4400**	**4400**	**4500**	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	**110**	**830**	**700**	--	--	--	--	--	--	--	--	**180**	**190**	**190**	--
Potassium	NV	µg/L	**1800**	**5700**	**3800**	**6600**	**4000**	**5000**	**5000**	--	--	--	--	**4400**	**5200**	**4200**	**4800**	**5000**	**5000**	**5000**	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	**2400**	**6700**	**2400**	**14000**	**3500**	**3100**	**4300**	--	--	**11500**	--	**13000**	**34000**	**16000**	**41000**	**40000**	**48000**	**57000**	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	--	--	--	--	--	--	0.028 U	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Anthracene	1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW09-I											OW09-II							
			Sample ID	OW9-I	OW9-I	OW 9-I	OW 9-I	OW9-I	OW9-I	OW9-I	OW9-I	OW9-1	OW9-I	OW09-I	OW9-II	OW9-II	OW 9-II	OW 9-II	OW9-II	OW9-II	OW9-11	OW9-II
			Start Depth (m)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
			End Depth (m)	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015	24 Oct 2016	30 Aug 2017	28 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015
Analyte	**Table 6 SCS** [a]	**Unit**																				
Fluorene	120	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Naphthalene	7	µg/L	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--
PCBs																						
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	100 U	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U	**200**	250 U	--	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	100 U	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	370 U	--	--	--	--	--	--	--	--	--	--
SVOCs																						
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	--	5 U	--	--	--	--	0.2 U	1 U	0.4 U	0.2 U	0.4 U	--	2 U	--	--
Chloromethane	NV	µg/L	0.5 U	5 U	1 U	1.3 U	1 U	--	13 U	--	--	--	--	0.5 U	2.5 U	1 U	0.5 U	1 U	--	5 U	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.4 U	0.5 U	2 U	1 U	
1,1,1-Trichloroethane	23	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,1,2-Trichloroethane	0.5	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,1-Dichloroethane	5	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
1,1-Dichloroethene	0.5	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
1,2-Dibromoethane	0.2	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,2-Dichlorobenzene	3	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,2-Dichloroethane	0.5	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,2-Dichloropropane	0.58	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
1,3-Dichlorobenzene	59	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,3-Dichloropropene	0.5	µg/L	--	--	--	--	--	0.71 U	--	2.8 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.71 U	--	1.4 U	
1,4-Dichlorobenzene	0.5	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	5 U	50 U	10 U	13 U	10 U	13 U	130 U	50 U	10 U	20 U	20 U	5 U	25 U	10 U	5 U	10 U	13 U	50 U	25 U	
4-Methyl-2-Pentanone	640	µg/L	5 U	50 U	10 U	13 U	10 U	13 U	130 U	50 U	5 U	20 U	20 U	5 U	25 U	10 U	5 U	10 U	13 U	50 U	25 U	
Acetone	2700	µg/L	10 U	100 U	20 U	25 U	20 U	25 U	250 U	100 U	10 U	30 U	30 U	10 U	50 U	20 U	10 U	20 U	25 U	100 U	50 U	
Bromodichloromethane	16	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.5 U	2 U	2 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
Bromoform	5	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	1 U	5 U	5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	
Bromomethane	0.89	µg/L	0.5 U	5 U	1 U	1.3 U	1 U	1.3 U	13 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	1 U	0.5 U	1 U	1.3 U	5 U	2.5 U	
Carbon tetrachloride	0.2	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
Chlorobenzene	30	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U	
Chlorodibromomethane	25	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	2 U	2 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW09-I											OW09-II							
			Sample ID	OW9-I	OW9-I	OW 9-I	OW 9-I	OW9-I	OW9-I	OW9-I	OW9-I	OW9-1	OW9-I	OW09-I	OW9-II	OW9-II	OW 9-II	OW 9-II	OW9-II	OW9-II	OW9-11	OW9-II
			Start Depth (m)	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	1.79	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
			End Depth (m)	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	4.84	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015	24 Oct 2016	30 Aug 2017	28 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	24 Oct 2013	22 Oct 2014	18 Nov 2015
Analyte	**Table 6 SCS** [a]	**Unit**																				
Chloroform	2	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	1 U	1 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
cis-1,2-Dichloroethene	1.6	µg/L	0.1 U	1 U	0.2 U	**7.4**	0.2 U	0.25 U	2.5 U	1 U	**4.6**	**2.29**	0.5 U	**8.5**	**6.6**	**7.3**	**7.1**	**9**	**9.1**	**8.5**	**6.7**
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.3 U	0.3 U	0.3 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
Dichlorodifluoromethane	590	µg/L	0.5 U	--	1 U	1.3 U	--	1.3 U	--	5 U	1 U	2 U	2 U	0.5 U	--	1 U	0.5 U	--	1.3 U	--	2.5 U
Dichloromethane	26	µg/L	0.5 U	5 U	1 U	1.3 U	1 U	1.3 U	13 U	5 U	2 U	5 U	5 U	0.5 U	2.5 U	1 U	0.5 U	1 U	1.3 U	5 U	2.5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	2 U	2 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
n-Hexane	5	µg/L	0.5 U	--	1 U	1.3 U	--	1.3 U	--	5 U	1 U	0.5 U	0.5 U	0.5 U	--	1 U	0.5 U	--	1.3 U	--	2.5 U
Styrene	5.4	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
Tetrachloroethene	0.5	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.1 U	1 U	0.2 U	0.25 U	0.2 U	0.25 U	2.5 U	1 U	0.5 U	0.5 U	0.5 U	**0.13**	0.5 U	0.2 U	0.1 U	0.2 U	0.25 U	1 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.4 U	0.3 U	0.3 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
Trichloroethylene	0.5	µg/L	0.1 U	1 U	0.2 U	**0.98**	0.2 U	0.25 U	2.5 U	1 U	**1.4**	**0.74**	0.5 U	**0.31**	0.5 U	**0.29**	**0.17**	**0.26**	0.25 U	1 U	0.5 U
Trichlorofluoromethane	150	µg/L	0.2 U	2 U	0.4 U	0.5 U	0.4 U	0.5 U	5 U	2 U	0.5 U	5 U	5 U	0.2 U	1 U	0.4 U	0.2 U	0.4 U	0.5 U	2 U	1 U
Vinyl Chloride	0.5	µg/L	0.2 U	2 U	0.4 U	**2.2**	0.4 U	0.5 U	5 U	2 U	**0.76**	**0.55**	0.5 U	**4.3**	**4**	**3.7**	**6.7**	**6.8**	**8.9**	**9.9**	**11**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location						**OW10**					**OW11-I**								
		Sample ID	OW9-11	OW9-II	OW9-II	OW9-11	OW09-II	OW10	OW 10	OW 10	OW10	OW10	OW11-1	OW 11-I	OW 11-I	DUP2	OW11-I	OW11-I	OW11-II	OW 11-II	OW 11-II
		Start Depth (m)	6.33	6.33	6.33	6.33	6.33	1.80	1.80	1.80	1.80	1.80	1.60	1.60	1.60	1.60	1.60	1.60	6.28	6.28	6.28
		End Depth (m)	7.85	7.85	7.85	7.85	7.85	4.85	4.85	4.85	4.85	4.85	4.65	4.65	4.65	4.65	4.65	4.65	7.80	7.80	7.80
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
		Sample Date	24 Oct 2016	30 Aug 2017	20 Mar 2018	13 Apr 2018	28 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	30 Aug 2017	03 Mar 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	01 Sep 2017	01 Sep 2017	25 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	**3**	**3.27**	--	--	**2.2**	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Ethylbenzene	2.4	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Toluene	24	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Xylene, o	NV	µg/L	0.2 U	0.3 U	--	--	0.3 U	0.1 U	0.1 U	0.1 U	0.3 U	0.3 U	0.1 U	0.1 U	0.1 U	0.3 U	0.3 U	0.3 UJ	--	--	--
Xylenes, m & p	NV	µg/L	0.2 U	0.4 U	--	--	0.4 U	0.1 U	0.1 U	0.1 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.4 U	0.4 U	0.4 UJ	--	--	--
Xylenes, Total	72	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	**340000**	**280000**	**330000**	--	--	**410000**	**360000**	**340000**	--	--	--	**380000**	**320000**	**310000**
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	**0.877**	--	--	--	**0.78**	**0.68**	**0.95**	**0.703**	--	**0.77**	**0.68**	**0.69**	**0.591**	**0.594**	--	**0.73**	**0.67**	**0.94**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	100 U	100 U	100 U	--	--	**160**	100 U	100 U	--	--	--	100 U	100 U	100 U
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	10 U	10 U	10 U	--	--	**14**	10 U	10 U	--	--	--	10 U	10 U	10 U
pH	NV	pH UNITS	--	**7.36**	--	--	--	**7.64**	**7.68**	**7.54**	**7.58**	--	**7.58**	**7.48**	**7.68**	**7.6**	**7.61**	--	**7.52**	**7.71**	**7.61**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	10 U	**11**	**14**	--	--	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	**96000**	**91000**	**190000**	--	--	**29000**	**17000**	**30000**	--	--	--	**26000**	**27000**	**30000**
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	0.1 U	0.1 U	0.1 U	--	--	--	--	0.1 U	--	--	--	--	**0.13**	**0.13**	--	--	--	--
Arsenic	25	µg/L	--	**24.3**	**17.9**	**21.4**	--	1 U	**1**	1 U	**1.29**	--	1 U	1 U	1 U	**0.19**	**0.18**	--	1 U	1 U	1 U
Barium	1000	µg/L	--	**152**	**135**	**154**	--	--	--	--	**40.1**	--	--	--	--	**46.5**	**46.4**	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location								OW10					OW11-I								
Sample ID			OW9-11	OW9-II	OW9-II	OW9-11	OW09-II	OW10	OW 10	OW 10	OW10	OW10	OW11-1	OW 11-I	OW 11-I	DUP2	OW11-I	OW11-I	OW11-II	OW 11-II	OW 11-II
Start Depth (m)			6.33	6.33	6.33	6.33	6.33	1.80	1.80	1.80	1.80	1.80	1.60	1.60	1.60	1.60	1.60	1.60	6.28	6.28	6.28
End Depth (m)			7.85	7.85	7.85	7.85	7.85	4.85	4.85	4.85	4.85	4.85	4.65	4.65	4.65	4.65	4.65	4.65	7.80	7.80	7.80
Sample Type			N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
Sample Date			24 Oct 2016	30 Aug 2017	20 Mar 2018	13 Apr 2018	28 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	30 Aug 2017	03 Mar 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	01 Sep 2017	01 Sep 2017	25 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011
Analyte	**Table 6 SCS [a]**	**Unit**																			
Beryllium	4	µg/L	--	0.1 U	0.1 U	0.1 U	--	--	--	--	0.1 U	--	--	--	--	0.1 U	0.1 U	--	--	--	--
Boron	5000	µg/L	--	**83**	**76**	**72**	--	--	--	--	**55**	--	--	--	--	**80**	**80**	--	--	--	--
Cadmium	2.1	µg/L	--	0.01 U	0.01 U	0.01 U	--	--	--	--	0.01 U	--	--	--	--	**0.1**	**0.099**	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	--	**130000**	**120000**	**180000**	--	--	**110000**	**110000**	**110000**	--	--	--	**110000**	**95000**	**100000**
Chromium	50	µg/L	--	0.5 U	0.5 U	0.5 U	--	--	--	--	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	--	--
Cobalt	3.8	µg/L	--	**0.48**	**0.46**	**0.47**	--	--	--	--	**0.28**	--	--	--	--	0.1 U	0.1 U	--	--	--	--
Copper	69	µg/L	--	0.2 U	0.2 U	0.2 U	--	--	--	--	0.2 U	--	--	--	--	**1.53**	**1.52**	--	--	--	--
Lead	10	µg/L	--	**9.41**	**2.38**	**14.3**	--	0.5 U	0.5 U	0.5 U	0.05 U	--	**1.1**	**2.5**	**2**	**7.69**	**8.09**	--	**2.4**	**3.2**	**5.3**
Magnesium	NV	µg/L	--	--	--	--	--	**22000**	**22000**	**30000**	--	--	**33000**	**32000**	**31000**	--	--	--	**32000**	**28000**	**29000**
Molybdenum	70	µg/L	--	**2.23**	**2**	**1.82**	--	--	--	--	**0.267**	--	--	--	--	**0.172**	**0.165**	--	--	--	--
Nickel	100	µg/L	--	**5.1**	**4.81**	**4.96**	--	--	--	--	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	--	--
Selenium	10	µg/L	--	**0.059**	**0.074**	**0.073**	--	--	--	--	**0.19**	--	--	--	--	**2.14**	**2.26**	--	--	--	--
Silver	1.2	µg/L	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Sodium	490000	µg/L	--	**15300**	**12200**	**13700**	--	**6100**	**4200**	**4500**	**6230**	--	**4900**	**3600**	**4200**	**2900**	**3000**	--	**4300**	**9600**	**63000**
Thallium	2	µg/L	--	**0.13**	**0.11**	**0.109**	--	--	--	--	0.01 U	--	--	--	--	**0.065**	**0.062**	--	--	--	--
Uranium	20	µg/L	--	**1.46**	**1.11**	**1.18**	--	--	--	--	**0.714**	--	--	--	--	**1.38**	**1.25**	--	--	--	--
Vanadium	6.2	µg/L	--	0.5 U	0.5 U	0.5 U	--	--	--	--	0.5 U	--	--	--	--	0.5 U	0.5 U	--	--	--	--
Zinc	890	µg/L	**670**	**639**	**581**	**601**	--	**8.3**	**70**	**7.5**	**39.4**	--	**57**	**68**	**98**	**55.8**	**56.9**	--	**510**	**430**	**530**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	1000 U	1000 U	1000 U	--	--	1000 U	1000 U	1000 U	--	--	--	1000 U	1000 U	1000 U
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	**490**	**520**	**570**	--	--	**150**	**160**	**210**	--	--	--	**260**	**300**	**900**
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	**3200**	**3500**	**4900**	--	--	**800**	**1300**	**2000**	--	--	--	**1700**	**1800**	**3500**
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	1 U	--	--	--	--	--	--	1 U	--	--	--	--	1 U	1 U	--	--	--	--
Chloride (Cl)	790000	µg/L	--	**33000**	--	--	--	**3500**	**2000**	**2100**	**6620**	--	**2400**	**2000**	**1800**	**2920**	**3030**	--	**3600**	**12000**	**95000**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	0.01 U	--	--	--	--	--	--	0.01 U	--	--	--	--	0.01 U	0.01 U	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.028 U	--	--	--	--	--	--	0.028 U	--	--	--	--	0.028 U	0.028 U	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Acenaphthene	4.1	µg/L	--	0.02 U	--	--	--	--	--	--	**0.196**	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Acenaphthylene	1	µg/L	--	0.02 U	--	--	--	--	--	--	**0.032**	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Anthracene	1	µg/L	--	0.02 U	--	--	--	--	--	--	**0.03 J**	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	0.01 U	--	--	--	--	--	--	0.01 U	--	--	--	--	0.01 U	0.01 U	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Chrysene	0.1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Fluoranthene	0.41	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location						OW10					OW11-I								
		Sample ID	OW9-11	OW9-II	OW9-II	OW9-11	OW09-II	OW10	OW 10	OW 10	OW10	OW10	OW11-1	OW 11-I	OW 11-I	DUP2	OW11-I	OW11-I	OW11-II	OW 11-II	OW 11-II
		Start Depth (m)	6.33	6.33	6.33	6.33	6.33	1.80	1.80	1.80	1.80	1.80	1.60	1.60	1.60	1.60	1.60	1.60	6.28	6.28	6.28
		End Depth (m)	7.85	7.85	7.85	7.85	7.85	4.85	4.85	4.85	4.85	4.85	4.65	4.65	4.65	4.65	4.65	4.65	7.80	7.80	7.80
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
		Sample Date	24 Oct 2016	30 Aug 2017	20 Mar 2018	13 Apr 2018	28 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	30 Aug 2017	03 Mar 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	01 Sep 2017	01 Sep 2017	25 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	--	0.02 U	--	--	--	--	--	--	**0.084**	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Naphthalene	7	µg/L	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Phenanthrene	1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
Pyrene	4.1	µg/L	--	0.02 U	--	--	--	--	--	--	0.02 U	--	--	--	--	0.02 U	0.02 U	--	--	--	--
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	--	--	--	100 U	100 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	--	--	--	100 U	100 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	100 U	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	100 U	--	--	--	--	--	--	100 U	--	--	--	--	100 U	100 U	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	--	--	--	100 U	100 U	100 U	100 U	--	100 U	100 U	100 U	100 U	100 U	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	250 U	--	--	--	--	--	--	250 U	--	--	--	--	250 U	250 U	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	200 U	250 U	--	--	--	100 U	100 U	100 U	250 U	--	100 U	100 U	100 U	250 U	250 U	--	--	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	100 U	--	--	--	--	100 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	200 U	250 U	--	--	--	100 U	100 U	100 U	250 U	--	100 U	100 U	100 U	250 U	250 U	--	--	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	370 U	--	--	--	--	--	--	370 U	--	--	--	--	370 U	370 U	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	0.2 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,1,1-Trichloroethane	23	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,1-Dichloroethane	5	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,1-Dichloroethene	0.5	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	--	--	--
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,2-Dichloropropane	0.58	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 U	--	--	--	0.5 U	0.5 U	--	--	--	0.5 U	0.5 U	0.5 UJ	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	10 U	20 U	--	--	20 U	5 U	5 U	5 U	20 U	20 U	5 U	5 U	5 U	20 U	20 U	20 UJ	--	--	--
4-Methyl-2-Pentanone	640	µg/L	5 U	20 U	--	--	20 U	5 U	5 U	5 U	20 U	20 U	5 U	5 U	5 U	20 U	20 U	20 UJ	--	--	--
Acetone	2700	µg/L	10 U	30 U	--	--	30 U	10 U	10 U	10 U	30 U	30 U	10 U	10 U	10 U	30 U	30 U	30 UJ	--	--	--
Bromodichloromethane	16	µg/L	0.5 U	2 U	--	--	2 U	0.1 U	0.1 U	0.1 U	2 U	2 U	0.1 U	0.1 U	0.1 U	2 U	2 U	2 UJ	--	--	--
Bromoform	5	µg/L	1 U	5 U	--	--	5 U	0.2 U	0.2 U	0.2 U	5 U	5 U	0.2 U	0.2 U	0.2 U	5 U	5 U	5 UJ	--	--	--
Bromomethane	0.89	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	--	--	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 UJ	--	--	--
Chlorobenzene	30	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Chlorodibromomethane	25	µg/L	0.5 U	2 U	--	--	2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	2 UJ	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location						**OW10**						**OW11-I**						
		Sample ID	OW9-11	OW9-II	OW9-II	OW9-11	OW09-II	OW10	OW 10	OW 10	OW10	OW10	OW11-1	OW 11-I	OW 11-I	DUP2	OW11-I	OW11-I	OW11-II	OW 11-II	OW 11-II
		Start Depth (m)	6.33	6.33	6.33	6.33	6.33	1.80	1.80	1.80	1.80	1.80	1.60	1.60	1.60	1.60	1.60	1.60	6.28	6.28	6.28
		End Depth (m)	7.85	7.85	7.85	7.85	7.85	4.85	4.85	4.85	4.85	4.85	4.65	4.65	4.65	4.65	4.65	4.65	7.80	7.80	7.80
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N
		Sample Date	24 Oct 2016	30 Aug 2017	20 Mar 2018	13 Apr 2018	28 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	30 Aug 2017	03 Mar 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011	01 Sep 2017	01 Sep 2017	25 Feb 2020	24 Mar 2010	16 Jun 2011	20 Sep 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Chloroform	2	µg/L	0.2 U	1 U	--	--	1 U	0.1 U	0.1 U	0.1 U	**1.6**	1 U	0.1 U	0.1 U	0.1 U	1 U	1 U	1 UJ	--	--	--
cis-1,2-Dichloroethene	1.6	µg/L	**6.6**	**6.54**	--	--	**6.51**	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	--	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 UJ	--	--	--
Dichlorodifluoromethane	590	µg/L	1 U	2 U	--	--	2 U	0.5 U	0.5 U	0.5 U	2 U	2 U	0.5 U	0.5 U	0.5 U	2 U	2 U	2 UJ	--	--	--
Dichloromethane	26	µg/L	2 U	5 U	--	--	5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	5 UJ	--	--	--
Methyl tert-butyl ether (MTBE)	15	µg/L	0.5 U	2 U	--	--	2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	2 UJ	--	--	--
n-Hexane	5	µg/L	1 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Styrene	5.4	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Tetrachloroethene	0.5	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
trans-1,3-Dichloropropene	NV	µg/L	0.4 U	0.3 U	--	--	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 UJ	--	--	--
Trichloroethylene	0.5	µg/L	0.2 U	0.5 U	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	--	--	--
Trichlorofluoromethane	150	µg/L	0.5 U	5 U	--	--	5 U	0.2 U	0.2 U	0.2 U	5 U	5 U	0.2 U	0.2 U	0.2 U	5 U	5 U	5 UJ	--	--	--
Vinyl Chloride	0.5	µg/L	**8**	**7.48**	--	--	**6.07**	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW11-II						OW12							OW13					
			Sample ID	DUP3	OW11-II	OW11-II	OW11-11	DUP3	OW11-II	OW12	OW12	OW 12	OW 12	OW12	OW12	OW12	OW13	OW13	OW 13	OW 13	OW13-II	OW13
			Start Depth (m)	6.28	6.28	6.28	6.28	6.28	6.28	1.76	1.76	1.76	1.76	1.76	1.76	1.76	6.48	6.48	6.48	6.48	6.48	6.48
			End Depth (m)	7.80	7.80	7.80	7.80	7.80	7.80	4.81	4.81	4.81	4.81	4.81	4.81	4.81	8.00	8.00	8.00	8.00	8.00	8.00
			Sample Type	FD	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	01 Sep 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	25 Feb 2020	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	05 Sep 2017	20 Mar 2018	25 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	30 Aug 2017
Analyte	**Table 6 SCS [a]**	**Unit**																				
ABNs																						
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.57 U
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.4 U
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2 U
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
BTEX																						
Benzene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	**0.14**	--	0.5 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
Toluene	24	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.5 U
Xylene, o	NV	µg/L	0.3 U	0.3 U	--	--	0.3 UJ	0.3 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.3 U	0.3 U	0.3 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.3 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	--	--	0.4 UJ	0.4 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.4 U	0.4 U	0.4 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.4 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
Chlorophenyls																						
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.3 U
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
Chemistry																						
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	--	--	**370000**	**340000**	**340000**	**310000**	--	--	--	**290000**	**320000**	**290000**	**340000**	--	--
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.822**	**0.819**	--	--	--	--	**0.7**	**0.66**	**0.65**	**0.64**	**0.589**	--	--	**0.7**	**0.82**	**0.67**	**0.8**	--	**0.784**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	--	--	**840**	**230**	**310**	**120**	--	--	--	100 U	100 U	100 U	100 U	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	--	--	**15**	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	10 U	--	--
pH	NV	pH UNITS	**7.6**	**7.57**	--	--	--	--	**7.47**	**7.71**	**7.66**	**7.62**	**7.51**	--	--	**7.51**	**7.55**	**7.6**	**7.5**	--	**7.34**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	10 U	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	--	--	**17000**	**22000**	**13000**	**19000**	--	--	--	**60000**	**87000**	**58000**	**61000**	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	6	µg/L	0.1 U	0.1 U	0.1 U	**0.13**	--	--	--	--	--	--	**0.37**	--	--	--	--	--	--	--	--	1 U
Arsenic	25	µg/L	**1.91**	**1.78**	**2.09**	**0.19**	--	--	1 U	1 U	1 U	1 U	**0.2**	--	--	**11**	**6.7**	**5.5**	**7.9**	--	**16.1**
Barium	1000	µg/L	**140**	**137**	**134**	**37.4**	--	--	--	--	--	--	**44.4**	--	--	--	--	--	--	--	--	**152**

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW11-II						OW12							OW13						
		Sample ID	DUP3	OW11-II	OW11-II	OW11-11	DUP3	OW11-II	OW12	OW12	OW 12	OW 12	OW12	OW12	OW12	OW13	OW13	OW 13	OW 13	OW13-II	OW13
		Start Depth (m)	6.28	6.28	6.28	6.28	6.28	6.28	1.76	1.76	1.76	1.76	1.76	1.76	1.76	6.48	6.48	6.48	6.48	6.48	6.48
		End Depth (m)	7.80	7.80	7.80	7.80	7.80	7.80	4.81	4.81	4.81	4.81	4.81	4.81	4.81	8.00	8.00	8.00	8.00	8.00	8.00
		Sample Type	FD	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	01 Sep 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	25 Feb 2020	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	05 Sep 2017	20 Mar 2018	25 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	30 Aug 2017
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	0.1 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	1 U
Boron	5000	µg/L	**135**	**143**	**123**	**54**	--	--	--	--	--	--	**74**	--	--	--	--	--	--	--	**110**
Cadmium	2.1	µg/L	**0.354**	**0.363**	**0.174**	**0.103**	--	--	--	--	--	--	**1.33**	--	--	--	--	--	--	--	0.1 U
Calcium	NV	µg/L	--	--	--	--	--	--	**110000**	**110000**	**110000**	**110000**	--	--	--	**100000**	**120000**	**110000**	**130000**	--	--
Chromium	50	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	5 U
Cobalt	3.8	µg/L	**5.79**	**5.74**	**1.36**	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	1 U
Copper	69	µg/L	**0.64**	**0.73**	**0.46**	**1.7**	--	--	--	--	--	--	**3.29**	--	--	--	--	--	--	--	2 U
Lead	10	µg/L	**1.68**	**1.6**	**4.08**	**4.76**	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.05 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Magnesium	NV	µg/L	--	--	--	--	--	--	**26000**	**22000**	**23000**	**22000**	--	--	--	**22000**	**25000**	**20000**	**26000**	--	--
Molybdenum	70	µg/L	**1.34**	**1.41**	**1.06**	**0.172**	--	--	--	--	--	--	**0.65**	--	--	--	--	--	--	--	**0.99**
Nickel	100	µg/L	**2.7**	**2.74**	**1.54**	0.5 U	--	--	--	--	--	--	**1.85**	--	--	--	--	--	--	--	5 U
Selenium	10	µg/L	**0.078**	**0.086**	**0.432**	**3.25**	--	--	--	--	--	--	**0.802**	--	--	--	--	--	--	--	0.5 U
Silver	1.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	0.5 U
Sodium	490000	µg/L	**50200**	**48400**	**92700**	**2810**	--	--	**3600**	**4000**	**3100**	**4100**	**2990**	--	--	**12000**	**16000**	**6900**	**13000**	--	**9900**
Thallium	2	µg/L	**0.282**	**0.265**	**0.225**	**0.025**	--	--	--	--	--	--	**0.12**	--	--	--	--	--	--	--	**0.24**
Uranium	20	µg/L	**1.07**	**1.06**	**1.15**	**0.99**	--	--	--	--	--	--	**1.39**	--	--	--	--	--	--	--	**0.74**
Vanadium	6.2	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	5 U
Zinc	890	µg/L	**435**	**435**	**383**	**50.4**	--	--	**94**	**910**	**44**	**510**	**367**	--	--	**1700**	**1900**	**1500**	**1900**	--	**1010**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	**240**	**350**	**230**	**390**	--	--	--	**2300**	**2000**	**2200**	**1900**	--	--
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	--	--	**2300**	**4200**	**2000**	**3200**	--	--	--	**3900**	**4500**	**4100**	**5000**	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	1 U	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	1 U
Chloride (Cl)	790000	µg/L	**66100**	**65600**	--	--	--	--	**2200**	**1700**	**2800**	**2000**	**1840**	--	--	**16000**	**24000**	**11000**	**15000**	--	**10900**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.01 U	0.01 U	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	0.01 U
PAHs																					
1-Methylnaphthalene	NV	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
2-(1-)Methylnaphthalene	3.2	µg/L	0.028 U	0.028 U	--	--	--	--	--	--	--	--	0.028 U	--	--	--	--	--	--	--	0.57 U
2-Methylnaphthalene	NV	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Acenaphthene	4.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Acenaphthylene	1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Anthracene	1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Benzo(a)anthracene	1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	0.01 U
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Chrysene	0.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Fluoranthene	0.41	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**OW11-II**						**OW12**							**OW13**						
		Sample ID	DUP3	OW11-II	OW11-II	OW11-11	DUP3	OW11-II	OW12	OW12	OW 12	OW 12	OW12	OW12	OW12	OW13	OW13	OW 13	OW 13	OW13-II	OW13
		Start Depth (m)	6.28	6.28	6.28	6.28	6.28	6.28	1.76	1.76	1.76	1.76	1.76	1.76	1.76	6.48	6.48	6.48	6.48	6.48	6.48
		End Depth (m)	7.80	7.80	7.80	7.80	7.80	7.80	4.81	4.81	4.81	4.81	4.81	4.81	4.81	8.00	8.00	8.00	8.00	8.00	8.00
		Sample Type	FD	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	01 Sep 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	25 Feb 2020	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	05 Sep 2017	20 Mar 2018	25 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	30 Aug 2017
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Naphthalene	7	µg/L	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	0.05 U
Phenanthrene	1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
Pyrene	4.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	0.02 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	--	--	--	--	--	--	--	--	25 U	--	--	100 U	100 U	100 U	25 U	--	25 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	--	--	--	--	--	--	--	--	25 U	--	--	100 U	100 U	100 U	25 U	--	25 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	100 U	100 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	--	--	--	--	--	--	--	--	100 U	--	--	100 U	100 U	100 U	100 U	--	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	250 U	250 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	250 U
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	250 U	--	--	--	--	--	--	--	--	250 U	--	--	100 U	100 U	100 U	100 U	--	250 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	250 U	--	--	--	--	--	--	--	--	250 U	--	--	100 U	100 U	100 U	100 U	--	250 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	370 U	370 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	370 U
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	0.2 U	0.4 U	0.2 U	0.2 U	--	--	--	0.2 U	1 U	0.4 U	0.2 U	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	0.5 U	1 U	0.5 U	0.5 U	--	--	--	0.5 U	2.5 U	1 U	0.5 U	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
1,1,1-Trichloroethane	23	µg/L	**34.5**	**37.1**	--	--	0.5 UJ	**27.1 J**	**13**	**31**	**6**	**22**	**11.7**	**6.58**	**5.8 J**	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	0.4 U	0.2 U	--	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	0.4 U	0.2 U	--	0.5 U
1,1-Dichloroethane	5	µg/L	**28.1**	**29.5**	--	--	0.5 UJ	**22.6 J**	**1.3**	**3.8**	**0.35**	**2**	**2.26**	**0.83**	**0.91 J**	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
1,1-Dichloroethene	0.5	µg/L	**0.67**	**0.74**	--	--	0.5 UJ	**0.75 J**	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	--	--	0.2 UJ	0.2 UJ	0.2 U	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U	--	--	0.2 U	--	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	0.4 U	0.2 U	--	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	--	--	--	--	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	0.4 U	0.2 U	--	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	--	--	20 UJ	20 UJ	5 U	10 U	5 U	5 U	20 U	20 U	20 UJ	5 U	25 U	10 U	5 U	--	20 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	--	--	20 UJ	20 UJ	5 U	10 U	5 U	5 U	20 U	20 U	20 UJ	5 U	25 U	10 U	5 U	--	20 U
Acetone	2700	µg/L	30 U	30 U	--	--	30 UJ	30 UJ	10 U	20 U	10 U	10 U	30 U	30 U	30 UJ	10 U	50 U	20 U	10 U	--	30 U
Bromodichloromethane	16	µg/L	2 U	2 U	--	--	2 UJ	2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	2 U	2 U	2 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	2 U
Bromoform	5	µg/L	5 U	5 U	--	--	5 UJ	5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	5 U	5 U	5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	5 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	--	--	0.5 U	--	0.5 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	--	--	0.2 UJ	0.2 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 UJ	0.1 U	--	0.2 U	0.1 U	--	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
Chlorodibromomethane	25	µg/L	2 U	2 U	--	--	2 UJ	2 UJ	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 UJ	0.2 U	1 U	0.4 U	0.2 U	--	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW11-II						OW12							OW13					
			Sample ID	DUP3	OW11-II	OW11-II	OW11-11	DUP3	OW11-II	OW12	OW12	OW 12	OW 12	OW12	OW12	OW12	OW13	OW13	OW 13	OW 13	OW13-II	OW13
			Start Depth (m)	6.28	6.28	6.28	6.28	6.28	6.28	1.76	1.76	1.76	1.76	1.76	1.76	1.76	6.48	6.48	6.48	6.48	6.48	6.48
			End Depth (m)	7.80	7.80	7.80	7.80	7.80	7.80	4.81	4.81	4.81	4.81	4.81	4.81	4.81	8.00	8.00	8.00	8.00	8.00	8.00
			Sample Type	FD	N	N	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N
			Sample Date	01 Sep 2017	01 Sep 2017	20 Mar 2018	13 Apr 2018	25 Feb 2020	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	05 Sep 2017	20 Mar 2018	25 Feb 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	30 Aug 2017
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	1 U	1 U	--	--	1 UJ	1 UJ	0.1 U	0.2 U	0.1 U	0.1 U	1 U	1 U	1 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**0.96**	**1.01**	--	--	0.5 UJ	1.4 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.95 U	0.5 U	0.5 UJ	**0.92**	**1.3**	**0.91**	**3**	--	**4.88**
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	--	0.3 UJ	0.3 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.3 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	--	--	2 UJ	2 UJ	0.5 U	--	0.5 U	0.5 U	2 U	2 U	2 UJ	0.5 U	--	1 U	0.5 U	--	2 U
Dichloromethane	26	µg/L	5 U	5 U	--	--	5 UJ	5 UJ	0.5 U	1 U	0.5 U	0.5 U	5 U	5 U	5 UJ	0.5 U	2.5 U	1 U	0.5 U	--	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	--	--	2 UJ	2 UJ	0.2 U	0.4 U	0.2 U	0.2 U	2 U	2 U	2 UJ	0.2 U	1 U	0.4 U	0.2 U	--	2 U
n-Hexane	5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.5 U	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	--	1 U	0.5 U	--	0.5 U
Styrene	5.4	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	**0.13**	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	0.1 U	--	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	0.1 U	0.2 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 UJ	0.1 U	0.5 U	0.2 U	**0.16**	--	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	--	--	0.3 UJ	0.3 UJ	0.2 U	0.4 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 UJ	0.2 U	1 U	0.4 U	0.2 U	--	0.3 U
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	--	--	0.5 UJ	0.5 UJ	**0.22**	**0.41**	**0.11**	**0.43**	0.5 U	0.5 U	0.5 UJ	**1.1**	**1.2**	**0.79**	**1.2**	--	**0.76**
Trichlorofluoromethane	150	µg/L	5 U	5 U	--	--	5 UJ	5 UJ	0.2 U	0.4 U	0.2 U	0.2 U	5 U	5 U	5 UJ	0.2 U	1 U	0.4 U	0.2 U	--	5 U
Vinyl Chloride	0.5	µg/L	**0.77**	**0.87**	--	--	0.5 UJ	**0.86 J**	0.2 U	0.4 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 UJ	0.2 U	1 U	0.4 U	**1.1**	--	**1.2**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				**OW13-39D**							**OW13-39S**								
		Sample ID	OW13	DUP5	OW13	MW13-39D	OW13-39D	MW13-39D	MW13-39D	OW13-39D	DUP6	OW13-39D	MW13-39S	OW13-39S	MW13-39S	MW13-39S	OW13-39S	OW13-39S	OW14	OW14	OW 14
		Start Depth (m)	6.48	6.48	6.48	10.68	10.68	10.68	10.68	10.68	10.68	10.68	3.04	3.04	3.04	3.04	3.04	3.04	6.29	6.29	6.29
		End Depth (m)	8.00	8.00	8.00	12.20	12.20	12.20	12.20	12.20	12.20	12.20	6.09	6.09	6.09	6.09	6.09	6.09	7.81	7.81	7.81
		Sample Type	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
		Sample Date	20 Mar 2018	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	**0.61**	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
Toluene	24	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	1 U	1 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
Xylene, o	NV	µg/L	0.3 U	0.3 U	0.3 U	0.5 U	5 U	5 U	0.4 U	0.3 U	0.3 U	0.3 U	0.2 U	0.5 U	0.5 U	0.2 U	0.3 U	0.3 U	0.1 U	0.1 U	0.2 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	0.4 U	0.5 U	5 U	5 U	0.4 U	0.4 U	0.4 U	0.4 U	0.2 U	0.5 U	0.5 U	0.2 U	0.4 U	0.4 U	0.1 U	0.1 U	0.2 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	**290000**	--	--	--	--	--	--	**400000**	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	**1400**	--	--	--	--	--	--	**1300**	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	**300000**	--	--	--	--	--	--	**410000**	--	--	--	--	**280000**	**310000**	**260000**
Ammonia	NV	µg/L	--	--	--	--	**320**	--	--	--	--	--	--	**130**	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	**2300**	--	--	--	--	--	--	**3800**	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	--	**0.85**	--	--	**0.93**	--	--	--	**0.81**	--	--	**0.761**	--	**0.63**	**0.9**	**0.81**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	**390000**	--	--	--	--	--	--	**410000**	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	100 U	--	--	--	--	--	--	100 U	--	--	--	--	**140**	100 U	100 U
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	**12**	--	--	--	--	--	--	**13**	--	--	--	--	10 U	10 U	10 U
pH	NV	pH UNITS	--	--	--	--	**7.71**	--	--	**7.57**	--	--	--	**7.53**	--	--	**7.51**	--	**7.69**	**7.48**	**7.49**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	10 U	--	--	--	--	--	--	10 U	--	--	--	--	10 U	10 U	10 U
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	**90000**	--	--	--	--	--	--	**26000**	--	--	--	--	**47000**	**160000**	**160000**
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	**480000**	--	--	--	--	--	--	**460000**	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	--	--	--	--	--	--	**0.23**	--	--	--	--	--	--	0.1 U	--	--	--	--
Arsenic	25	µg/L	--	--	--	--	--	--	--	**9.58**	--	--	--	--	--	--	**0.73**	--	1 U	1 U	1 U
Barium	1000	µg/L	--	--	--	--	--	--	--	**283**	--	--	--	--	--	--	**68**	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				**OW13-39D**							**OW13-39S**								
		Sample ID	OW13	DUP5	OW13	MW13-39D	OW13-39D	MW13-39D	MW13-39D	OW13-39D	DUP6	OW13-39D	MW13-39S	OW13-39S	MW13-39S	MW13-39S	OW13-39S	OW13-39S	OW14	OW14	OW 14
		Start Depth (m)	6.48	6.48	6.48	10.68	10.68	10.68	10.68	10.68	10.68	10.68	3.04	3.04	3.04	3.04	3.04	3.04	6.29	6.29	6.29
		End Depth (m)	8.00	8.00	8.00	12.20	12.20	12.20	12.20	12.20	12.20	12.20	6.09	6.09	6.09	6.09	6.09	6.09	7.81	7.81	7.81
		Sample Type	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
		Sample Date	20 Mar 2018	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--	--
Boron	5000	µg/L	--	--	--	--	--	--	--	**251**	--	--	--	--	--	--	**133**	--	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	**0.245**	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	**110000**	--	--	--	--	--	--	**130000**	--	--	--	--	**87000**	**140000**	**130000**
Chromium	50	µg/L	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	**0.74**	--	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	**0.28**	--	--	--	--	--	--	**0.59**	--	--	--	--
Copper	69	µg/L	--	--	--	--	20 U	--	--	0.2 U	--	--	--	20 U	--	--	**0.55**	--	--	--	--
Lead	10	µg/L	--	--	--	--	--	--	--	**3.92**	--	--	--	--	--	--	**0.476**	--	0.5 U	0.5 U	0.5 U
Magnesium	NV	µg/L	--	--	--	--	**28000**	--	--	--	--	--	--	**22000**	--	--	--	--	**27000**	**35000**	**33000**
Molybdenum	70	µg/L	--	--	--	--	--	--	--	**3.82**	--	--	--	--	--	--	**0.563**	--	--	--	--
Nickel	100	µg/L	--	--	--	--	--	--	--	**2.16**	--	--	--	--	--	--	**2.27**	--	--	--	--
Selenium	10	µg/L	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	**0.313**	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--	--
Sodium	490000	µg/L	--	--	--	--	**25000**	--	--	**25000**	--	--	--	**9900**	--	--	**15300**	--	**5400**	**6600**	**6300**
Thallium	2	µg/L	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	**0.06**	--	--	--	--
Uranium	20	µg/L	--	--	--	--	--	--	--	**3.65**	--	--	--	--	--	--	**0.881**	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--	--
Zinc	890	µg/L	--	--	--	--	10 U	--	--	**260**	--	--	--	**600**	--	--	**698**	--	**1300**	**3700**	**2100**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1000 U	1000 U	1000 U
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**3100**	**3900**	**2600**
Iron	NV	µg/L	--	--	--	--	**1700**	--	--	--	--	--	--	**630**	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	**30**	--	--	--	--	--	--	**220**	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	**2000**	--	--	--	--	--	--	**4000**	--	--	--	--	**3000**	**6000**	**4900**
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	1 U	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	--	**40000**	--	--	**44300**	--	--	--	**15000**	--	--	**19300**	--	**11000**	**12000**	**14000**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	0.01 U	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	**0.054**	**0.072**	--	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	--	0.071 U	0.071 U	0.071 U	--	--	--	--	0.071 U	0.071 U	**0.15**	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	--	--	--	--	0.05 U	0.05 U	**0.056**	--	--	--	--	0.05 U	0.05 U	**0.073**	--	--	--	--	--
Acenaphthene	4.1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	**1.4**	**1.2**	**0.85**	--	--	--	--	--
Acenaphthylene	1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Anthracene	1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	**0.052**	**0.069**	--	--	--	--	--
Benzo(a)anthracene	1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	--	--	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--	0.01 U	0.01 U	0.01 U	--	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Chrysene	0.1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Fluoranthene	0.41	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Location						OW13-39D							OW13-39S								
Sample ID			OW13	DUP5	OW13	MW13-39D	OW13-39D	MW13-39D	MW13-39D	OW13-39D	DUP6	OW13-39D	MW13-39S	OW13-39S	MW13-39S	MW13-39S	OW13-39S	OW13-39S	OW14	OW14	OW 14
Start Depth (m)			6.48	6.48	6.48	10.68	10.68	10.68	10.68	10.68	10.68	10.68	3.04	3.04	3.04	3.04	3.04	3.04	6.29	6.29	6.29
End Depth (m)			8.00	8.00	8.00	12.20	12.20	12.20	12.20	12.20	12.20	12.20	6.09	6.09	6.09	6.09	6.09	6.09	7.81	7.81	7.81
Sample Type			N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
Sample Date			20 Mar 2018	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	**0.97**	**1.1**	**0.75**	--	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
Naphthalene	7	µg/L	--	--	--	--	0.05 U	0.05 U	**0.051**	--	--	--	--	0.5 U	0.5 U	0.2 U	--	--	--	--	--
Phenanthrene	1	µg/L	--	--	--	--	**0.035**	0.03 U	0.03 U	--	--	--	--	0.03 U	0.03 U	0.03 U	--	--	--	--	--
Pyrene	4.1	µg/L	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	--	--	--	--	--
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	**180**	**120**	**140**	**312**	--	--	--	25 U	25 U	**42**	**34**	--	100 U	100 U	100 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	**180**	**120**	**140**	**313**	--	--	--	25 U	25 U	**42**	**34**	--	100 U	100 U	100 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	100 U	100 U	100 U	100 U	--	--	--	**150**	100 U	100 U	100 U	--	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	200 U	200 U	200 U	250 U	--	--	--	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	130 U	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	130 U	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	200 U	200 U	200 U	250 U	--	--	--	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	10 U	--	--	--	--	--	--	1 U	--	--	--	--	0.2 U	0.2 U	0.4 U
Chloromethane	NV	µg/L	--	--	--	--	25 U	--	--	--	--	--	--	2.5 U	--	--	--	--	0.5 U	0.5 U	1 U
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	**4.4**	**11**	**8**	**5.2**	**15.2**	**4.94**	**5.02**	**2.1**	**2.5**	**2.4**	**0.79**	**1**	**0.55**	0.1 U	0.1 U	0.2 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	10 U	10 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	14 U	14 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.4 U	1.4 U	0.5 U	0.5 U	0.5 U	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	20 U	25 U	250 U	250 U	20 U	20 U	20 U	20 U	10 U	25 U	25 U	10 U	20 U	20 U	5 U	5 U	10 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	20 U	13 U	250 U	250 U	10 U	20 U	20 U	20 U	5 U	25 U	25 U	5 U	20 U	20 U	5 U	5 U	10 U
Acetone	2700	µg/L	30 U	30 U	30 U	25 U	500 U	500 U	20 U	30 U	30 U	30 U	10 U	50 U	50 U	10 U	30 U	30 U	10 U	10 U	20 U
Bromodichloromethane	16	µg/L	2 U	2 U	2 U	1.3 U	5 U	5 U	1 U	2 U	2 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	2 U	2 U	0.1 U	0.1 U	0.2 U
Bromoform	5	µg/L	5 U	5 U	5 U	2.5 U	10 U	10 U	2 U	5 U	5 U	5 U	1 U	1 U	1 U	1 U	5 U	5 U	0.2 U	0.2 U	0.4 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	25 U	25 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
Chlorodibromomethane	25	µg/L	2 U	2 U	2 U	1.3 U	10 U	10 U	1 U	2 U	2 U	2 U	0.5 U	1 U	1 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.4 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				**OW13-39D**							**OW13-39S**								
		Sample ID	OW13	DUP5	OW13	MW13-39D	OW13-39D	MW13-39D	MW13-39D	OW13-39D	DUP6	OW13-39D	MW13-39S	OW13-39S	MW13-39S	MW13-39S	OW13-39S	OW13-39S	OW14	OW14	OW 14
		Start Depth (m)	6.48	6.48	6.48	10.68	10.68	10.68	10.68	10.68	10.68	10.68	3.04	3.04	3.04	3.04	3.04	3.04	6.29	6.29	6.29
		End Depth (m)	8.00	8.00	8.00	12.20	12.20	12.20	12.20	12.20	12.20	12.20	6.09	6.09	6.09	6.09	6.09	6.09	7.81	7.81	7.81
		Sample Type	N	FD	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
		Sample Date	20 Mar 2018	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	28 Feb 2020	06 Jan 2014	24 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	28 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Chloroform	2	µg/L	1 U	1 U	1 U	0.5 U	5 U	5 U	0.4 U	1 U	1 U	1 U	0.2 U	0.5 U	0.5 U	0.2 U	1 U	1 U	0.1 U	0.1 U	0.2 U
cis-1,2-Dichloroethene	1.6	µg/L	**2.67**	**2.22**	**2.26**	**180**	**280**	**180**	**110**	**192**	**68.4**	**69.9**	**100**	**60**	**69**	**57**	**51.2**	**25.5**	**2.3**	**0.65**	0.2 U
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.3 U	10 U	10 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U	1 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.4 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	2 U	2.5 U	--	25 U	2 U	2 U	2 U	2 U	1 U	--	2.5 U	1 U	2 U	2 U	0.5 U	--	1 U
Dichloromethane	26	µg/L	5 U	5 U	5 U	5 U	25 U	25 U	4 U	5 U	5 U	5 U	2 U	2.5 U	2.5 U	2 U	5 U	5 U	0.5 U	0.5 U	1 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	2 U	1.3 U	10 U	10 U	1 U	2 U	2 U	2 U	0.5 U	1 U	1 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.4 U
n-Hexane	5	µg/L	0.5 U	0.5 U	0.5 U	2.5 U	--	25 U	2 U	0.5 U	0.5 U	0.5 U	1 U	--	2.5 U	1 U	0.5 U	0.5 U	0.5 U	--	1 U
Styrene	5.4	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.4 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.2 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	0.5 U	**9.3**	**15**	**11**	**8.4**	**22.2**	**7.56**	**7.83**	**9.1**	**4.1**	**2.8**	**4**	**4.72**	**1.62**	**0.16**	0.1 U	0.2 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	0.3 U	0.4 U	10 U	10 U	0.4 U	0.3 U	0.3 U	0.3 U	0.4 U	1 U	1 U	0.4 U	0.3 U	0.3 U	0.2 U	0.2 U	0.4 U
Trichloroethylene	0.5	µg/L	**0.75**	**0.5**	0.5 U	**560**	**860**	**770**	**580**	**1290**	**562**	**577**	**130**	**91**	**71**	**120**	**184**	**66.8**	**0.45**	**1.5**	**0.99**
Trichlorofluoromethane	150	µg/L	5 U	5 U	5 U	1.3 U	10 U	10 U	1 U	5 U	5 U	5 U	0.5 U	1 U	1 U	0.5 U	5 U	5 U	0.2 U	0.2 U	0.4 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	0.5 U	**28**	**46**	**26**	**15**	**45.2**	**10.2**	**10.5**	**12**	**12**	**17**	**4**	**2.76**	**3.65**	0.2 U	0.2 U	0.4 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**OW14**				**OW15**		**OW16**									**OW17**					
		Sample ID	OW 14	OW14	OW14	OW14	OW15	OW15	OW16	OW16	OW 16	OW 16	OW16	OW16	OW16	OW16	OW16	OW17	OW17	OW18-I	OW 18-1		
		Start Depth (m)	6.29	6.29	6.29	6.29	1.75	1.75	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.79	1.79	1.81	1.81		
		End Depth (m)	7.81	7.81	7.81	7.81	4.80	4.80	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.84	4.84	4.86	4.86		
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
		Sample Date	20 Sep 2011	30 Aug 2017	21 Mar 2018	27 Feb 2020	05 Sep 2017	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	24 Oct 2014	05 Sep 2017	25 Feb 2020	05 Sep 2017	02 Mar 2020	23 Mar 2010	16 Jun 2011		
Analyte	**Table 6 SCS [a]**	**Unit**																					
ABNs																							
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U		
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
BTEX																							
Benzene	0.5	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	--	0.2 U	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U		
Ethylbenzene	2.4	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	--	0.2 U	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U		
Toluene	24	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.2 U	--	--	0.2 U	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U		
Xylene, o	NV	µg/L	0.1 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	0.2 U	--	--	0.2 U	--	--	--	0.3 U	0.3 UJ	0.3 U	0.3 U	0.1 U	0.1 U		
Xylenes, m & p	NV	µg/L	0.1 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 UJ	0.4 U	--	--	0.4 U	--	--	--	0.4 U	0.4 UJ	0.4 U	0.4 U	0.1 U	0.1 U		
Xylenes, Total	72	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.4 U	--	--	0.4 U	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U		
Chlorophenyls																							
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Chemistry																							
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**320000**	--	**370000**	--	--	--	--	--	--		
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**1300**	--	**1300**	--	--	--	--	--	--		
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Alkalinity, Total (as CaCO3)	NV	µg/L	**410000**	--	--	--	--	--	**330000**	**260000**	**310000**	**280000**	**320000**	**340000**	**370000**	--	--	--	--	**340000**	**360000**		
Ammonia	NV	µg/L	--	--	--	--	--	--	--	--	--	--	50 U	--	**140**	--	--	--	--	--	--		
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**3000**	--	**3700**	--	--	--	--	--	--		
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Electrical Conductivity	NV	mS/cm	**1.1**	**0.86**	--	--	**0.571**	--	**0.64**	**0.93**	**0.62**	**0.77**	**0.61**	**0.62**	**0.69**	**0.532**	--	**0.83**	--	**0.95**	**0.75**		
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**340000**	--	**380000**	--	--	--	--	--	--		
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Nitrate, as NO3	NV	µg/L	100 U	--	--	--	--	--	**200**	**320**	**180**	100 U	**330**	**160**	**190**	--	--	--	--	100 U	100 U		
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	**160**	--	--	--	--	--	--	--		
Nitrite, as NO2	NV	µg/L	10 U	--	--	--	--	--	**12**	10 U	10 U	**36**	10 U	10 U	10 U	--	--	--	--	**12**	10 U		
pH	NV	pH UNITS	**7.32**	**7.38**	--	--	**7.38**	--	**7.51**	**7.64**	**7.54**	**7.43**	**7.62**	**7.89**	**7.57**	**7.42**	--	**7.49**	--	**7.59**	**7.61**		
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U		
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Sulfate	NV	µg/L	**140000**	--	--	--	--	--	**17000**	**91000**	**14000**	**40000**	**13000**	**7600**	**7800**	--	--	--	--	**34000**	**47000**		
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	--	--	--	**350000**	--	**390000**	--	--	--	--	--	--		
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Metals and Hydride Forming Metals																							
Antimony	6	µg/L	--	1 U	--	--	0.1 U	--	--	--	--	--	--	--	--	**0.2**	--	**0.23**	--	--	--		
Arsenic	25	µg/L	**2.2**	1 U	--	--	**2.01**	--	1 U	1 U	1 U	1 U	--	--	--	**0.58**	--	**3.92**	--	1 U	1 U		
Barium	1000	µg/L	--	**94.4**	--	--	**44.7**	--	--	--	--	--	--	--	--	**31.8**	--	**56.2**	--	--	--		

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW14				OW15		OW16									OW17					
		Sample ID	OW 14	OW14	OW14	OW14	OW15	OW15	OW16	OW16	OW 16	OW 16	OW16	OW16	OW16	OW16	OW16	OW17	OW17	OW18-I	OW 18-1		
		Start Depth (m)	6.29	6.29	6.29	6.29	1.75	1.75	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.79	1.79	1.81	1.81		
		End Depth (m)	7.81	7.81	7.81	7.81	4.80	4.80	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.84	4.84	4.86	4.86		
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
		Sample Date	20 Sep 2011	30 Aug 2017	21 Mar 2018	27 Feb 2020	05 Sep 2017	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	24 Oct 2014	05 Sep 2017	25 Feb 2020	05 Sep 2017	02 Mar 2020	23 Mar 2010	16 Jun 2011		
Analyte	**Table 6 SCS** [a]	**Unit**																					
Beryllium	4	µg/L	--	1 U	--	--	0.1 U	--	--	--	--	--	--	--	--	0.1 U	--	0.1 U	--	--	--		
Boron	5000	µg/L	--	**130**	--	--	**76**	--	--	--	--	--	--	--	--	**63**	--	**90**	--	--	--		
Cadmium	2.1	µg/L	--	0.1 U	--	--	**0.016**	--	--	--	--	--	--	--	--	**0.969**	--	**0.013**	--	--	--		
Calcium	NV	µg/L	**170000**	--	--	--	--	--	**110000**	**140000**	**100000**	**120000**	**110000**	--	**120000**	--	--	--	--	**110000**	**120000**		
Chromium	50	µg/L	--	5 U	--	--	0.5 U	--	--	--	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--		
Cobalt	3.8	µg/L	--	1 U	--	--	**0.16**	--	--	--	--	--	--	--	--	**0.93**	--	**1.12**	--	--	--		
Copper	69	µg/L	--	2 U	--	--	0.2 U	--	--	--	--	--	20 U	--	20 U	**8**	--	**0.99**	--	--	--		
Lead	10	µg/L	**1.2**	**0.57**	--	--	**0.275**	--	**2**	**2.4**	**1.6**	**2.6**	--	--	--	**3.25**	--	**0.083**	--	**0.6**	**0.59**		
Magnesium	NV	µg/L	**46000**	--	--	--	--	--	**19000**	**20000**	**17000**	**20000**	**15000**	--	**17000**	--	--	--	--	**27000**	**27000**		
Molybdenum	70	µg/L	--	0.5 U	--	--	**1.56**	--	--	--	--	--	--	--	--	**1.7**	--	**1.34**	--	--	--		
Nickel	100	µg/L	--	5 U	--	--	**1.92**	--	--	--	--	--	--	--	--	**6.7**	--	**1.81**	--	--	--		
Selenium	10	µg/L	--	0.5 U	--	--	**0.076**	--	--	--	--	--	--	--	--	**0.079**	--	**0.188**	--	--	--		
Silver	1.2	µg/L	--	0.5 U	--	--	0.05 U	--	--	--	--	--	--	--	--	0.05 U	--	0.05 U	--	--	--		
Sodium	490000	µg/L	**14000**	5000 U	--	--	**9730**	--	**5300**	**22000**	**6900**	**17000**	**1500**	--	**2200**	**2860**	--	**5090**	--	**39000**	**9000**		
Thallium	2	µg/L	--	0.1 U	--	--	**0.015**	--	--	--	--	--	--	--	--	**0.157**	--	**0.023**	--	--	--		
Uranium	20	µg/L	--	**1.41**	--	--	**0.452**	--	--	--	--	--	--	--	--	**0.826**	--	**1**	--	--	--		
Vanadium	6.2	µg/L	--	5 U	--	--	0.5 U	--	--	--	--	--	--	--	--	0.5 U	--	0.5 U	--	--	--		
Zinc	890	µg/L	**3200**	**1300**	--	--	**87.5**	--	**190**	**200**	**190**	**540**	**180**	--	**260**	**349**	--	**94.1**	--	**1300**	**1100**		
Non-Regulated Metals																							
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Bromide	NV	µg/L	1000 U	--	--	--	--	--	1000 U	**1000**	1000 U	1000 U	--	--	--	--	--	--	--	1000 U	1000 U		
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Fluoride	NV	µg/L	**3500**	--	--	--	--	--	**180**	**150**	**260**	**280**	--	--	--	--	--	--	--	**440**	**370**		
Iron	NV	µg/L	--	--	--	--	--	--	--	--	--	--	20 U	--	20 U	--	--	--	--	--	--		
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Manganese	NV	µg/L	--	--	--	--	--	--	--	--	--	--	10 U	--	10 U	--	--	--	--	--	--		
Potassium	NV	µg/L	**7100**	--	--	--	--	--	**1000**	**1100**	**1400**	**2400**	1000 U	--	**1000**	--	--	--	--	**3900**	**4100**		
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
ORPs																							
Chromium, Hexavalent (Cr6+)	25	µg/L	--	1 U	--	--	1 U	--	--	--	--	--	--	--	--	1 U	--	1 U	--	--	--		
Chloride (Cl)	790000	µg/L	**33000**	**5900**	--	--	**14800**	--	**5400**	**92000**	**7400**	**49000**	**2100**	**1600**	**2000**	**3270**	--	**2550**	--	**94000**	**5300**		
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Mercury	0.1	µg/L	--	0.01 U	--	--	0.01 U	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	--	--		
PAHs																							
1-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	**0.025**	--	0.05 U	0.05 U		
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.028 U	--	--	0.028 U	--	--	--	--	--	--	--	--	0.028 U	--	0.028 U	--	--	--		
2-Methylnaphthalene	NV	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Acenaphthene	4.1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	**0.062**	--	0.05 U	0.05 U		
Acenaphthylene	1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Anthracene	1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Benzo(a)anthracene	1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Benzo(a)pyrene	0.01	µg/L	--	0.01 U	--	--	0.01 U	--	--	--	--	--	--	--	--	0.01 U	--	0.01 U	--	**0.013**	0.01 U		
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U	0.05 U		
Benzo(b)fluoranthene	0.1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	--	--		
Benzo(g,h,i)perylene	0.2	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.1 U	0.1 U		
Benzo(k)fluoranthene	0.1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Chrysene	0.1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		
Dibenzo(a,h)anthracene	0.2	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.1 U	0.1 U		
Fluoranthene	0.41	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U		

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW14				OW15		OW16									OW17				
		Sample ID	OW 14	OW14	OW14	OW14	OW15	OW15	OW16	OW16	OW 16	OW 16	OW16	OW16	OW16	OW16	OW16	OW17	OW17	OW18-I	OW 18-1
		Start Depth (m)	6.29	6.29	6.29	6.29	1.75	1.75	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.79	1.79	1.81	1.81
		End Depth (m)	7.81	7.81	7.81	7.81	4.80	4.80	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.84	4.84	4.86	4.86
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	20 Sep 2011	30 Aug 2017	21 Mar 2018	27 Feb 2020	05 Sep 2017	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	24 Oct 2014	05 Sep 2017	25 Feb 2020	05 Sep 2017	02 Mar 2020	23 Mar 2010	16 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.1 U	0.1 U
Naphthalene	7	µg/L	--	0.05 U	--	--	0.05 U	--	--	--	--	--	--	--	--	0.05 U	--	0.06 U	--	0.05 U	0.05 U
Phenanthrene	1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.03 U	0.03 U
Pyrene	4.1	µg/L	--	0.02 U	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	0.02 U	--	0.05 U	0.05 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	0.04 U	--	--	--	--	--	--	--	--	0.04 U	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	--	--	25 U	--	100 U	--	--	25 U	--	--	--	25 U	--	25 U	--	100 U	100 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	--	--	25 U	--	100 U	--	--	25 U	--	--	--	25 U	--	25 U	--	100 U	100 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--	100 U	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	100 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	--	--	100 U	--	100 U	100 U	100 U	100 U	--	--	--	100 U	--	100 U	--	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	250 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	100 U	250 U	--	--	250 U	--	100 U	100 U	100 U	100 U	--	--	--	250 U	--	250 U	--	100 U	100 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--	100 U	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	130 U	--	--	--	--	--	--	--	--	130 U	--	130 U	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	130 U	--	--	--	--	--	--	--	--	130 U	--	130 U	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	100 U	250 U	--	--	250 U	--	100 U	100 U	100 U	100 U	--	--	--	250 U	--	250 U	--	100 U	100 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	370 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U
Chloromethane	NV	µg/L	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U
1,1,1-Trichloroethane	23	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	**0.15**	**0.16**
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,1,2-Trichloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,1-Dichloroethane	5	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U
1,1-Dichloroethene	0.5	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	--	--	--	--	--	--	--	0.2 U	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,2-Dichloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,2-Dichloropropane	0.58	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U
1,3-Dichlorobenzene	59	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,3-Dichloropropene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	--	--
1,4-Dichlorobenzene	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
1,4-Dioxane	50	µg/L	--	20 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	5 U	20 U	20 U	20 U	20 U	20 UJ	--	--	--	--	--	--	--	20 U	20 UJ	20 U	20 U	5 U	5 U
4-Methyl-2-Pentanone	640	µg/L	5 U	20 U	20 U	20 U	20 U	20 UJ	--	--	--	--	--	--	--	20 U	20 UJ	20 U	20 U	5 U	5 U
Acetone	2700	µg/L	10 U	30 U	30 U	30 U	30 U	30 UJ	--	--	--	--	--	--	--	30 U	30 UJ	30 U	30 U	10 U	10 U
Bromodichloromethane	16	µg/L	0.1 U	2 U	2 U	2 U	2 U	2 UJ	--	--	--	--	--	--	--	2 U	2 UJ	2 U	2 U	0.1 U	0.1 U
Bromoform	5	µg/L	0.2 U	5 U	5 U	5 U	5 U	5 UJ	--	--	--	--	--	--	--	5 U	5 UJ	5 U	5 U	0.2 U	0.2 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	--	--	--	--	--	--	--	0.2 U	0.2 UJ	0.2 U	0.2 U	0.1 U	0.1 U
Chlorobenzene	30	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.1 U	0.1 U
Chlorodibromomethane	25	µg/L	0.2 U	2 U	2 U	2 U	2 U	2 UJ	--	--	--	--	--	--	--	2 U	2 UJ	2 U	2 U	0.2 U	0.2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	**OW14**				**OW15**		**OW16**										**OW17**				
		Sample ID	OW 14	OW14	OW14	OW14	OW15	OW15	OW16	OW16	OW 16	OW 16	OW16	OW16	OW16	OW16	OW16	OW17	OW17	OW18-I	OW 18-1
		Start Depth (m)	6.29	6.29	6.29	6.29	1.75	1.75	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.79	1.79	1.81	1.81
		End Depth (m)	7.81	7.81	7.81	7.81	4.80	4.80	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.84	4.84	4.86	4.86
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	20 Sep 2011	30 Aug 2017	21 Mar 2018	27 Feb 2020	05 Sep 2017	25 Feb 2020	23 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	12 Dec 2012	24 Oct 2013	24 Oct 2014	05 Sep 2017	25 Feb 2020	05 Sep 2017	02 Mar 2020	23 Mar 2010	16 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Chloroform	2	µg/L	0.1 U	1 U	1 U	1 U	1 U	1 UJ	--	--	--	--	--	--	--	1 U	1 UJ	1 U	1 U	0.1 U	0.1 U
cis-1,2-Dichloroethene	1.6	µg/L	**3.6**	**0.98**	0.5 U	**11.1**	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	**3**	**0.28**
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	--	--	--	--	--	--	--	0.3 U	0.3 UJ	0.3 U	0.3 U	0.2 U	0.2 U
Dichlorodifluoromethane	590	µg/L	0.5 U	2 U	2 U	2 U	2 U	2 UJ	--	--	--	--	--	--	--	2 U	2 UJ	2 U	2 U	0.5 U	0.5 U
Dichloromethane	26	µg/L	0.5 U	5 U	5 U	5 U	5 U	5 UJ	--	--	--	--	--	--	--	5 U	5 UJ	5 U	5 U	0.5 U	0.5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	2 U	2 U	2 U	2 U	2 UJ	--	--	--	--	--	--	--	2 U	2 UJ	2 U	2 U	0.2 U	0.2 U
n-Hexane	5	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U
Tetrachloroethene	0.5	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	**0.14**	**0.11**
trans-1,2-Dichloroethene	1.6	µg/L	**0.29**	0.5 U	0.5 U	**0.89**	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	**0.47**	0.1 U
trans-1,3-Dichloropropene	NV	µg/L	0.2 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 UJ	--	--	--	--	--	--	--	0.3 U	0.3 UJ	0.3 U	0.3 U	0.2 U	0.2 U
Trichloroethylene	0.5	µg/L	**1.6**	**2.08**	**0.85**	**1.25**	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	**20**	**9.5**
Trichlorofluoromethane	150	µg/L	0.2 U	5 U	5 U	5 U	5 U	5 UJ	--	--	--	--	--	--	--	5 U	5 UJ	5 U	5 U	0.2 U	0.2 U
Vinyl Chloride	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	--	--	--	--	--	--	--	0.5 U	0.5 UJ	0.5 U	0.5 U	0.2 U	0.2 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW18-I								OW18-II										
			Sample ID	OW 18-I	OW18-I	OW18-I	OW18-I	OW18-I	OW18-1	OW18-I	OW18-I	OW18-II	OW 18-II	OW 18-II	OW18-II	OW18-II	OW18-II	OW18-II	OW18-11	OW18-II	DUP8	OW18-II
			Start Depth (m)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32
			End Depth (m)	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	24 Oct 2016	29 Aug 2017	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	25 Oct 2016	29 Aug 2017	02 Mar 2020	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**																				
ABNs																						
1,1'-Biphenyl	0.5	µg/L	--	--	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	0.05 U	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.5	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	**2.9**	**2.5**	**1.7**	**2.4**	**2.8**	**2.8**	**2.9**	**2.3**	**2.44**	**1.96**	**2.09**
Ethylbenzene	2.4	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
Toluene	24	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.2 U	0.5 U	0.5 U	0.5 U
Xylene, o	NV	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.3 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.4 U	0.4 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
Chlorophenyls																						
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	**390000**	**390000**	**410000**	--	--	--	--	--	--	--	**390000**	**390000**	**400000**	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	**1500**	**1400**	**1200**	--	--	--	--	--	--	--	**2000**	**1600**	**1400**	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	**320000**	**390000**	**390000**	**420000**	--	--	--	--	**380000**	**370000**	**370000**	**390000**	**390000**	**400000**	--	--	--	--	--	--
Ammonia	NV	µg/L	--	**53**	50 U	50 U	--	--	--	--	--	--	--	**280**	**220**	**280**	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	**2200**	**1900**	**2500**	--	--	--	--	--	--	--	**5100**	**5100**	**5000**	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.83**	**0.72**	**0.73**	**0.78**	--	--	**0.787**	--	**0.94**	**0.86**	**0.89**	**0.85**	**0.86**	**0.86**	--	--	**0.849**	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	**390000**	**390000**	**410000**	--	--	--	--	--	--	--	**440000**	**430000**	**430000**	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	**200**	100 U	100 U	100 U	--	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--
pH	NV	pH UNITS	**7.49**	**7.62**	**7.59**	**7.5**	--	--	**7.34**	--	**7.47**	**7.81**	**7.59**	**7.75**	**7.64**	**7.56**	--	--	**7.34**	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	**760**	10 U	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	**19000**	**18000**	**9400**	**15000**	--	--	--	--	**100000**	**75000**	**76000**	**55000**	**49000**	**45000**	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	**420000**	**410000**	**440000**	--	--	--	--	--	--	--	**500000**	**500000**	**490000**	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	6	µg/L	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--
Arsenic	25	µg/L	1 U	--	--	--	--	--	1 U	--	**5.3**	**1.3**	**7.4**	--	--	--	--	--	--	**9.91**	--	--
Barium	1000	µg/L	--	--	--	--	--	--	**52.8**	--	--	--	--	--	--	--	--	--	--	**226**	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW18-I								OW18-II										
			Sample ID	OW 18-I	OW18-I	OW18-I	OW18-I	OW18-I	OW18-1	OW18-I	OW18-I	OW18-II	OW 18-II	OW 18-II	OW18-II	OW18-II	OW18-II	OW18-II	OW18-11	OW18-II	DUP8	OW18-II
			Start Depth (m)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32
			End Depth (m)	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	24 Oct 2016	29 Aug 2017	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	25 Oct 2016	29 Aug 2017	02 Mar 2020	02 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**																				
Beryllium	4	µg/L	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	0.1 U	--	--
Boron	5000	µg/L	--	--	--	--	--	--	**140**	--	--	--	--	--	--	--	--	--	--	**125**	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	**0.44**	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--
Calcium	NV	µg/L	**100000**	**120000**	**120000**	**120000**	--	--	--	--	**130000**	**130000**	**130000**	**130000**	**130000**	**130000**	--	--	--	--	--
Chromium	50	µg/L	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	**1.27**	--	--
Copper	69	µg/L	--	20 U	20 U	20 U	--	--	2 U	--	--	--	--	20 U	20 U	20 U	--	--	--	**0.26**	--	--
Lead	10	µg/L	**1.9**	--	--	--	--	--	**1.08**	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	**0.209**	--	--
Magnesium	NV	µg/L	**20000**	**23000**	**22000**	**24000**	--	--	--	--	**33000**	**29000**	**30000**	**27000**	**27000**	**26000**	--	--	--	--	--	--
Molybdenum	70	µg/L	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	**1.65**	--	--
Nickel	100	µg/L	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--	--	**4.81**	--	--
Selenium	10	µg/L	--	--	--	--	--	--	**0.62**	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--
Sodium	490000	µg/L	**47000**	**7900**	**4500**	**7400**	--	--	**6900**	--	**19000**	**16000**	**18000**	**16000**	**14000**	**13000**	--	--	**9620**	--	--
Thallium	2	µg/L	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	**0.078**	--	--
Uranium	20	µg/L	--	--	--	--	--	--	**0.58**	--	--	--	--	--	--	--	--	--	--	**3.58**	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	5 U	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--
Zinc	890	µg/L	**1300**	**1100**	**1100**	**900**	**1700**	**1600**	**1720**	--	**960**	**860**	**820**	**820**	**910**	**850**	**850**	**1000**	**787**	--	--
Non-Regulated Metals																						
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	1000 U	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	**500**	--	--	--	--	--	--	--	**780**	**690**	**760**	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	--	20 U	20 U	20 U	--	--	--	--	--	--	--	**2300**	**2600**	**2400**	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	**70**	**60**	**60**	--	--	--	--	--	--	--	**50**	**40**	**50**	--	--	--	--	--	--
Potassium	NV	µg/L	**4400**	**4000**	**4000**	**4000**	--	--	--	--	**5500**	**5300**	**5800**	**6000**	**5000**	**5000**	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	1 U	--	--	--
Chloride (Cl)	790000	µg/L	**56000**	**5600**	**2500**	**3900**	--	--	**5500**	--	**22000**	**22000**	**20000**	**20000**	**18000**	**17000**	--	--	**11200**	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.071 U	0.071 U	0.071 U	0.071 U	0.071 U	0.028 U	--	--	--	--	0.071 U	0.071 U	0.071 U	0.071 U	0.071 U	0.028 U	--	--	--
2-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.054**	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Acenaphthene	4.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Acenaphthylene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Benzo(a)anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.011**	0.01 U	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Chrysene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--
Fluoranthene	0.41	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW18-I								OW18-II										
			Sample ID	OW 18-I	OW18-I	OW18-I	OW18-I	OW18-I	OW18-1	OW18-I	OW18-I	OW18-II	OW 18-II	OW 18-II	OW18-II	OW18-II	OW18-II	OW18-II	OW18-11	OW18-II	DUP8	OW18-II
			Start Depth (m)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32
			End Depth (m)	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	24 Oct 2016	29 Aug 2017	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	25 Oct 2016	29 Aug 2017	02 Mar 2020	02 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**																				
Fluorene	120	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--
Naphthalene	7	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.055**	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--
Phenanthrene	1	µg/L	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	--	--
Pyrene	4.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--
PCBs																						
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	100 U	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	100 U	100 U	100 U	100 U	100 U	100 U	**210**	100 U	100 U	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--	250 U	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U	100 U	200 U	**200**	200 U	200 U	250 U	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	370 U	--	--	--	--	--	--	--	--	--	370 U	--	--
SVOCs																						
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	1 U	0.2 U	--	0.2 U	--	--	--	--	1 U	1 U	1 U	1 U	--	2 U	--	--	--	--	--	--
Chloromethane	NV	µg/L	2.5 U	0.5 U	--	0.5 U	--	--	--	--	2.5 U	2.5 U	2.5 U	2.5 U	--	5 U	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	**0.16**	**0.15**	**0.16**	**0.15**	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.75 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	0.5	µg/L	**1.1**	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	**1.9**	**1.7**	**0.79**	**1.3**	**1.9**	**2**	**1.7**	**1.6**	**1.39**	**1.88**	**1.85**
1,2-Dibromoethane	0.2	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	--	--	0.28 U	0.28 U	0.28 U	0.5 U	0.5 U	0.5 U	--	--	--	--	2.8 U	2.8 U	1.4 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	25 U	5 U	5 U	5 U	5 U	10 U	20 U	20 U	25 U	25 U	25 U	25 U	50 U	50 U	25 U	10 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	25 U	5 U	5 U	5 U	5 U	5 U	20 U	20 U	25 U	25 U	25 U	25 U	50 U	50 U	25 U	5 U	20 U	20 U	20 U
Acetone	2700	µg/L	50 U	10 U	10 U	10 U	10 U	10 U	30 U	30 U	50 U	50 U	50 U	50 U	100 U	100 U	50 U	10 U	30 U	30 U	30 U
Bromodichloromethane	16	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	2 U	2 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.5 U	2 U	2 U	2 U
Bromoform	5	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	5 U	5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	1 U	5 U	5 U	5 U
Bromomethane	0.89	µg/L	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	2 U	2 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	2 U	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW18-I								OW18-II										
			Sample ID	OW 18-I	OW18-I	OW18-I	OW18-I	OW18-I	OW18-1	OW18-I	OW18-I	OW18-II	OW 18-II	OW 18-II	OW18-II	OW18-II	OW18-II	OW18-II	OW18-11	OW18-II	DUP8	OW18-II
			Start Depth (m)	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32	6.32
			End Depth (m)	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84	7.84
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	24 Oct 2016	29 Aug 2017	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	24 Oct 2014	20 Nov 2015	25 Oct 2016	29 Aug 2017	02 Mar 2020	02 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**																				
Chloroform	2	µg/L	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**42**	**0.71**	**0.84**	**0.57**	**0.33**	**9.1**	**4.2**	**0.54**	**130**	**110**	**79**	**110**	**120**	**130**	**130**	**110**	**93.2**	**98.6**	**105**
cis-1,3-Dichloropropene	NV	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	2.5 U	--	0.5 U	--	0.5 U	1 U	2 U	2 U	2.5 U	2.5 U	2.5 U	--	5 U	--	2.5 U	1 U	2 U	2 U	2 U
Dichloromethane	26	µg/L	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2 U	5 U	5 U	2.5 U	2.5 U	2.5 U	2.5 U	5 U	5 U	2.5 U	2 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	2 U	2 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	2 U	2 U	2 U
n-Hexane	5	µg/L	2.5 U	--	0.5 U	--	0.5 U	1 U	0.5 U	0.5 U	2.5 U	2.5 U	2.5 U	--	5 U	--	2.5 U	1 U	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.1 U	**0.11**	**0.14**	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1 U	1 U	0.5 U	0.2 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	**7.3**	0.1 U	0.1 U	0.1 U	0.1 U	**2.1**	**1.06**	0.5 U	**3.1**	**2.7**	**1.7**	**2.7**	**3.1**	**3.1**	**2.4**	**3.3**	**2.57**	**2.61**	**2.42**
trans-1,3-Dichloropropene	NV	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.4 U	0.3 U	0.3 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.4 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	**110**	**13**	**13**	**12**	**9.7**	**44**	**13**	**7.65**	**2.7**	**3.3**	**1**	**1.4**	**2.3**	**2.1**	**1.1**	**2.1**	**2.7**	**10.3**	**9.68**
Trichlorofluoromethane	150	µg/L	1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	5 U	5 U	1 U	1 U	1 U	1 U	2 U	2 U	1 U	0.5 U	5 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	**6.6**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	**48**	**33**	**19**	**26**	**45**	**42**	**46**	**34**	**35**	**31.7**	**33.5**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW19												OW22D						
			Sample ID	OW19	OW 19	OW 19	OW19	OW19	OW19	OW19	OW19	OW19	OW19	DUP9	OW19	OW22-D	OW 22 (D)	OW 22(D)	OW22(D)	OW22(D)	OW22(D)	OW22D
			Start Depth (m)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	6.71	6.71	6.71	6.71	6.71	6.71	6.71
			End Depth (m)	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.47	7.47	7.47	7.47	7.47	7.47	7.47
			Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	23 Mar 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	22 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	21 Mar 2018	02 Mar 2020	02 Mar 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015
Analyte	**Table 6 SCS [a]**	**Unit**																				
ABNs																						
1,1'-Biphenyl	0.5	µg/L	--	0.05 U	--	--	--	0.05 U	--	--	--	--	--	--	--	0.05 U	--	--	--	0.05 U	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.5	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	**2.2**	**2.3**	**2.2**	**1.3**	**1.7**	**1.5**	**1.1**
Ethylbenzene	2.4	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U
Toluene	24	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylene, o	NV	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylenes, m & p	NV	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.4 U	0.4 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.4 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.4 U	0.4 U	0.4 U	0.4 U
Chlorophenyls																						
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	**380000**	**450000**	**390000**	--	--	--	--	--	--	--	--	--	--	**380000**	**370000**	**370000**	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	1000 U	1000 U	**1400**	--	--	--	--	--	--	--	--	--	--	**1900**	**1400**	**2400**	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	**310000**	**240000**	**480000**	**380000**	**450000**	**390000**	--	--	--	--	--	--	**490000**	**430000**	**370000**	**380000**	**370000**	**380000**	--
Ammonia	NV	µg/L	--	--	--	**120**	**120**	**110**	--	--	--	--	--	--	--	--	--	**720**	**650**	**700**	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	**6700**	**5200**	**4900**	--	--	--	--	--	--	--	--	--	**6700**	**6800**	**6700**	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.8**	**1.1**	**0.89**	**0.82**	**0.94**	**0.96**	--	--	**0.777**	--	--	--	**1.8**	**1.7**	**1.8**	**1.7**	**1.7**	**1.7**	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	**450000**	**500000**	**540000**	--	--	--	--	--	--	--	--	--	**990000**	**920000**	**970000**	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--
pH	NV	pH UNITS	**7.24**	**7.46**	**7.2**	**7.34**	**7.31**	**7.58**	--	--	**7.37**	--	--	--	**7.47**	**7.53**	**7.59**	**7.72**	**7.61**	**7.83**	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	**130000**	**380000**	**3800**	**64000**	**72000**	**150000**	--	--	--	--	--	--	**570000**	**540000**	**680000**	**550000**	**510000**	**520000**	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	**490000**	**560000**	**610000**	--	--	--	--	--	--	--	--	--	**1200000**	**1200000**	**1200000**	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	6	µg/L	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Arsenic	25	µg/L	1 U	1 U	1 U	--	--	--	--	--	**1.38**	--	--	--	**8.4**	**4.9**	**3.3**	--	--	--	--	--
Barium	1000	µg/L	--	--	--	--	--	--	--	--	**101**	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW19											OW22D						
			Sample ID	OW19	OW 19	OW 19	OW19	OW19	OW19	OW19	OW19	OW19	OW19	DUP9	OW19	OW22-D	OW 22 (D)	OW 22(D)	OW22(D)	OW22(D)	OW22(D)	OW22D
			Start Depth (m)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	6.71	6.71	6.71	6.71	6.71	6.71	6.71
			End Depth (m)	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.47	7.47	7.47	7.47	7.47	7.47	7.47
			Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	23 Mar 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	22 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	21 Mar 2018	02 Mar 2020	02 Mar 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015
Analyte	**Table 6 SCS** [a]	**Unit**																				
Beryllium	4	µg/L	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--
Boron	5000	µg/L	--	--	--	--	--	--	--	--	**91**	--	--	--	--	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	µg/L	**170000**	**190000**	**150000**	**150000**	**170000**	**180000**	--	--	--	--	--	--	**370000**	**330000**	**340000**	**330000**	**310000**	**330000**	--
Chromium	50	µg/L	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	--	**2.22**	--	--	--	--	--	--	--	--	--	--	--
Copper	69	µg/L	--	--	--	20 U	20 U	20 U	--	--	0.2 U	--	--	--	--	--	--	--	20 U	20 U	20 U	--
Lead	10	µg/L	**0.97**	0.5 U	0.5 U	--	--	--	--	--	**0.37**	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--
Magnesium	NV	µg/L	**30000**	**27000**	**29000**	**20000**	**21000**	**20000**	--	--	--	--	--	--	**44000**	**38000**	**40000**	**39000**	**34000**	**35000**	--	--
Molybdenum	70	µg/L	--	--	--	--	--	--	--	--	**0.945**	--	--	--	--	--	--	--	--	--	--	--
Nickel	100	µg/L	--	--	--	--	--	--	--	--	**10.1**	--	--	--	--	--	--	--	--	--	--	--
Selenium	10	µg/L	--	--	--	--	--	--	--	--	**0.063**	--	--	--	--	--	--	--	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--
Sodium	490000	µg/L	**8300**	**2100**	**7000**	**3800**	**3600**	**2900**	--	--	**4490**	--	--	--	**21000**	**35000**	**22000**	**23000**	**27000**	**20000**	--	--
Thallium	2	µg/L	--	--	--	--	--	--	--	--	**0.01**	--	--	--	--	--	--	--	--	--	--	--
Uranium	20	µg/L	--	--	--	--	--	--	--	--	**1.96**	--	--	--	--	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--
Zinc	890	µg/L	**4500**	**2600**	**640**	**1800**	**1900**	**2500**	**3700**	**2700**	**1360**	--	--	--	**41**	**42**	**29**	**20**	**30**	10 U	--	
Non-Regulated Metals																						
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	--	--	1000 U	1000 U	2000 U	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	**580**	**630**	**660**	--	--	--	--	--	--	--	--	--	**2300**	**2100**	**2200**	--	--	--	--	--
Iron	NV	µg/L	--	--	--	**2100**	**2500**	**1600**	--	--	--	--	--	--	--	--	--	**2500**	**2100**	**1800**	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	**600**	**480**	**480**	--	--	--	--	--	--	--	--	--	**150**	**140**	**150**	--	--
Potassium	NV	µg/L	**2800**	**1900**	**7300**	**2000**	**4000**	**3000**	--	--	--	--	--	--	**7500**	**7400**	**6900**	**7000**	**6000**	**6000**	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	**4800**	**4000**	**1900**	**5800**	**2100**	**1900**	--	--	**4370**	--	--	--	**35000**	**60000**	**35000**	**35000**	**42000**	**36000**	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	**0.11**	0.05 U	**0.28**	0.05 U	**0.25**	--	--	--	**0.071**	0.05 U	0.05 U	0.05 U	**0.055**	0.05 U	0.05 U	
2-(1-)Methylnaphthalene	3.2	µg/L	--	--	--	0.071 U	**0.11**	--	**0.33**	0.071 U	**0.277**	--	--	--	--	--	--	0.071 U	0.071 U	--	0.071 U	
2-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.053**	0.05 U	**0.027**	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Acenaphthene	4.1	µg/L	0.05 U	0.05 U	**0.071**	**0.24**	**0.61**	**0.33**	**0.21**	**0.059**	**0.247**	--	--	--	**0.13**	**0.11**	**0.1**	**0.13**	**0.21**	**0.16**	**0.17**	
Acenaphthylene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.035 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	**0.055**	0.05 U	**0.11**	0.05 U	0.065 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Benzo(a)anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	
Benzo(g,h,i)perylene	0.2	µg/L	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Chrysene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Dibenzo(a,h)anthracene	0.2	µg/L	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Fluoranthene	0.41	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW19											OW22D						
			Sample ID	OW19	OW 19	OW 19	OW19	OW19	OW19	OW19	OW19	OW19	OW19	DUP9	OW19	OW22-D	OW 22 (D)	OW 22(D)	OW22(D)	OW22(D)	OW22(D)	OW22D
			Start Depth (m)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	6.71	6.71	6.71	6.71	6.71	6.71	6.71
			End Depth (m)	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.47	7.47	7.47	7.47	7.47	7.47	7.47
			Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	23 Mar 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	22 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	21 Mar 2018	02 Mar 2020	02 Mar 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015
Analyte	**Table 6 SCS [a]**	**Unit**																				
Fluorene	120	µg/L	0.05 U	0.05 U	0.05 U	**0.14**	**0.49**	**0.19**	0.5 U	**0.096**	**0.352**	--	--	--	**0.093**	**0.061**	**0.06**	0.05 U	**0.11**	**0.07**	**0.082**
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Naphthalene	7	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 U	**0.071**	0.05 U	0.075 U	--	--	--	**0.058**	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.091**	0.03 U	0.075 U	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Pyrene	4.1	µg/L	0.05 U	0.05 U	**0.057**	0.05 U	**0.065**	**0.065**	**0.052**	0.05 U	**0.051**	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
PCBs																						
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	100 U	100 U	**53**	--	--	--	--	--	25 U	--	--	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	100 U	100 U	**53**	--	--	--	--	--	25 U	--	--	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	100 U	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	**130**	**110**	--	--	--	--	--	100 U	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	100 U	**280**	100 U	--	--	--	--	--	250 U	--	--	--	100 U	100 U	100 U	100 U	200 U	200 U	200 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	100 U	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	100 U	100 U	100 U	--	--	--	--	--	250 U	--	--	--	100 U	100 U	100 U	100 U	200 U	200 U	200 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																						
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--
Chloroethane	NV	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	--	--	--	--	--
Chloromethane	NV	µg/L	0.5 U	1 U	1.3 U	--	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
1,1,1-Trichloroethane	23	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,1,2-Trichloroethane	0.5	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,1-Dichloroethane	5	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	**0.34**	**0.35**	**0.34**	--	--	--	--	--
1,1-Dichloroethene	0.5	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
1,2-Dibromoethane	0.2	µg/L	0.2 U	--	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,2-Dichlorobenzene	3	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,2-Dichloroethane	0.5	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,2-Dichloropropane	0.58	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
1,3-Dichlorobenzene	59	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,3-Dichloropropene	0.5	µg/L	--	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	5 U	10 U	13 U	--	--	--	--	--	20 U	20 U	20 U	20 U	5 U	5 U	5 U	--	--	--	--	--
4-Methyl-2-Pentanone	640	µg/L	5 U	10 U	13 U	--	--	--	--	--	20 U	20 U	20 U	20 U	5 U	5 U	5 U	--	--	--	--	--
Acetone	2700	µg/L	10 U	20 U	25 U	--	--	--	--	--	30 U	30 U	30 U	30 U	10 U	10 U	10 U	--	--	--	--	--
Bromodichloromethane	16	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	2 U	2 U	2 U	2 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
Bromoform	5	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	5 U	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--
Bromomethane	0.89	µg/L	0.5 U	--	--	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--
Carbon tetrachloride	0.2	µg/L	0.1 U	0.2 U	--	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
Chlorobenzene	30	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--
Chlorodibromomethane	25	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	2 U	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW19												OW22D						
			Sample ID	OW19	OW 19	OW 19	OW19	OW19	OW19	OW19	OW19	OW19	OW19	DUP9	OW19	OW22-D	OW 22 (D)	OW 22(D)	OW22(D)	OW22(D)	OW22(D)	OW22D
			Start Depth (m)	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	6.71	6.71	6.71	6.71	6.71	6.71	6.71
			End Depth (m)	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.82	7.47	7.47	7.47	7.47	7.47	7.47	7.47
			Sample Type	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N
			Sample Date	23 Mar 2010	16 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	22 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	21 Mar 2018	02 Mar 2020	02 Mar 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	1 U	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	--	--	--	--
cis-1,2-Dichloroethene	1.6	µg/L	0.1 U	0.2 U	**8.3**	--	--	--	--	--	**4.06**	0.5 U	0.5 U	0.5 U	**0.29**	**0.33**	**0.42**	--	--	--	--
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	--	--	--	--
Dichlorodifluoromethane	590	µg/L	0.5 U	1 U	1.3 U	--	--	--	--	--	2 U	2 U	2 U	2 U	0.5 U	0.5 U	0.5 U	--	--	--	--
Dichloromethane	26	µg/L	0.5 U	1 U	1.3 U	--	--	--	--	--	5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	--	--	--	--
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	2 U	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	--	--	--	--
n-Hexane	5	µg/L	0.5 U	1 U	1.3 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--
Styrene	5.4	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--
Tetrachloroethene	0.5	µg/L	**0.37**	**0.21**	**0.51**	--	--	--	--	--	**0.91**	**1.14**	**0.79**	**0.83**	0.1 U	0.1 U	0.1 U	--	--	--	--
trans-1,2-Dichloroethene	1.6	µg/L	0.1 U	0.2 U	0.25 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--
trans-1,3-Dichloropropene	NV	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	0.3 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	--	--	--	--
Trichloroethylene	0.5	µg/L	**0.36**	0.2 U	**1.3**	--	--	--	--	--	**0.97**	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--
Trichlorofluoromethane	150	µg/L	0.2 U	0.4 U	0.5 U	--	--	--	--	--	5 U	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	--	--	--	--
Vinyl Chloride	0.5	µg/L	0.2 U	0.4 U	**2.9**	--	--	--	--	--	**1.05**	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location											**OW22S**								
		Sample ID	OW22D	DUP 4	OW22D	OW22D	OW22 (S)	OW 22 (S)	OW 22(S)	OW22(S)	OW22(S)	OW22(S)	OW22S	OW22S	OW22S	OW22S	OW22S	OW22S	OW23(D)	OW23D	OW 23(D)
		Start Depth (m)	6.71	6.71	6.71	6.71	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	6.55	6.55	6.55
		End Depth (m)	7.47	7.47	7.47	7.47	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	7.77	7.77	7.77
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	25 Oct 2016	06 Sep 2017	06 Sep 2017	26 Feb 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015	25 Oct 2016	06 Sep 2017	21 Mar 2018	13 Apr 2018	26 Feb 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	0.05 U
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	**1.4**	**1.35**	**1.39**	**0.86**	0.1 U	0.1 U	**0.27**	0.2 U	0.2 U	0.2 U	0.2 U	**1.1**	0.5 U	0.5 U	--	0.5 U	**1.7**	**2.1**	**1.4**
Ethylbenzene	2.4	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	**7.1**	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
Toluene	24	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.52**	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
Xylene, o	NV	µg/L	0.2 U	0.3 U	0.3 U	0.3 U	0.1 U	0.1 U	**0.11**	0.2 U	0.2 U	0.2 U	0.2 U	**3.1**	0.3 U	0.3 U	--	0.3 U	0.5 U	0.5 U	0.1 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.4 U	0.4 U	0.4 U	0.4 U	**6.2**	0.4 U	0.4 U	--	0.4 U	0.5 U	0.5 U	0.1 U
Xylenes, Total	72	µg/L	0.4 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	**0.11**	0.4 U	0.4 U	0.4 U	0.4 U	**9.3**	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	**220000**	**230000**	**280000**	--	--	--	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	1000 U	1000 U	**1800**	--	--	--	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	**150000**	**200000**	**350000**	**220000**	**230000**	**290000**	--	--	--	--	--	--	**360000**	**330000**	**340000**
Ammonia	NV	µg/L	--	--	--	--	--	--	--	50 U	50 U	**66**	--	--	--	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	--	**4500**	**4900**	**4300**	--	--	--	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	**1.64**	**1.64**	--	**1.7**	**1.5**	**2**	**1.3**	**1.2**	**1**	--	--	**1.28**	--	--	--	**0.82**	**0.93**	**0.91**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	**790000**	**720000**	**580000**	--	--	--	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	**490**	**250**	100 U	100 U	100 U	100 U	--	--	--	--	--	--	100 U	100 U	100 U
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	10 U	10 U	10 U
pH	NV	pH UNITS	--	**7.52**	**7.58**	--	**7.49**	**7.5**	**7.46**	**7.36**	**7.63**	**7.82**	--	--	**7.59**	--	--	--	**7.24**	**7.38**	**7.24**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	10 U	10 U	10 U
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	**900000**	**740000**	**910000**	**510000**	**420000**	**280000**	--	--	--	--	--	--	**63000**	**120000**	**100000**
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	--	**960000**	**850000**	**690000**	--	--	--	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	**0.28**	**0.28**	--	--	--	--	--	--	--	--	--	**0.59**	1 U	1 U	--	--	--	--
Arsenic	25	µg/L	--	**22.2**	**21.7**	--	1 U	1 U	1 U	--	--	--	--	--	**0.2**	1 U	1 U	--	**13**	**17**	**14**
Barium	1000	µg/L	--	**107**	**107**	--	--	--	--	--	--	--	--	--	**38.7**	**18.9**	**16.7**	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					**OW22S**														
		Sample ID	OW22D	DUP 4	OW22D	OW22D	OW22 (S)	OW 22 (S)	OW 22(S)	OW22(S)	OW22(S)	OW22(S)	OW22S	OW22S	OW22S	OW22S	OW22S	OW22S	OW23(D)	OW23D	OW 23(D)
		Start Depth (m)	6.71	6.71	6.71	6.71	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	6.55	6.55	6.55
		End Depth (m)	7.47	7.47	7.47	7.47	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	7.77	7.77	7.77
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	25 Oct 2016	06 Sep 2017	06 Sep 2017	26 Feb 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015	25 Oct 2016	06 Sep 2017	21 Mar 2018	13 Apr 2018	26 Feb 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	--	0.1 U	0.1 U	--	--	--	--	--	--	--	--	--	0.1 U	1 U	1 U	--	--	--	--
Boron	5000	µg/L	--	**88**	**89**	--	--	--	--	--	--	--	--	--	**63**	100 U	100 U	--	--	--	--
Cadmium	2.1	µg/L	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	0.01 U	**0.24**	**0.193**	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	**370000**	**350000**	**440000**	**280000**	**260000**	**200000**	--	--	--	--	--	--	**120000**	**130000**	**140000**
Chromium	50	µg/L	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	0.5 U	5 U	5 U	--	--	--	--
Cobalt	3.8	µg/L	--	**0.2**	**0.21**	--	--	--	--	--	--	--	--	--	**0.25**	1 U	1 U	--	--	--	--
Copper	69	µg/L	--	0.2 U	0.2 U	--	--	--	--	20 U	20 U	20 U	--	--	0.2 U	**6.7**	2 U	--	--	--	--
Lead	10	µg/L	--	0.05 U	0.05 U	--	**0.96**	**1.3**	0.5 U	--	--	--	--	--	**0.166**	**1.9**	**2.08**	--	**1.1**	**1.1**	**0.57**
Magnesium	NV	µg/L	--	--	--	--	**28000**	**20000**	**27000**	**24000**	**20000**	**20000**	--	--	--	--	--	--	**26000**	**28000**	**28000**
Molybdenum	70	µg/L	--	**3.25**	**3.25**	--	--	--	--	--	--	--	--	--	**3.46**	**12.5**	**11.9**	--	--	--	--
Nickel	100	µg/L	--	**3.32**	**3.45**	--	--	--	--	--	--	--	--	--	**16.2**	**12**	**10.3**	--	--	--	--
Selenium	10	µg/L	--	**0.057**	**0.053**	--	--	--	--	--	--	--	--	--	**0.393**	0.5 U	0.5 U	--	--	--	--
Silver	1.2	µg/L	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	0.05 U	0.5 U	0.5 U	--	--	--	--
Sodium	490000	µg/L	--	**29200**	**29700**	--	**1500**	**1500**	**2200**	**1000**	**2100**	**1800**	--	--	**2480**	5000 U	**1300**	--	**21000**	**24000**	**23000**
Thallium	2	µg/L	--	**0.033**	**0.032**	--	--	--	--	--	--	--	--	--	0.01 U	0.1 U	0.1 U	--	--	--	--
Uranium	20	µg/L	--	**3.47**	**3.46**	--	--	--	--	--	--	--	--	--	**25.9**	**7.24**	**6.05**	--	--	--	--
Vanadium	6.2	µg/L	--	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	**0.57**	5 U	5 U	--	--	--	--
Zinc	890	µg/L	--	**846**	**860**	--	**2600**	**2900**	**14**	**3200**	**280**	**1000**	**1800**	**770**	**17.3**	**1740**	**1390**	--	**760**	**670**	**740**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	1000 U	1000 U	2000 U	--	--	--	--	--	--	--	--	--	1000 U	1000 U	1000 U
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	**1600**	**1400**	**1800**	--	--	--	--	--	--	--	--	--	**870**	**630**	**630**
Iron	NV	µg/L	--	--	--	--	--	--	--	**30**	**60**	**540**	--	--	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	--	**20**	**70**	**40**	--	--	--	--	--	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	**4100**	**4200**	**4800**	**3000**	**4000**	**4000**	--	--	--	--	--	--	**4400**	**4600**	**4700**
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	1 U	1 U	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	**50000**	**48300**	--	**1900**	1000 U	2000 U	**2100**	**1900**	**1500**	--	--	2500 U	--	--	--	**16000**	**39000**	**37000**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	0.01 U	0.01 U	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.1 U	0.05 U	**0.18**	**180**	**2.55**	--	--	--	0.05 U	0.05 U	0.05 U
2-(1-)Methylnaphthalene	3.2	µg/L	0.071 U	0.028 U	0.028 U	--	--	--	--	0.71 U	0.11 U	--	0.5 U	**280**	**2.55**	--	--	--	--	--	--
2-Methylnaphthalene	NV	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	0.05 U	0.5 U	**100**	0.11 U	--	--	--	0.05 U	0.05 U	0.05 U
Acenaphthene	4.1	µg/L	**0.13**	**0.066**	**0.065**	--	--	--	--	0.5 U	**0.15**	**0.33**	**2.4**	**40**	**1.01**	--	--	--	0.05 U	0.05 U	0.05 U
Acenaphthylene	1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	**0.05**	**0.074**	2.5 U	0.29 U	--	--	--	0.05 U	0.05 U	0.05 U
Anthracene	1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.5 U	**0.28**	**1.5**	**31**	0.2 U	--	--	--	0.05 U	0.05 U	0.05 U
Benzo(a)anthracene	1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	**0.085**	**0.15**	**0.4**	**5.2**	0.58 U	--	--	--	0.05 U	0.05 U	0.05 U
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	--	--	--	--	0.1 U	**0.03**	**0.065**	**0.096**	**1.4**	**0.106**	--	--	--	0.01 U	0.01 U	0.01 U
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	--	--	--	--	--	--	0.5 U	0.05 U	**0.15**	**0.13**	**2.7**	--	--	--	--	0.05 U	0.05 U	0.05 U
Benzo(b)fluoranthene	0.1	µg/L	--	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	**0.248**	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	0.05 U	0.05 U	2.5 U	**0.054**	--	--	--	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	0.05 U	0.05 U	2.5 U	**0.06**	--	--	--	0.05 U	0.05 U	0.05 U
Chrysene	0.1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	2 U	0.2 U	**0.32**	**0.5**	**9.8**	1.4 U	--	--	--	0.05 U	0.05 U	0.05 U
Dibenzo(a,h)anthracene	0.2	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	0.05 U	0.05 U	2.5 U	0.05 U	--	--	--	0.1 U	0.1 U	0.1 U
Fluoranthene	0.41	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	**0.29**	**0.37**	**0.57**	**16**	**0.625**	--	--	--	0.05 U	0.05 U	0.05 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					OW22S														
		Sample ID	OW22D	DUP 4	OW22D	OW22D	OW22 (S)	OW 22 (S)	OW 22(S)	OW22(S)	OW22(S)	OW22(S)	OW22S	OW22S	OW22S	OW22S	OW22S	OW22S	OW23(D)	OW23D	OW 23(D)
		Start Depth (m)	6.71	6.71	6.71	6.71	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	6.55	6.55	6.55
		End Depth (m)	7.47	7.47	7.47	7.47	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	7.77	7.77	7.77
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	25 Oct 2016	06 Sep 2017	06 Sep 2017	26 Feb 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015	25 Oct 2016	06 Sep 2017	21 Mar 2018	13 Apr 2018	26 Feb 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Fluorene	120	µg/L	**0.068**	**0.033**	**0.031**	--	--	--	--	0.5 U	0.5 U	0.1 U	5 U	**83**	**2.31**	--	--	--	0.05 U	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	0.5 U	0.05 U	0.05 U	0.05 U	2.5 U	**0.05**	--	--	--	0.1 U	0.1 U	0.1 U
Naphthalene	7	µg/L	0.05 U	0.05 U	0.05 U	--	--	--	--	0.5 U	0.05 U	0.1 U	0.05 U	**27**	0.25 U	--	--	--	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	0.03 U	0.02 U	0.02 U	--	--	--	--	0.3 U	0.1 U	**0.14**	**0.5**	**84**	1.4 U	--	--	--	0.03 U	0.03 U	0.03 U
Pyrene	4.1	µg/L	0.05 U	0.02 U	0.02 U	--	--	--	--	**0.82**	**0.59**	**0.9**	**1.3**	**30**	**1.63**	--	--	--	0.05 U	0.05 U	0.05 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	25 U	--	--	--	--	25 U	25 U	25 U	25 U	**530**	**94**	--	--	--	100 U	100 U	100 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	25 U	--	--	--	--	25 U	25 U	25 U	25 U	**550**	**94**	--	--	--	100 U	100 U	100 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	100 U	--	--	--	--	**830**	**630**	**1400**	**5600**	**210000**	**6170**	--	--	--	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	200 U	250 U	250 U	--	--	--	--	**7800**	**6000**	**13000**	**39000**	**850000**	**57500**	--	--	--	100 U	100 U	100 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	130 U	130 U	--	--	--	--	--	--	--	--	--	**18500**	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	130 U	130 U	--	--	--	--	--	--	--	--	--	**38900**	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	200 U	250 U	250 U	--	--	--	--	**360**	**300**	**810**	**2200**	**37000**	**4060**	--	--	--	100 U	100 U	100 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	**0.065**	--	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--	--	1 U	1 U	0.2 U
Chloromethane	NV	µg/L	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	--	--	--	2.5 U	2.5 U	0.5 U
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
1,1,1-Trichloroethane	23	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	1.7 U	20 U	--	0.5 U	1 U	1 U	0.2 U
1,1,2-Trichloroethane	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	3 U	--	0.5 U	1 U	1 U	0.2 U
1,1-Dichloroethane	5	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
1,1-Dichloroethene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
1,2-Dibromoethane	0.2	µg/L	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.2 U	3 U	--	0.2 U	1 U	1 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
1,2-Dichloroethane	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
1,2-Dichloropropane	0.58	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
1,3-Dichlorobenzene	59	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
1,3-Dichloropropene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
1,4-Dioxane	50	µg/L	--	20 U	20 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	--	20 U	20 U	20 U	5 U	5 U	5 U	--	--	--	--	--	20 U	20 U	--	20 U	25 U	25 U	5 U
4-Methyl-2-Pentanone	640	µg/L	--	20 U	20 U	20 U	5 U	5 U	5 U	--	--	--	--	--	20 U	20 U	--	20 U	25 U	25 U	5 U
Acetone	2700	µg/L	--	30 U	30 U	30 U	10 U	10 U	10 U	--	--	--	--	--	30 U	30 U	--	30 U	50 U	50 U	10 U
Bromodichloromethane	16	µg/L	--	2 U	2 U	2 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	2 U	2 U	--	2 U	0.5 U	0.5 U	0.1 U
Bromoform	5	µg/L	--	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	5 U	5 U	--	5 U	1 U	1 U	0.2 U
Bromomethane	0.89	µg/L	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	2.5 U	2.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	--	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.2 U	0.2 U	--	0.2 U	0.5 U	0.5 U	0.1 U
Chlorobenzene	30	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
Chlorodibromomethane	25	µg/L	--	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	2 U	2 U	--	2 U	1 U	1 U	0.2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					**OW22S**														
		Sample ID	OW22D	DUP 4	OW22D	OW22D	OW22 (S)	OW 22 (S)	OW 22(S)	OW22(S)	OW22(S)	OW22(S)	OW22S	OW22S	OW22S	OW22S	OW22S	OW22S	OW23(D)	OW23D	OW 23(D)
		Start Depth (m)	6.71	6.71	6.71	6.71	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	6.55	6.55	6.55
		End Depth (m)	7.47	7.47	7.47	7.47	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	7.77	7.77	7.77
		Sample Type	N	FD	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	25 Oct 2016	06 Sep 2017	06 Sep 2017	26 Feb 2020	24 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	19 Nov 2015	25 Oct 2016	06 Sep 2017	21 Mar 2018	13 Apr 2018	26 Feb 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011
Analyte	**Table 6 SCS** [a]	**Unit**																			
Chloroform	2	µg/L	--	1 U	1 U	1 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	1 U	1 U	--	1 U	0.5 U	0.5 U	0.1 U
cis-1,2-Dichloroethene	1.6	µg/L	--	**0.59**	**0.61**	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	**23**	**29**	**23**
cis-1,3-Dichloropropene	NV	µg/L	--	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.3 U	0.3 U	--	0.3 U	1 U	1 U	0.2 U
Dichlorodifluoromethane	590	µg/L	--	2 U	2 U	2 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	2 U	2 U	--	2 U	2.5 U	--	0.5 U
Dichloromethane	26	µg/L	--	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	5 U	5 U	--	5 U	2.5 U	2.5 U	0.5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	--	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	2 U	2 U	--	2 U	1 U	1 U	0.2 U
n-Hexane	5	µg/L	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	2.5 U	--	0.5 U
Styrene	5.4	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	1 U	1 U	0.2 U
Tetrachloroethene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	0.1 U
trans-1,2-Dichloroethene	1.6	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	**0.65**	**0.51**	**0.47**
trans-1,3-Dichloropropene	NV	µg/L	--	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.3 U	0.3 U	--	0.3 U	1 U	1 U	0.2 U
Trichloroethylene	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	**2**	**1.9**	**1.6**
Trichlorofluoromethane	150	µg/L	--	5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	5 U	5 U	--	5 U	1 U	1 U	0.2 U
Vinyl Chloride	0.5	µg/L	--	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	--	--	--	--	--	0.5 U	0.5 U	--	0.5 U	**4.3**	**10**	**3.4**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW23D										OW23S								
			Sample ID	OW 23(D)	OW23(D)	OW23(D)	OW23(D)	OW23D	OW23D	OW23D	OW23D	DUP 7	OW23D	OW23(S)	OW23S	OW 23(S)	OW 23(S)	OW23(S)	OW23(S)	OW23(S)	OW23S	OW23S
			Start Depth (m)	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
			End Depth (m)	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	27 Mar 2019	03 Mar 2020	03 Mar 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016
Analyte	**Table 6 SCS [a]**	**Unit**																				
ABNs																						
1,1'-Biphenyl	0.5	µg/L	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	2.5 U	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																						
Benzene	0.5	µg/L	**1.4**	**2**	**1.5**	**1.7**	**1.4**	**1.2**	**1.1**	--	**0.78**	**0.82**	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
Ethylbenzene	2.4	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
Toluene	24	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.2 U
Xylene, o	NV	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.3 U	--	0.3 U	0.3 U	0.25 U	2.5 U	**0.2**	**0.42**	2.5 U	5 U	1 U	5 U	**0.38**
Xylenes, m & p	NV	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.4 U	--	0.4 U	0.4 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	**0.23**
Xylenes, Total	72	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	**0.2**	**0.42**	2.5 U	5 U	1 U	5 U	**0.62**
Chlorophenyls																						
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																						
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	**340000**	--	**330000**	--	--	--	--	--	--	--	--	--	--	**490000**	**490000**	**520000**	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	**1600**	--	**2000**	--	--	--	--	--	--	--	--	--	--	1000 U	1000 U	**1600**	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	**290000**	**340000**	--	**330000**	--	--	--	--	--	--	**470000**	**520000**	**420000**	**490000**	**490000**	**500000**	**520000**	--	--
Ammonia	NV	µg/L	--	**360**	--	**380**	--	--	--	--	--	--	--	--	--	--	**380**	**340**	**390**	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	**6800**	--	**5500**	--	--	--	--	--	--	--	--	--	--	**68000**	**58000**	**60000**	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.92**	**0.97**	--	**0.92**	--	--	**0.902**	--	--	--	**1**	**0.96**	**0.84**	**0.91**	**0.95**	**0.96**	**0.95**	--	--
Hardness (as CaCO3)	NV	µg/L	--	**460000**	--	**430000**	--	--	--	--	--	--	--	--	--	--	**510000**	**480000**	**500000**	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	100 U	100 U	--	100 U	--	--	--	--	--	--	1000 U	100 U	100 U	100 U	100 U	100 U	100 U	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	10 U	10 U	--	10 U	--	--	--	--	--	--	100 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--
pH	NV	pH UNITS	**7.59**	**7.71**	--	**7.8**	--	--	**7.56**	--	--	--	**7.16**	**7.36**	**7.11**	**7.2**	**7.33**	**7.19**	**7.51**	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	10 U	--	10 U	--	--	--	--	--	--	50 U	10 U	**91**	10 U	10 U	100 U	10 U	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	**100000**	**100000**	--	**95000**	--	--	--	--	--	--	**95000**	**8700**	**37000**	**4500**	**30000**	**31000**	**12000**	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	**580000**	--	**540000**	--	--	--	--	--	--	--	--	--	--	**570000**	**560000**	**560000**	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																						
Antimony	6	µg/L	--	--	--	--	--	--	**0.14**	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	25	µg/L	**13**	--	--	--	--	--	**14**	--	--	--	**1.2**	**1.2**	**1.4**	**1.8**	--	--	--	--	--	--
Barium	1000	µg/L	--	--	--	--	--	--	**102**	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW23D										OW23S								
			Sample ID	OW 23(D)	OW23(D)	OW23(D)	OW23(D)	OW23D	OW23D	OW23D	OW23D	DUP 7	OW23D	OW23(S)	OW23S	OW 23(S)	OW 23(S)	OW23(S)	OW23(S)	OW23(S)	OW23S	OW23S
			Start Depth (m)	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
			End Depth (m)	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	27 Mar 2019	03 Mar 2020	03 Mar 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016
Analyte	**Table 6 SCS** [a]	**Unit**																				
Beryllium	4	µg/L	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--
Boron	5000	µg/L	--	--	--	--	--	--	--	**71**	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	µg/L	**120000**	**140000**	**130000**	**130000**	--	--	--	--	--	--	--	**170000**	**160000**	**150000**	**150000**	**170000**	**160000**	**170000**	--	--
Chromium	50	µg/L	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	**0.42**	--	--	--	--	--	--	--	--	--	--	--	--
Copper	69	µg/L	--	20 U	20 U	20 U	--	--	--	0.2 U	--	--	--	--	--	--	--	20 U	20 U	20 U	--	--
Lead	10	µg/L	**0.68**	--	--	--	--	--	--	**1.67**	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--
Magnesium	NV	µg/L	**25000**	**27000**	**26000**	**26000**	--	--	--	--	--	--	--	**28000**	**25000**	**23000**	**22000**	**23000**	**21000**	**22000**	--	--
Molybdenum	70	µg/L	--	--	--	--	--	--	--	**2.64**	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	100	µg/L	--	--	--	--	--	--	--	**4.27**	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	10	µg/L	--	--	--	--	--	--	--	**0.051**	--	--	--	--	--	--	--	--	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	490000	µg/L	**30000**	**34000**	**29000**	**29000**	--	--	--	**35200**	--	--	--	**15000**	**9500**	**15000**	**8400**	**13000**	**11000**	**13000**	--	--
Thallium	2	µg/L	--	--	--	--	--	--	--	**0.063**	--	--	--	--	--	--	--	--	--	--	--	--
Uranium	20	µg/L	--	--	--	--	--	--	--	**2.19**	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	890	µg/L	**530**	**690**	**610**	**620**	--	--	--	**553**	--	--	--	**10**	**7.2**	**24**	**7.1**	10 U	10 U	10 U	--	--
Non-Regulated Metals																						
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	1000 U	--	--	--	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	**560**	--	--	--	--	--	--	--	--	--	--	**610**	**530**	**520**	**510**	--	--	--	--	--
Iron	NV	µg/L	--	**3800**	**2900**	**3400**	--	--	--	--	--	--	--	--	--	--	--	**8900**	**7700**	**6400**	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	**170**	**140**	**160**	--	--	--	--	--	--	--	--	--	--	--	**1200**	**1000**	**1100**	--	--
Potassium	NV	µg/L	**4600**	**5000**	**4000**	**5000**	--	--	--	--	--	--	--	**11000**	**11000**	**9600**	**9800**	**11000**	**10000**	**11000**	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	**61000**	**56000**	--	**43000**	--	--	--	**67000**	--	--	--	**8000**	1000 U	**5400**	**2700**	**6100**	**5700**	**6400**	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	**17**	**9.4**
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.071 U	0.071 U	--	0.071 U	0.071 U	0.028 U	--	--	--	--	--	--	--	--	14 U	7.1 U	--	**24**	**15**
2-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	**7.1**	**5.3**
Acenaphthene	4.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	**3.5**	**21**	**20**
Acenaphthylene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	20 U	5 U	**3.8**	**30**	**15**
Benzo(a)anthracene	1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	**11**	5 U	**3.3**	**21**	**13**
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	--	--	--	--	--	2 U	1 U	**0.7**	**2.1**	**2.4**
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	**5.6**	**6.1**
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Chrysene	0.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	**9**	**6.5**	**35**	**38**
Dibenzo(a,h)anthracene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Fluoranthene	0.41	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	--	20 U	**11**	**8.8**	**13**	**24**

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW23D										OW23S								
			Sample ID	OW 23(D)	OW23(D)	OW23(D)	OW23(D)	OW23D	OW23D	OW23D	OW23D	DUP 7	OW23D	OW23(S)	OW23S	OW 23(S)	OW 23(S)	OW23(S)	OW23(S)	OW23(S)	OW23S	OW23S
			Start Depth (m)	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
			End Depth (m)	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	27 Mar 2019	03 Mar 2020	03 Mar 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016
Analyte	**Table 6 SCS** [a]	**Unit**																				
Fluorene	120	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.092**	0.02 U	--	--	--	--	--	--	--	20 U	**5.5**	**4.3**	50 U	**24**
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Naphthalene	7	µg/L	0.05 U	0.05 U	**0.17**	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	--	--	10 U	5 U	2.5 U	5 U	5 U
Phenanthrene	1	µg/L	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.02 U	--	--	--	--	--	--	--	**56**	**23**	**11**	**110**	**74**
Pyrene	4.1	µg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	--	--	--	--	--	--	--	**38**	**16**	**16**	**47**	**59**
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--	--	--	--	--	--	25 U	25 U	25 U	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--	--	--	--	--	--	25 U	25 U	25 U	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	--	--	**10000**	**13000**	**6700**	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	100 U	100 U	200 U	200 U	200 U	**1600**	**430**	250 U	--	--	--	--	--	--	**430000**	**580000**	**270000**	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	**310**	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	100 U	100 U	200 U	200 U	200 U	200 U	250 U	250 U	--	--	--	--	--	--	**24000**	**23000**	**16000**	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	5 U	--	--	--
Chloroethane	NV	µg/L	0.2 U	1 U	--	1 U	--	--	--	--	--	--	--	0.5 U	5 U	0.2 U	0.5 U	5 U	--	2 U	--	--
Chloromethane	NV	µg/L	0.5 U	2.5 U	--	2.5 U	--	--	--	--	--	--	--	1.3 U	13 U	0.5 U	1.3 U	13 U	--	5 U	--	--
Perylene	NV	µg/L	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	--	--	--	5 U	--	--	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.1 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	5 U	10 U	2 U	10 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
1,1-Dichloroethene	0.5	µg/L	**0.12**	0.5 U	**0.14**	0.5 U	**0.12**	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
1,3-Dichlorobenzene	59	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	--	--	0.28 U	--	0.28 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	--	--	--	--	14 U	--	14 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	5 U	25 U	5 U	25 U	5 U	10 U	20 U	--	20 U	20 U	13 U	130 U	5 U	13 U	130 U	250 U	50 U	250 U	10 U
4-Methyl-2-Pentanone	640	µg/L	5 U	25 U	5 U	25 U	5 U	5 U	20 U	--	20 U	20 U	13 U	130 U	5 U	13 U	130 U	250 U	50 U	250 U	5 U
Acetone	2700	µg/L	10 U	50 U	10 U	50 U	10 U	10 U	30 U	--	30 U	30 U	25 U	250 U	**10**	25 U	250 U	500 U	100 U	500 U	**14**
Bromodichloromethane	16	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.5 U	2 U	--	2 U	2 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.5 U
Bromoform	5	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	1 U	5 U	--	5 U	5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	1 U
Bromomethane	0.89	µg/L	0.5 U	2.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	1.3 U	13 U	0.5 U	1.3 U	13 U	25 U	5 U	25 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.2 U	--	0.2 U	0.2 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
Chlorobenzene	30	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
Chlorodibromomethane	25	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	2 U	--	2 U	2 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW23D										OW23S								
			Sample ID	OW 23(D)	OW23(D)	OW23(D)	OW23(D)	OW23D	OW23D	OW23D	OW23D	DUP 7	OW23D	OW23(S)	OW23S	OW 23(S)	OW 23(S)	OW23(S)	OW23(S)	OW23(S)	OW23S	OW23S
			Start Depth (m)	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52	2.52
			End Depth (m)	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26
			Sample Type	N	N	N	N	N	N	N	N	FD	N	N	N	N	N	N	N	N	N	N
			Sample Date	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016	07 Sep 2017	27 Mar 2019	03 Mar 2020	03 Mar 2020	23 Mar 2010	07 Oct 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013	20 Oct 2014	20 Nov 2015	25 Oct 2016
Analyte	**Table 6 SCS [a]**	**Unit**																				
Chloroform	2	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	1 U	--	1 U	1 U	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
cis-1,2-Dichloroethene	1.6	µg/L	**23**	**26**	**27**	**28**	**25**	**27**	**25.4**	--	**23.7**	**21.7**	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	**4**
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.3 U	0.3 U	--	0.3 U	0.3 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.3 U
Dichlorodifluoromethane	590	µg/L	0.5 U	--	0.5 U	--	0.5 U	1 U	2 U	--	2 U	2 U	1.3 U	--	0.5 U	1.3 U	--	25 U	--	25 U	1 U
Dichloromethane	26	µg/L	0.5 U	2.5 U	0.5 U	2.5 U	0.5 U	2 U	5 U	--	5 U	5 U	1.3 U	13 U	0.5 U	1.3 U	13 U	25 U	5 U	25 U	2 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	2 U	--	2 U	2 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
n-Hexane	5	µg/L	0.5 U	--	0.5 U	--	0.5 U	1 U	0.5 U	--	0.5 U	0.5 U	1.3 U	--	0.5 U	1.3 U	--	25 U	--	25 U	1 U
Styrene	5.4	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	0.5 U	--	0.5 U	0.5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.1 U	0.5 U	0.1 U	0.5 U	0.1 U	0.2 U	0.5 U	--	0.5 U	0.5 U	0.25 U	2.5 U	**0.11**	0.25 U	2.5 U	5 U	1 U	5 U	0.2 U
trans-1,2-Dichloroethene	1.6	µg/L	**0.32**	0.5 U	**0.43**	0.5 U	**0.38**	**0.7**	**0.55**	--	**0.69**	**0.76**	0.25 U	2.5 U	0.1 U	0.25 U	2.5 U	5 U	1 U	5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.4 U	0.3 U	--	0.3 U	0.3 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.4 U
Trichloroethylene	0.5	µg/L	**1.4**	**1.8**	**1.7**	**1.9**	**1.4**	**2.9**	**2.23**	--	**5.04**	**5.44**	0.25 U	2.5 U	**0.12**	**0.35**	2.5 U	5 U	1 U	5 U	**1.4**
Trichlorofluoromethane	150	µg/L	0.2 U	1 U	0.2 U	1 U	0.2 U	0.5 U	5 U	--	5 U	5 U	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	0.5 U
Vinyl Chloride	0.5	µg/L	**6.4**	**7**	**9.6**	**8.6**	**10**	**5.9**	**7.26**	--	**2.4**	**2.37**	0.5 U	5 U	0.2 U	0.5 U	5 U	10 U	2 U	10 U	**0.85**

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location			**OW24D**																
		Sample ID	DUP 1	OW235	OW24(D)	OW 24(D)	OW 24(D)	OW24(D)	OW24(D)	OW24D	OW24D	OW24D	GW-DUP5	OW24D	DUP10	OW24D	OW24(S)	OW 24 (S)	OW 24(S)	OW24(S)	OW24(S)
		Start Depth (m)	2.52	2.52	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.60	2.60	2.60	2.60	2.60
		End Depth (m)	5.26	5.26	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.34	5.34	5.34	5.34	5.34
		Sample Type	FD	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N
		Sample Date	20 Mar 2018	20 Mar 2018	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	21 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	27 Mar 2019	27 Mar 2019	02 Mar 2020	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	0.05 U	--	--	0.05 U	--	--	--	--	--	--	--	--	0.05 U	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	**0.23**	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Ethylbenzene	2.4	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Toluene	24	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
Xylene, o	NV	µg/L	**0.48**	**0.49**	25 U	20 U	20 U	20 U	25 U	50 U	2 U	0.3 U	--	--	0.3 U	0.3 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Xylenes, m & p	NV	µg/L	0.4 U	0.4 U	25 U	20 U	20 U	20 U	25 U	50 U	2 U	0.4 U	--	--	0.4 U	0.4 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Xylenes, Total	72	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	**350000**	**350000**	--	--	--	--	--	--	--	--	--	--	**310000**	**340000**
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	**2000**	**2500**	--	--	--	--	--	--	--	--	--	--	**1800**	**1500**
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	**350000**	**330000**	**330000**	**350000**	**360000**	--	--	--	--	--	--	--	**260000**	**290000**	**340000**	**310000**	**350000**
Ammonia	NV	µg/L	--	--	--	--	--	**120**	**140**	--	--	--	--	--	--	--	--	--	--	50 U	50 U
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	**3000**	**3300**	--	--	--	--	--	--	--	--	--	--	**2000**	**2200**
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.835**	**0.827**	**1**	**1**	**1.1**	**1**	**1**	--	--	**0.814**	--	--	--	--	**0.64**	**0.59**	**0.72**	**0.6**	**0.65**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	**460000**	**450000**	--	--	--	--	--	--	--	--	--	--	**320000**	**350000**
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	100 U	100 U	100 U	100 U	100 U	--	--	--	--	--	--	--	**1370**	**200**	**290**	**220**	100 U
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U
pH	NV	pH UNITS	**7.01**	**7.02**	**7.35**	**7.65**	**7.65**	**7.78**	**7.87**	--	--	**7.56**	--	--	--	--	**7.83**	**7.66**	**7.69**	**7.78**	**7.67**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	**110000**	**110000**	**100000**	**95000**	**86000**	--	--	--	--	--	--	--	**29000**	**19000**	**29000**	**12000**	**9600**
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	**610000**	**590000**	--	--	--	--	--	--	--	--	--	--	**340000**	**370000**
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	0.1 U	0.1 U	--	--	--	--	--	--	--	**0.19**	--	--	--	--	--	--	--	--	--
Arsenic	25	µg/L	**1.17**	**1.13**	**1.5**	**1.8**	**4.1**	--	--	--	--	**1.01**	--	--	--	--	1 U	1 U	1 U	--	--
Barium	1000	µg/L	**83.1**	**84.4**	--	--	--	--	--	--	--	**187**	--	--	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location		OW24D																
			Sample ID	DUP 1	OW235	OW24(D)	OW 24(D)	OW 24(D)	OW24(D)	OW24(D)	OW24D	OW24D	OW24D	GW-DUP5	OW24D	DUP10	OW24D	OW24(S)	OW 24 (S)	OW 24(S)	OW24(S)	OW24(S)
			Start Depth (m)	2.52	2.52	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.60	2.60	2.60	2.60	2.60
			End Depth (m)	5.26	5.26	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.34	5.34	5.34	5.34	5.34
			Sample Type	FD	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N
			Sample Date	20 Mar 2018	20 Mar 2018	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	21 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	27 Mar 2019	27 Mar 2019	02 Mar 2020	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	0.1 U	0.1 U	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--
Boron	5000	µg/L	**56**	**55**	--	--	--	--	--	--	--	**134**	--	--	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	0.01 U	0.01 U	--	--	--	--	--	--	--	**0.751**	--	--	--	--	--	--	--	--	--
Calcium	NV	µg/L	--	--	**130000**	**130000**	**130000**	**140000**	**130000**	--	--	--	--	--	--	--	**87000**	**97000**	**120000**	**110000**	**110000**
Chromium	50	µg/L	0.5 U	0.5 U	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	0.1 U	0.1 U	--	--	--	--	--	--	--	**0.34**	--	--	--	--	--	--	--	--	--
Copper	69	µg/L	0.2 U	0.2 U	--	--	--	20 U	20 U	--	--	**0.67**	--	--	--	--	--	--	--	20 U	20 U
Lead	10	µg/L	0.05 U	0.05 U	0.5 U	0.5 U	0.5 U	--	--	--	--	**0.141**	--	--	--	--	0.5 U	0.5 U	0.5 U	--	--
Magnesium	NV	µg/L	--	--	**30000**	**28000**	**29000**	**29000**	**27000**	--	--	--	--	--	--	--	**17000**	**16000**	**20000**	**14000**	**15000**
Molybdenum	70	µg/L	**0.318**	**0.31**	--	--	--	--	--	--	--	**0.586**	--	--	--	--	--	--	--	--	--
Nickel	100	µg/L	0.5 U	0.5 U	--	--	--	--	--	--	--	**1.96**	--	--	--	--	--	--	--	--	--
Selenium	10	µg/L	**0.27**	**0.185**	--	--	--	--	--	--	--	**0.13**	--	--	--	--	--	--	--	--	--
Silver	1.2	µg/L	0.05 U	0.05 U	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--
Sodium	490000	µg/L	**8870**	**8740**	**43000**	**41000**	**51000**	**47000**	**43000**	--	--	**26900**	--	--	--	--	**22000**	**5600**	**11000**	**3700**	**4200**
Thallium	2	µg/L	0.01 U	0.01 U	--	--	--	--	--	--	--	**0.137**	--	--	--	--	--	--	--	--	--
Uranium	20	µg/L	**0.123**	**0.119**	--	--	--	--	--	--	--	**1.23**	--	--	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	**0.63**	**0.64**	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--
Zinc	890	µg/L	**1**	1 U	**580**	**500**	**230**	**140**	**400**	--	--	**949**	--	--	--	--	**400**	**740**	**1300**	**890**	**1100**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	**570**	**520**	**530**	--	--	--	--	--	--	--	--	--	**650**	**790**	**960**	--	--
Iron	NV	µg/L	--	--	--	--	--	**2100**	**1500**	--	--	--	--	--	--	--	--	--	--	20 U	20 U
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	**50**	**50**	--	--	--	--	--	--	--	--	--	--	10 U	**20**
Potassium	NV	µg/L	--	--	**4400**	**4200**	**4000**	**4000**	**4000**	--	--	--	--	--	--	--	**3300**	**4300**	**5600**	**4000**	**4000**
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	1 U	1 U	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	**3040**	**3080**	**71000**	**75000**	**83000**	**74000**	**75000**	--	--	**41100**	--	--	--	--	**30000**	**5500**	**13000**	**4400**	**2800**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	0.01 U	0.01 U	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	**0.456**	**0.456**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-(1-)Methylnaphthalene	3.2	µg/L	**0.532**	**0.526**	--	--	--	0.071 U	--	0.071 U	0.071 U	--	--	--	--	--	--	--	--	0.071 U	0.071 U
2-Methylnaphthalene	NV	µg/L	**0.076**	**0.07**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.053**	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	4.1	µg/L	**0.072**	**0.086**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthylene	1	µg/L	**0.02**	**0.02**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Anthracene	1	µg/L	**0.102 J**	**0.068 J**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)anthracene	1	µg/L	**0.114**	**0.108**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)pyrene	0.01	µg/L	0.025 U	0.025 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	--	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(b)fluoranthene	0.1	µg/L	**0.03**	**0.028**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	0.02 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	0.02 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chrysene	0.1	µg/L	**0.266**	**0.222**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	0.02 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U
Fluoranthene	0.41	µg/L	**0.14**	**0.142**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location			OW24D																
		Sample ID	DUP 1	OW235	OW24(D)	OW 24(D)	OW 24(D)	OW24(D)	OW24(D)	OW24D	OW24D	OW24D	GW-DUP5	OW24D	DUP10	OW24D	OW24(S)	OW 24 (S)	OW 24(S)	OW24(S)	OW24(S)
		Start Depth (m)	2.52	2.52	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.60	2.60	2.60	2.60	2.60
		End Depth (m)	5.26	5.26	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.34	5.34	5.34	5.34	5.34
		Sample Type	FD	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N
		Sample Date	20 Mar 2018	20 Mar 2018	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	21 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	27 Mar 2019	27 Mar 2019	02 Mar 2020	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013
Analyte	**Table 6 SCS [a]**	**Unit**																			
Fluorene	120	µg/L	**0.332**	**0.318**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	0.02 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U
Naphthalene	7	µg/L	**0.112**	**0.118**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.053**	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	**1.43**	**1.33**	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.035**	0.03 U	--	--	--	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Pyrene	4.1	µg/L	**0.322**	**0.308**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	**600**	**830**	**1100**	--	--	--	--	**304**	--	--	--	--	100 U	100 U	25 U	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	**600**	**830**	**1100**	--	--	--	--	**304**	**254**	**258**	--	--	100 U	100 U	25 U	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	**600**	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	**130**	**120**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	**130**	**120**	100 U	100 U	100 U	--	--	--	--	100 U	--	--	--	--	100 U	100 U	100 U	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	**8050**	**7350**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	**8060**	**7360**	100 U	100 U	100 U	--	--	--	--	250 U	--	--	--	--	100 U	100 U	100 U	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	100 U	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	**550**	**430**	100 U	100 U	100 U	--	--	--	--	250 U	--	--	--	--	100 U	100 U	100 U	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	**8730**	**7900**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U
Chloroethane	NV	µg/L	--	--	50 U	40 U	40 U	40 U	50 U	--	--	--	--	--	--	--	1 U	1 U	1 U	0.4 U	--
Chloromethane	NV	µg/L	--	--	130 U	100 U	100 U	100 U	130 U	--	--	--	--	--	--	--	2.5 U	2.5 U	2.5 U	1 U	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.05 U
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.4 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.65 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,1-Dichloroethane	5	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
1,1-Dichloroethene	0.5	µg/L	0.5 U	0.5 U	25 U	**30**	**43**	**33**	**51**	**64**	**17**	**9.93**	--	--	**6.47**	**6.41**	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	50 U	40 U	40 U	40 U	50 U	100 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	1 U	1 U	1 U	0.4 U	0.5 U
1,2-Dichlorobenzene	3	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
1,3-Dichlorobenzene	59	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.5 U	0.5 U	--	--	--	--	--	140 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	--	--	--	--	0.71 U
1,4-Dichlorobenzene	0.5	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	20 U	20 U	1300 U	1000 U	1000 U	1000 U	1300 U	2500 U	100 U	20 U	--	--	20 U	20 U	25 U	25 U	25 U	10 U	13 U
4-Methyl-2-Pentanone	640	µg/L	20 U	20 U	1300 U	1000 U	1000 U	1000 U	1300 U	2500 U	50 U	20 U	--	--	20 U	20 U	25 U	25 U	25 U	10 U	13 U
Acetone	2700	µg/L	30 U	30 U	2500 U	2000 U	2000 U	2000 U	2500 U	5000 U	100 U	30 U	--	--	30 U	30 U	50 U	50 U	50 U	20 U	25 U
Bromodichloromethane	16	µg/L	2 U	2 U	25 U	20 U	20 U	20 U	25 U	50 U	0.5 U	2 U	--	--	2 U	2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Bromoform	5	µg/L	5 U	5 U	50 U	40 U	40 U	40 U	50 U	100 U	1 U	5 U	--	--	5 U	5 U	1 U	1 U	1 U	0.4 U	0.5 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	130 U	100 U	100 U	100 U	130 U	250 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	2.5 U	2.5 U	2.5 U	1 U	1.3 U
Carbon tetrachloride	0.2	µg/L	0.2 U	0.2 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.2 U	--	--	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Chlorobenzene	30	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
Chlorodibromomethane	25	µg/L	2 U	2 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	2 U	--	--	2 U	2 U	1 U	1 U	1 U	0.4 U	0.5 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location		OW24D																
			Sample ID	DUP 1	OW235	OW24(D)	OW 24(D)	OW 24(D)	OW24(D)	OW24(D)	OW24D	OW24D	OW24D	GW-DUP5	OW24D	DUP10	OW24D	OW24(S)	OW 24 (S)	OW 24(S)	OW24(S)	OW24(S)
			Start Depth (m)	2.52	2.52	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	2.60	2.60	2.60	2.60	2.60
			End Depth (m)	5.26	5.26	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	5.34	5.34	5.34	5.34	5.34
			Sample Type	FD	N	N	N	N	N	N	N	N	N	FD	N	FD	N	N	N	N	N	N
			Sample Date	20 Mar 2018	20 Mar 2018	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	21 Oct 2014	20 Nov 2015	24 Oct 2016	07 Sep 2017	27 Mar 2019	27 Mar 2019	02 Mar 2020	02 Mar 2020	23 Mar 2010	17 Jun 2011	20 Sep 2011	12 Dec 2012	25 Oct 2013
Analyte	**Table 6 SCS [a]**	**Unit**																			
Chloroform	2	µg/L	1 U	1 U	25 U	20 U	20 U	20 U	25 U	50 U	2 U	1 U	--	--	1 U	1 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
cis-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	**450**	**530**	**720**	**600**	**740**	**960**	**340**	**225**	--	--	**139**	**141**	0.5 U	**4.2**	**20**	**3.8**	**4.1**
cis-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	50 U	40 U	40 U	40 U	50 U	100 U	0.3 U	0.3 U	--	--	0.3 U	0.3 U	1 U	1 U	1 U	0.4 U	0.5 U
Dichlorodifluoromethane	590	µg/L	2 U	2 U	130 U	100 U	100 U	--	--	250 U	10 U	2 U	--	--	2 U	2 U	2.5 U	2.5 U	2.5 U	--	1.3 U
Dichloromethane	26	µg/L	5 U	5 U	130 U	100 U	100 U	100 U	130 U	250 U	2 U	5 U	--	--	5 U	5 U	2.5 U	2.5 U	2.5 U	1 U	1.3 U
Methyl tert-butyl ether (MTBE)	15	µg/L	2 U	2 U	50 U	40 U	40 U	40 U	50 U	100 U	5 U	2 U	--	--	2 U	2 U	1 U	1 U	1 U	0.4 U	0.5 U
n-Hexane	5	µg/L	0.5 U	0.5 U	130 U	100 U	100 U	--	--	250 U	1 U	0.5 U	--	--	0.5 U	0.5 U	2.5 U	2.5 U	2.5 U	--	1.3 U
Styrene	5.4	µg/L	0.5 U	0.5 U	50 U	40 U	40 U	40 U	50 U	100 U	0.5 U	0.5 U	--	--	0.5 U	0.5 U	1 U	1 U	1 U	0.4 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.5 U	0.5 U	25 U	20 U	20 U	20 U	25 U	50 U	0.2 U	0.5 U	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.25 U
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	0.5 U	**35**	**40**	**62**	**55**	**63**	**81**	**26**	**22.7**	--	--	**12.7**	**12.2**	0.5 U	0.5 U	**0.57**	0.2 U	0.25 U
trans-1,3-Dichloropropene	NV	µg/L	0.3 U	0.3 U	50 U	40 U	40 U	40 U	50 U	100 U	0.4 U	0.3 U	--	--	0.3 U	0.3 U	1 U	1 U	1 U	0.4 U	0.5 U
Trichloroethylene	0.5	µg/L	0.5 U	0.5 U	**2700**	**3400**	**5300**	**3900**	**5400**	**7900**	**2000**	**1170**	--	--	**861**	**991**	**85**	**64**	**76**	**52**	**54**
Trichlorofluoromethane	150	µg/L	5 U	5 U	50 U	40 U	40 U	40 U	50 U	100 U	5 U	5 U	--	--	5 U	5 U	1 U	1 U	1 U	0.4 U	0.5 U
Vinyl Chloride	0.5	µg/L	0.5 U	0.5 U	50 U	**46**	**86**	**45**	**64**	100 U	**17**	**14.2**	--	--	**3.36**	**3.46**	1 U	1 U	1 U	0.4 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location	OW24S						OW25														
		Sample ID	OW24(S)	OW24S	OW24(S)	OW24S	OW24S	OW24S	OW25	OW25	OW 25	OW 25	OW25	OW25	OW25	OW25	OW25	OW25	DUP2	OW25	GW-DUP1
		Start Depth (m)	2.60	2.60	2.60	2.60	2.60	2.60	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
		End Depth (m)	5.34	5.34	5.34	5.34	5.34	5.34	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	FD
		Sample Date	21 Oct 2014	20 Nov 2015	23 Dec 2015	24 Oct 2016	07 Sep 2017	02 Mar 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	17 Oct 2018	17 Oct 2018	27 Mar 2019
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	0.05 U	--	--	--	0.4 U	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	0.57 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	0.4 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--
Ethylbenzene	2.4	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--
Toluene	24	µg/L	1 U	--	5 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	--	--	--
Xylene, o	NV	µg/L	0.5 U	--	2.5 U	0.2 U	0.3 U	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.3 U	--	--	--
Xylenes, m & p	NV	µg/L	0.5 U	--	2.5 U	0.2 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.4 U	--	--	--
Xylenes, Total	72	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	0.2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	0.3 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	**360000**	--	--	--	--	--	--	--	--	--	**380000**	**380000**	**380000**	--	--	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	**2300**	--	--	--	--	--	--	--	--	--	**3000**	**2600**	**1300**	--	--	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	**370000**	--	--	--	--	--	**320000**	**350000**	**310000**	**330000**	**380000**	**380000**	**380000**	--	--	--	--	--	--
Ammonia	NV	µg/L	**69**	--	--	--	--	--	--	--	--	--	50 U	50 U	**65**	--	--	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	**3800**	--	--	--	--	--	--	--	--	--	**1300**	**2000**	**1800**	--	--	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	**0.69**	--	--	--	**1.21**	--	**0.63**	**0.69**	**0.61**	**0.81**	**0.74**	**0.72**	**0.74**	--	--	**0.757**	--	--	--
Hardness (as CaCO3)	NV	µg/L	**360000**	--	--	--	--	--	--	--	--	--	**390000**	**390000**	**380000**	--	--	--	--	--	--
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	100 U	--	--	--	--	--	**110**	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	10 U	--	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	--	--
pH	NV	pH UNITS	**7.82**	--	--	--	**7.55**	--	**7.65**	**7.66**	**7.77**	**7.82**	**7.92**	**7.86**	**7.57**	--	--	**7.44**	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	10 U	--	--	--	--	--	**30**	**100**	**69**	**230**	**27**	**180**	**250**	--	--	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	**8500**	--	--	--	--	--	**27000**	**30000**	**26000**	**30000**	**35000**	**22000**	**20000**	--	--	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	**390000**	--	--	--	--	--	--	--	--	--	**440000**	**420000**	**420000**	--	--	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	--	--	--	**0.12**	--	--	--	--	--	--	--	--	--	--	**0.12**	--	--	--
Arsenic	25	µg/L	--	--	--	--	**0.11**	--	1 U	1 U	1 U	**1.5**	--	--	--	--	--	**1.96**	--	--	--
Barium	1000	µg/L	--	--	--	--	**65**	--	--	--	--	--	--	--	--	--	--	**36.4**	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW24S						OW25												
			Sample ID	OW24(S)	OW24S	OW24(S)	OW24S	OW24S	OW24S	OW25	OW25	OW 25	OW 25	OW25	OW25	OW25	OW25	OW25	OW25	DUP2	OW25	GW-DUP1
			Start Depth (m)	2.60	2.60	2.60	2.60	2.60	2.60	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
			End Depth (m)	5.34	5.34	5.34	5.34	5.34	5.34	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	FD
			Sample Date	21 Oct 2014	20 Nov 2015	23 Dec 2015	24 Oct 2016	07 Sep 2017	02 Mar 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	17 Oct 2018	17 Oct 2018	27 Mar 2019
Analyte	**Table 6 SCS** [a]	**Unit**																				
Beryllium	4	µg/L	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--
Boron	5000	µg/L	--	--	--	--	**125**	--	--	--	--	--	--	--	--	--	--	--	**65**	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	**0.358**	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--
Calcium	NV	µg/L	**120000**	--	--	--	--	--	**90000**	**98000**	**89000**	**92000**	**110000**	**110000**	**110000**	--	--	--	--	--	--	--
Chromium	50	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	0.1 U	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--
Copper	69	µg/L	20 U	--	--	--	**1**	--	--	--	--	--	20 U	20 U	20 U	--	--	**0.26**	--	--	--	--
Lead	10	µg/L	--	--	--	--	0.05 U	--	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.05 U	--	--	--	--
Magnesium	NV	µg/L	**15000**	--	--	--	--	--	**24000**	**24000**	**24000**	**23000**	**28000**	**26000**	**26000**	--	--	--	--	--	--	--
Molybdenum	70	µg/L	--	--	--	--	**0.225**	--	--	--	--	--	--	--	--	--	--	**0.735**	--	--	--	--
Nickel	100	µg/L	--	--	--	--	**1.2**	--	--	--	--	--	--	--	--	--	--	**1.51**	--	--	--	--
Selenium	10	µg/L	--	--	--	--	**0.555**	--	--	--	--	--	--	--	--	--	--	**0.092**	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--
Sodium	490000	µg/L	**5900**	--	--	--	**100000**	--	**7100**	**7100**	**7000**	**34000**	**7300**	**8100**	**7600**	--	--	**16600**	--	--	--	--
Thallium	2	µg/L	--	--	--	--	**0.069**	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--
Uranium	20	µg/L	--	--	--	--	**0.747**	--	--	--	--	--	--	--	--	--	--	**1.43**	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	0.5 U	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--
Zinc	890	µg/L	**1200**	--	--	--	**674**	--	**200**	**9.5**	**25**	**12**	**270**	10 U	10 U	--	--	**48.5**	--	--	--	--
Non-Regulated Metals																						
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	--	--	1000 U	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	--	--	**210**	**200**	**220**	**260**	--	--	--	--	--	--	--	--	--	--
Iron	NV	µg/L	20 U	--	--	--	--	--	--	--	--	--	**140**	**650**	**720**	--	--	--	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	10 U	--	--	--	--	--	--	--	--	--	10 U	**20**	**60**	--	--	--	--	--	--	--
Potassium	NV	µg/L	**4000**	--	--	--	--	--	**7000**	**8600**	**7900**	**7900**	**8000**	**7000**	**7000**	--	--	--	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																						
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	1 U	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--
Chloride (Cl)	790000	µg/L	**5700**	--	--	--	**170000**	--	**2400**	**2200**	**3800**	**45000**	**2800**	**5200**	**5800**	--	--	**24100**	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	0.01 U	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--
PAHs																						
1-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.3 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
2-(1-)Methylnaphthalene	3.2	µg/L	--	0.071 U	--	0.071 U	0.028 U	--	--	--	--	--	--	0.071 U	0.071 U	0.071 U	0.3 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U
2-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acenaphthene	4.1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acenaphthylene	1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.053**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.11**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)anthracene	1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.055**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	--	0.01 U	0.01 U	--	0.01 U	**1**	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 UJ	**0.034 J**	0.01 U	
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	0.05 U	--	0.05 U	--	--	3 U	0.05 U	0.5 U	0.05 U	0.25 U	0.05 U	0.05 U	**3.1**	**1.1**	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	0.02 U	0.02 U	0.02 U	0.02 U	
Benzo(g,h,i)perylene	0.2	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.1 U	0.1 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.5 U	**0.26**	0.05 U	0.05 U	0.1 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	
Chrysene	0.1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.1 U	0.5 U	0.15 U	0.02 U	0.02 U	0.02 U	0.02 U	
Dibenzo(a,h)anthracene	0.2	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.1 U	0.1 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	
Fluoranthene	0.41	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.1**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW24S						OW25												
			Sample ID	OW24(S)	OW24S	OW24(S)	OW24S	OW24S	OW24S	OW25	OW25	OW 25	OW 25	OW25	OW25	OW25	OW25	OW25	OW25	DUP2	OW25	GW-DUP1
			Start Depth (m)	2.60	2.60	2.60	2.60	2.60	2.60	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
			End Depth (m)	5.34	5.34	5.34	5.34	5.34	5.34	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	FD
			Sample Date	21 Oct 2014	20 Nov 2015	23 Dec 2015	24 Oct 2016	07 Sep 2017	02 Mar 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	17 Oct 2018	17 Oct 2018	27 Mar 2019
Analyte	**Table 6 SCS** [a]	**Unit**																				
Fluorene	120	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.16**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.1 U	0.1 U	1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	7	µg/L	0.05 U	0.05 U	--	**0.05**	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	0.03 U	0.03 U	--	0.03 U	0.02 U	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	**0.23**	**0.063**	0.02 U	0.02 U	0.02 U	0.02 U
Pyrene	4.1	µg/L	0.05 U	0.05 U	--	0.05 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**0.065**	0.05 U	0.02 U	0.02 U	0.02 U	0.02 U
PCBs																						
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	0.02 U	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	--	0.04 U	--	--	--	--	--	--	--	--	--	--	--	0.04 U	--	--	--
PHCs																						
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	--	**84**	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	--	**84**	--	100 U	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	--	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	**190**	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	100 U	--	--	--	--	--	--	--	--	--	--	--	100 U	--	--	100 U
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	--	--	--	--	100 U	--	**190**	**110**	100 U	100 U	**120**	100 U	**160**	**110**	**920**	100 U	--	--	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	250 U	--	--	--	--	--	--	--	--	--	--	--	250 U	--	--	250 U
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	--	--	--	--	250 U	--	**3300**	**4100**	**760**	100 U	**2100**	**400**	**4900**	**5500**	**5200**	250 U	--	--	--	250 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	**3300**	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	130 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	--	--	--	--	250 U	--	100 U	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	--	--	250 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	370 U	--	--	--	--	--	--	--	--	--	--	--	370 U	--	--	--
SVOCs																						
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	1 U	--	--	--	--	--	0.2 U	0.2 U	0.2 U	0.2 U	1 U	--	0.2 U	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	2.5 U	--	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--
VOCs																						
1,1,1,2-Tetrachloroethane	1.1	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,1,1-Trichloroethane	23	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	**0.28**	**0.59**	**0.26**	**0.28**	**0.35**	**0.25**	**0.17**	**0.19**	0.2 U	0.5 U	--	--	--	--
1,1,2,2-Tetrachloroethane	0.5	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,1,2-Trichloroethane	0.5	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,1-Dichloroethane	5	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	**0.15**	**0.24**	**0.17**	**0.39**	**0.13**	**0.29**	**0.3**	**0.24**	**0.37**	0.5 U	--	--	--	--
1,1-Dichloroethene	0.5	µg/L	0.5 U	--	2.5 U	**1**	**0.85**	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--	--
1,2-Dibromoethane	0.2	µg/L	1 U	--	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	--	--	--	--
1,2-Dichlorobenzene	3	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,2-Dichloroethane	0.5	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,2-Dichloropropane	0.58	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--	--
1,3-Dichlorobenzene	59	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,3-Dichloropropene	0.5	µg/L	--	--	7.1 U	0.5 U	0.5 U	0.5 U	--	--	--	--	--	0.71 U	0.28 U	0.28 U	0.5 U	0.5 U	--	--	--	--
1,4-Dichlorobenzene	0.5	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--	--
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	25 U	--	130 U	10 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	13 U	5 U	5 U	10 U	20 U	--	--	--	--
4-Methyl-2-Pentanone	640	µg/L	25 U	--	130 U	5 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	13 U	5 U	5 U	5 U	20 U	--	--	--	--
Acetone	2700	µg/L	50 U	--	250 U	10 U	30 U	30 U	10 U	10 U	10 U	10 U	10 U	25 U	10 U	10 U	10 U	30 U	--	--	--	--
Bromodichloromethane	16	µg/L	0.5 U	--	2.5 U	0.5 U	2 U	2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.5 U	2 U	--	--	--	--
Bromoform	5	µg/L	1 U	--	5 U	1 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	1 U	5 U	--	--	--	--
Bromomethane	0.89	µg/L	2.5 U	--	13 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	--	--	--	--
Carbon tetrachloride	0.2	µg/L	0.5 U	--	2.5 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.2 U	--	--	--	--
Chlorobenzene	30	µg/L	0.5 U	--	2.5 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--	--
Chlorodibromomethane	25	µg/L	1 U	--	5 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	2 U	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location	OW24S						OW25												
			Sample ID	OW24(S)	OW24S	OW24(S)	OW24S	OW24S	OW24S	OW25	OW25	OW 25	OW 25	OW25	OW25	OW25	OW25	OW25	OW25	DUP2	OW25	GW-DUP1
			Start Depth (m)	2.60	2.60	2.60	2.60	2.60	2.60	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98	1.98
			End Depth (m)	5.34	5.34	5.34	5.34	5.34	5.34	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72	4.72
			Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	FD
			Sample Date	21 Oct 2014	20 Nov 2015	23 Dec 2015	24 Oct 2016	07 Sep 2017	02 Mar 2020	24 Mar 2010	07 Oct 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	19 Nov 2015	26 Oct 2016	01 Sep 2017	17 Oct 2018	17 Oct 2018	27 Mar 2019
Analyte	**Table 6 SCS** [a]	**Unit**																				
Chloroform	2	µg/L	0.5 U	--	2.5 U	0.2 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	1 U	--	--	--
cis-1,2-Dichloroethene	1.6	µg/L	**7.1**	--	2.5 U	**48**	**45.1**	**13**	**0.38**	**0.73**	**0.75**	**2.1**	**0.54**	**1.6**	**1.6**	**1.5**	**3**	**2.43**	--	--	--
cis-1,3-Dichloropropene	NV	µg/L	1 U	--	5 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.3 U	0.3 U	--	--	--
Dichlorodifluoromethane	590	µg/L	--	--	13 U	1 U	2 U	2 U	0.5 U	--	0.5 U	0.5 U	--	1.3 U	--	0.5 U	1 U	2 U	--	--	--
Dichloromethane	26	µg/L	2.5 U	--	13 U	2 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	2 U	5 U	--	--	--
Methyl tert-butyl ether (MTBE)	15	µg/L	1 U	--	5 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	2 U	--	--	--
n-Hexane	5	µg/L	--	--	13 U	1 U	0.5 U	0.5 U	0.5 U	--	0.5 U	0.5 U	--	1.3 U	--	0.5 U	1 U	0.5 U	--	--	--
Styrene	5.4	µg/L	1 U	--	5 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	--	--	--
Tetrachloroethene	0.5	µg/L	0.5 U	--	2.5 U	**0.32**	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	--	--	--
trans-1,2-Dichloroethene	1.6	µg/L	0.5 U	--	2.5 U	**2.5**	**2.47**	0.5 U	**0.12**	**0.17**	**0.14**	**0.47**	0.1 U	**0.29**	**0.38**	**0.22**	0.5 U	0.5 U	--	--	--
trans-1,3-Dichloropropene	NV	µg/L	1 U	--	5 U	0.4 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.4 U	0.3 U	--	--	--
Trichloroethylene	0.5	µg/L	**53**	--	2.5 U	**400**	**325**	**144**	**2.2**	**3.1**	**1.8**	**2.3**	**2.9**	**2.1**	**1.6**	**2.1**	**0.88**	**2.57**	--	--	--
Trichlorofluoromethane	150	µg/L	1 U	--	5 U	0.5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	5 U	--	--	--
Vinyl Chloride	0.5	µg/L	1 U	--	5 U	**0.21**	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	**0.83**	0.2 U	**0.77**	**0.85**	**0.39**	**1**	**0.67**	--	--	--

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				**OW26D**										**OW26S**					
		Sample ID	OW25	OW25	OW25	OW26D	OW 26(D)	OW 26(D)	OW26(D)	OW26(D)	OW26(D)	OW26D	OW26D	OW26D	OW26D	OW26S	OW 26(S)	OW 26(S)	OW26(S)	OW26(S)	OW26(S)
		Start Depth (m)	1.98	1.98	1.98	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	3.08	3.08	3.08	3.08	3.08	3.08
		End Depth (m)	4.72	4.72	4.72	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	4.60	4.60	4.60	4.60	4.60	4.60
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	27 Mar 2019	17 Apr 2019	27 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014
Analyte	**Table 6 SCS [a]**	**Unit**																			
ABNs																					
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U	--	--	--	--	--	0.05 U	--	0.05 U	--	0.05 U
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
BTEX																					
Benzene	0.5	µg/L	--	--	0.5 U	**0.1**	**0.11**	**0.17**	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Ethylbenzene	2.4	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Toluene	24	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Xylene, o	NV	µg/L	--	--	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.3 U	0.3 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, m & p	NV	µg/L	--	--	0.4 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.4 U	0.4 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Xylenes, Total	72	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chlorophenyls																					
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chemistry																					
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	**300000**	**300000**	**300000**	--	--	--	--	--	--	--	**330000**	**310000**	**310000**
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	--	--	**1800**	**2200**	**1100**	--	--	--	--	--	--	--	**1800**	**1300**	**1100**
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	**310000**	**290000**	**290000**	**300000**	**300000**	**300000**	--	--	--	--	**300000**	**280000**	**290000**	**330000**	**320000**	**310000**
Ammonia	NV	µg/L	--	--	--	--	--	--	**430**	**320**	**400**	--	--	--	--	--	--	--	**250**	**100**	**190**
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	--	--	**9200**	**10000**	**10000**	--	--	--	--	--	--	--	**6900**	**7500**	**7600**
Cation - Anion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color	NV	CU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	--	**1**	**1.3**	**1.3**	**1.3**	**1.1**	**1.6**	--	--	**1.13**	--	**0.76**	**0.87**	**1**	**0.93**	**0.82**	**0.93**
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	--	--	**400000**	**360000**	**420000**	--	--	--	--	--	--	--	**370000**	**340000**	**330000**
Ion Balance	NV	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	100 U	100 U	100 U	100 U	100 U	100 U	--	--	--	--	**560**	**200**	100 U	100 U	100 U	100 U
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U
pH	NV	pH UNITS	--	--	--	**7.51**	**7.6**	**7.66**	**7.81**	**7.89**	**7.59**	--	--	**7.43 J**	--	**7.54**	**7.6**	**7.65**	**7.75**	**7.63**	**7.58**
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U	--	--	--	--	10 U	10 U	10 U	10 U	10 U	10 U
Saturation pH	NV	pH UNITS	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate	NV	µg/L	--	--	--	**59000**	**67000**	**67000**	**69000**	**56000**	**52000**	--	--	--	--	**34000**	**44000**	**44000**	**46000**	**34000**	**31000**
Sulfur	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	--	--	**650000**	**610000**	**810000**	--	--	--	--	--	--	--	**530000**	**470000**	**510000**
Turbidity	NV	NTU	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals and Hydride Forming Metals																					
Antimony	6	µg/L	--	--	--	--	--	--	--	--	--	--	--	**0.12**	--	--	--	--	--	--	--
Arsenic	25	µg/L	--	--	--	**6.8**	**6.8**	**6.7**	--	--	--	--	--	**8.32**	--	1 U	1 U	1 U	--	--	--
Barium	1000	µg/L	--	--	--	--	--	--	--	--	--	--	--	**80**	--	--	--	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				OW26D										OW26S					
		Sample ID	OW25	OW25	OW25	OW26D	OW 26(D)	OW 26(D)	OW26(D)	OW26(D)	OW26(D)	OW26D	OW26D	OW26D	OW26D	OW26S	OW 26(S)	OW 26(S)	OW26(S)	OW26(S)	OW26(S)
		Start Depth (m)	1.98	1.98	1.98	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	3.08	3.08	3.08	3.08	3.08	3.08
		End Depth (m)	4.72	4.72	4.72	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	4.60	4.60	4.60	4.60	4.60	4.60
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	27 Mar 2019	17 Apr 2019	27 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014
Analyte	**Table 6 SCS** [a]	**Unit**																			
Beryllium	4	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--
Boron	5000	µg/L	--	--	--	--	--	--	--	--	--	--	--	**67**	--	--	--	--	--	--	--
Cadmium	2.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
Calcium	NV	µg/L	--	--	--	**120000**	**130000**	**120000**	**120000**	**110000**	**120000**	--	--	--	--	**98000**	**100000**	**99000**	**110000**	**110000**	**100000**
Chromium	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--
Cobalt	3.8	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--
Copper	69	µg/L	--	--	--	--	--	--	20 U	20 U	20 U	--	--	0.2 U	--	--	--	--	20 U	20 U	20 U
Lead	10	µg/L	--	--	--	0.5 U	0.5 U	0.5 U	--	--	--	--	--	**0.12**	--	0.5 U	**0.63**	0.5 U	--	--	--
Magnesium	NV	µg/L	--	--	--	**26000**	**28000**	**26000**	**25000**	**23000**	**27000**	--	--	--	--	**21000**	**20000**	**18000**	**21000**	**19000**	**18000**
Molybdenum	70	µg/L	--	--	--	--	--	--	--	--	--	--	--	**5.05**	--	--	--	--	--	--	--
Nickel	100	µg/L	--	--	--	--	--	--	--	--	--	--	--	**1.22**	--	--	--	--	--	--	--
Selenium	10	µg/L	--	--	--	--	--	--	--	--	--	--	--	**0.173**	--	--	--	--	--	--	--
Silver	1.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--
Sodium	490000	µg/L	--	--	--	**66000**	**110000**	**110000**	**110000**	**91000**	**140000**	--	--	**99200**	--	**27000**	**52000**	**69000**	**54000**	**42000**	**60000**
Thallium	2	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
Uranium	20	µg/L	--	--	--	--	--	--	--	--	--	--	--	**3.76**	--	--	--	--	--	--	--
Vanadium	6.2	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.5 U	--	--	--	--	--	--	--
Zinc	890	µg/L	--	--	--	**300**	**330**	**330**	**310**	**300**	**330**	--	--	**239**	--	**690**	**760**	**790**	**900**	**800**	**820**
Non-Regulated Metals																					
Aluminum	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromide	NV	µg/L	--	--	--	1000 U	1000 U	1000 U	--	--	--	--	--	--	--	1000 U	1000 U	1000 U	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoride	NV	µg/L	--	--	--	**350**	**370**	**390**	--	--	--	--	--	--	--	**240**	**290**	**290**	--	--	--
Iron	NV	µg/L	--	--	--	--	--	--	**1500**	**1400**	**1500**	--	--	--	--	--	--	--	**150**	**230**	**280**
Lithium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	--	--	**50**	**50**	**60**	--	--	--	--	--	--	--	**340**	**250**	**220**
Potassium	NV	µg/L	--	--	--	**4400**	**5000**	**4600**	**4000**	**4000**	**5000**	--	--	--	--	**5400**	**4200**	**4500**	**5000**	**5000**	**5000**
Rubidium (Rb)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tin	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ORPs																					
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	--	--	--	--	--	--	--	--	--	1 U	--	--	--	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	--	**120000**	**240000**	**210000**	**140000**	**140000**	**270000**	--	--	**162000**	--	**45000**	**87000**	**120000**	**77000**	**60000**	**98000**
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--
PAHs																					
1-Methylnaphthalene	NV	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-(1-)Methylnaphthalene	3.2	µg/L	0.028 U	0.028 U	--	--	--	--	--	0.071 U	0.071 U	0.071 U	0.071 U	--	--	--	--	--	--	0.071 U	0.071 U
2-Methylnaphthalene	NV	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthene	4.1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Acenaphthylene	1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Anthracene	1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)anthracene	1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	--	--	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b&j)fluoranthene	0.1	µg/L	--	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(b)fluoranthene	0.1	µg/L	0.02 U	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.02 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzo(k)fluoranthene	0.1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chrysene	0.1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibenzo(a,h)anthracene	0.2	µg/L	0.02 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U
Fluoranthene	0.41	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				OW26D										OW26S					
		Sample ID	OW25	OW25	OW25	OW26D	OW 26(D)	OW 26(D)	OW26(D)	OW26(D)	OW26(D)	OW26D	OW26D	OW26D	OW26D	OW26S	OW 26(S)	OW 26(S)	OW26(S)	OW26(S)	OW26(S)
		Start Depth (m)	1.98	1.98	1.98	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	3.08	3.08	3.08	3.08	3.08	3.08
		End Depth (m)	4.72	4.72	4.72	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	4.60	4.60	4.60	4.60	4.60	4.60
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	27 Mar 2019	17 Apr 2019	27 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014
Analyte	**Table 6 SCS [a]**	**Unit**																			
Fluorene	120	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.02 U	0.02 U	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U
Naphthalene	7	µg/L	0.05 U	0.05 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Phenanthrene	1	µg/L	0.02 U	0.02 U	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	--	--	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Pyrene	4.1	µg/L	0.02 U	0.02 U	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	--	--	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
PCBs																					
Aroclor 1016	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	**0.66**	0.05 U	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	**0.61**	0.05 U	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	0.05 U	0.05 U	--	--	--	--
PCB, Total	0.2	µg/L	--	--	--	0.05 U	0.05 U	--	--	--	--	--	--	--	--	**1.27**	0.05 U	--	--	--	--
PHCs																					
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	--	--	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	--	--	--	100 U	100 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	--	100 U	100 U	25 U	25 U	25 U	25 U
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	100 U	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	100 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	--	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	--	100 U	100 U	100 U	100 U	100 U	100 U
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	250 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	250 U	--	--	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U	100 U	200 U	200 U
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	100 U	--	--	--	--	--	--	--	--	--	100 U	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	250 U	--	--	100 U	100 U	100 U	100 U	200 U	200 U	200 U	200 U	250 U	--	100 U	100 U	100 U	100 U	200 U	200 U
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	370 U	--	--	--	--	--	--	--
SVOCs																					
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	0.05 U	--
Chloroethane	NV	µg/L	--	--	--	0.2 U	0.2 U	0.2 U	1 U	--	0.2 U	--	--	--	--	0.2 U	0.2 U	0.2 U	1 U	--	0.2 U
Chloromethane	NV	µg/L	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--	--	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U
Perylene	NV	µg/L	--	--	--	--	--	--	--	0.05 U	--	--	--	--	--	--	--	--	--	0.05 U	--
VOCs																					
1,1,1,2-Tetrachloroethane	1.1	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U
1,1,1-Trichloroethane	23	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	**2.6**	**2.4**	**3.1**	**2.6**	**3**	**2.8**
1,1,2,2-Tetrachloroethane	0.5	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	0.5	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1-Dichloroethane	5	µg/L	--	--	0.5 U	**3.3**	**2**	**2.6**	**1.5**	**1.7**	**1.5**	**1.3**	**1**	**1.35**	**0.61**	**4.3**	**3.8**	**5.1**	**4**	**4.5**	**4.7**
1,1-Dichloroethene	0.5	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	**0.11**	**0.13**	**0.12**	**0.14**	**0.16**
1,2-Dibromoethane	0.2	µg/L	--	--	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloroethane	0.5	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	0.58	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
1,3-Dichlorobenzene	59	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,3-Dichloropropene	0.5	µg/L	--	--	0.5 U	--	--	--	--	0.71 U	0.28 U	0.28 U	0.5 U	0.5 U	0.5 U	--	--	--	--	0.28 U	0.28 U
1,4-Dichlorobenzene	0.5	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,4-Dioxane	50	µg/L	--	--	--	--	--	--	--	--	--	--	--	20 U	--	--	--	--	--	--	--
2-Butanone	1800	µg/L	--	--	20 U	5 U	5 U	5 U	5 U	13 U	5 U	5 U	10 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	640	µg/L	--	--	20 U	5 U	5 U	5 U	5 U	13 U	5 U	5 U	5 U	20 U	20 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	2700	µg/L	--	--	30 U	10 U	10 U	10 U	10 U	25 U	10 U	10 U	10 U	30 U	30 U	10 U	10 U	10 U	10 U	10 U	10 U
Bromodichloromethane	16	µg/L	--	--	2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.5 U	2 U	2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Bromoform	5	µg/L	--	--	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	1 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Bromomethane	0.89	µg/L	--	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	--	--	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chlorobenzene	30	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chlorodibromomethane	25	µg/L	--	--	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location				**OW26D**										**OW26S**					
		Sample ID	OW25	OW25	OW25	OW26D	OW 26(D)	OW 26(D)	OW26(D)	OW26(D)	OW26(D)	OW26D	OW26D	OW26D	OW26D	OW26S	OW 26(S)	OW 26(S)	OW26(S)	OW26(S)	OW26(S)
		Start Depth (m)	1.98	1.98	1.98	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	10.28	3.08	3.08	3.08	3.08	3.08	3.08
		End Depth (m)	4.72	4.72	4.72	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80	4.60	4.60	4.60	4.60	4.60	4.60
		Sample Type	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
		Sample Date	27 Mar 2019	17 Apr 2019	27 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	24 Mar 2010	16 Jun 2011	19 Sep 2011	11 Dec 2012	24 Oct 2013	24 Oct 2014
Analyte	**Table 6 SCS** [a]	**Unit**																			
Chloroform	2	µg/L	--	--	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	1 U	1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
cis-1,2-Dichloroethene	1.6	µg/L	--	--	**0.63**	**2.1**	**2.3**	**2.5**	**2.2**	**2.3**	**2.4**	**2.4**	**2.1**	**2.39**	**1.16**	**0.19**	**0.59**	**0.64**	**0.67**	**0.75**	**0.79**
cis-1,3-Dichloropropene	NV	µg/L	--	--	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.3 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Dichlorodifluoromethane	590	µg/L	--	--	2 U	0.5 U	0.5 U	0.5 U	--	1.3 U	--	0.5 U	1 U	2 U	2 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--
Dichloromethane	26	µg/L	--	--	5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.3 U	0.5 U	0.5 U	2 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	--	--	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
n-Hexane	5	µg/L	--	--	0.5 U	0.5 U	0.5 U	0.5 U	--	1.3 U	--	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	--	0.5 U	--
Styrene	5.4	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Tetrachloroethene	0.5	µg/L	--	--	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.25 U	0.1 U	0.1 U	0.2 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
trans-1,2-Dichloroethene	1.6	µg/L	--	--	0.5 U	**0.1**	0.1 U	**0.13**	0.1 U	0.25 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.12**	0.1 U
trans-1,3-Dichloropropene	NV	µg/L	--	--	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.4 U	0.3 U	0.3 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Trichloroethylene	0.5	µg/L	--	--	**1.4**	**0.33**	**0.27**	**0.26**	**0.2**	0.25 U	**0.16**	**0.11**	0.2 U	0.5 U	0.5 U	**0.11**	**0.24**	**0.35**	**0.34**	**0.4**	**0.41**
Trichlorofluoromethane	150	µg/L	--	--	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.5 U	5 U	5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Vinyl Chloride	0.5	µg/L	--	--	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					**OW31**				
		Sample ID	OW26S	OW26S	OW26S	OW26S	OW31	OW31	DUP	OW31-E	OW31
		Start Depth (m)	3.08	3.08	3.08	3.08	28.90	28.90	28.90	28.90	28.90
		End Depth (m)	4.60	4.60	4.60	4.60	33.32	33.32	33.32	33.32	33.32
		Sample Type	N	N	N	N	N	N	FD	N	N
		Sample Date	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	19 Sep 2016	08 Sep 2017	08 Sep 2017	17 Oct 2018	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**									
ABNs											
1,1'-Biphenyl	0.5	µg/L	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	3	µg/L	--	--	--	--	--	--	--	--	--
2,2'-oxybis(1-chloropropane)	120	µg/L	--	--	--	--	--	--	--	--	--
2,4 & 2,6-Dinitrotoluene	5	µg/L	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	59	µg/L	--	--	--	--	--	--	--	--	--
2,4-Dinitrophenol	10	µg/L	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--
2,6-Dinitrotoluene	NV	µg/L	--	--	--	--	--	--	--	--	--
3,3'-Dichlorobenzidine	0.5	µg/L	--	--	--	--	--	--	--	--	--
4-Chloroaniline	10	µg/L	--	--	--	--	--	--	--	--	--
Bis (2-chloroethyl) ether	5	µg/L	--	--	--	--	--	--	--	--	--
Bis (2-ethylhexyl) phthalate	10	µg/L	--	--	--	--	--	--	--	--	--
Diethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--
Dimethylphthalate	30	µg/L	--	--	--	--	--	--	--	--	--
Phenol	890	µg/L	--	--	--	--	--	--	--	--	--
BTEX											
Benzene	0.5	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	2.4	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	24	µg/L	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.79**	**1.1**
Xylene, o	NV	µg/L	0.1 U	0.2 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Xylenes, m & p	NV	µg/L	0.1 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Xylenes, Total	72	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorophenyls											
2,4,5-Trichlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	2	µg/L	--	--	--	--	--	--	--	--	--
2,4-Dichlorophenol	20	µg/L	--	--	--	--	--	--	--	--	--
2-Chlorophenol	8.9	µg/L	--	--	--	--	--	--	--	--	--
Pentachlorophenol	30	µg/L	--	--	--	--	--	--	--	--	--
Chemistry											
Alkalinity, Bicarbonate (as CaCO3)	NV	µg/L	--	--	--	--	**128000**	--	--	--	--
Alkalinity, Carbonate (as CaCO3)	NV	µg/L	--	--	--	--	10000 U	--	--	--	--
Alkalinity, Hydroxide (as CaCO3)	NV	µg/L	--	--	--	--	10000 U	--	--	--	--
Alkalinity, Total (as CaCO3)	NV	µg/L	--	--	--	--	**128000**	--	--	--	--
Ammonia	NV	µg/L	--	--	--	--	**1750**	--	--	--	--
Carbon, dissolved organic (DOC)	NV	µg/L	--	--	--	--	**2900**	--	--	--	--
Cation - Anion Balance	NV	%	--	--	--	--	0 U	--	--	--	--
Color	NV	CU	--	--	--	--	**72.1**	--	--	--	--
Conductivity % Difference	NV	%	--	--	--	--	0 U	--	--	--	--
Electrical Conductivity	NV	mS/cm	--	--	**0.891**	--	**1.09**	--	--	--	--
Hardness (as CaCO3)	NV	µg/L	--	--	--	--	0 U	--	--	--	--
Ion Balance	NV	%	--	--	--	--	0 U	--	--	--	--
Nitrate, as NO3	NV	µg/L	--	--	--	--	20 U	--	--	--	--
Nitrate-Nitrite, as N, Total	NV	µg/L	--	--	--	--	22 U	--	--	--	--
Nitrite, as NO2	NV	µg/L	--	--	--	--	10 U	--	--	--	--
pH	NV	pH UNITS	--	--	**7.38**	--	**8.08**	--	--	--	--
pH (Laboratory)	NV	pH UNITS	--	--	--	--	--	--	--	--	--
Phosphorus	NV	µg/L	--	--	--	--	50 U	--	--	--	--
Phosphorus, Total Orthophosphate (As P)	NV	µg/L	--	--	--	--	3 U	--	--	--	--
Saturation pH	NV	pH UNITS	--	--	--	--	0 U	--	--	--	--
Silica (as SIO2)	NV	µg/L	--	--	--	--	**2070000**	--	--	--	--
Sulfate	NV	µg/L	--	--	--	--	**117000**	--	--	--	--
Sulfur	NV	µg/L	--	--	--	--	**50600**	--	--	--	--
Total dissolved solids	NV	µg/L	--	--	--	--	**609000 U**	--	--	--	--
Turbidity	NV	NTU	--	--	--	--	**49.6**	--	--	--	--
Metals and Hydride Forming Metals											
Antimony	6	µg/L	--	--	**0.39**	--	**3.3**	--	--	--	--
Arsenic	25	µg/L	--	--	**0.49**	--	**0.17**	--	--	--	--
Barium	1000	µg/L	--	--	**64.1**	--	**4.44**	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					**OW31**				
		Sample ID	OW26S	OW26S	OW26S	OW26S	OW31	OW31	DUP	OW31-E	OW31
		Start Depth (m)	3.08	3.08	3.08	3.08	28.90	28.90	28.90	28.90	28.90
		End Depth (m)	4.60	4.60	4.60	4.60	33.32	33.32	33.32	33.32	33.32
		Sample Type	N	N	N	N	N	N	FD	N	N
		Sample Date	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	19 Sep 2016	08 Sep 2017	08 Sep 2017	17 Oct 2018	02 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**									
Beryllium	4	µg/L	--	--	0.1 U	--	0.1 U	--	--	--	--
Boron	5000	µg/L	--	--	**76**	--	**93**	--	--	--	--
Cadmium	2.1	µg/L	--	--	**0.783**	--	0.01 U	--	--	--	--
Calcium	NV	µg/L	--	--	--	--	**35600**	--	--	--	--
Chromium	50	µg/L	--	--	**0.55**	--	0.5 U	--	--	--	--
Cobalt	3.8	µg/L	--	--	**0.83**	--	0.1 U	--	--	--	--
Copper	69	µg/L	--	--	**9.68**	--	0.2 U	--	--	--	--
Lead	10	µg/L	--	--	**0.204**	--	0.05 U	--	--	--	--
Magnesium	NV	µg/L	--	--	--	--	**42300**	--	--	--	--
Molybdenum	70	µg/L	--	--	**2.64**	--	**18.8**	--	--	--	--
Nickel	100	µg/L	--	--	**5.39**	--	**0.65**	--	--	--	--
Selenium	10	µg/L	--	--	**0.264**	--	0.05 U	--	--	--	--
Silver	1.2	µg/L	--	--	0.05 U	--	0.05 U	--	--	--	--
Sodium	490000	µg/L	--	--	**48300**	--	**97800**	--	--	--	--
Thallium	2	µg/L	--	--	**0.128**	--	0.01 U	--	--	--	--
Uranium	20	µg/L	--	--	**3.53**	--	**0.015**	--	--	--	--
Vanadium	6.2	µg/L	--	--	0.5 U	--	0.5 U	--	--	--	--
Zinc	890	µg/L	--	--	**722**	--	1 U	--	--	--	--
Non-Regulated Metals											
Aluminum	NV	µg/L	--	--	--	--	5 U	--	--	--	--
Bismuth	NV	µg/L	--	--	--	--	0.05 U	--	--	--	--
Bromide	NV	µg/L	--	--	--	--	100 U	--	--	--	--
Cesium (Cs)	NV	µg/L	--	--	--	--	**1.58**	--	--	--	--
Fluoride	NV	µg/L	--	--	--	--	**105**	--	--	--	--
Iron	NV	µg/L	--	--	--	--	10 U	--	--	--	--
Lithium	NV	µg/L	--	--	--	--	**68.9**	--	--	--	--
Manganese	NV	µg/L	--	--	--	--	**269**	--	--	--	--
Potassium	NV	µg/L	--	--	--	--	**30600**	--	--	--	--
Rubidium (Rb)	NV	µg/L	--	--	--	--	**99.1**	--	--	--	--
Silicon	NV	µg/L	--	--	--	--	**968**	--	--	--	--
Strontium	NV	µg/L	--	--	--	--	**1050**	--	--	--	--
Tellurium	NV	µg/L	--	--	--	--	0.2 U	--	--	--	--
Thorium	NV	µg/L	--	--	--	--	0.1 U	--	--	--	--
Tin	NV	µg/L	--	--	--	--	**0.88**	--	--	--	--
Titanium	NV	µg/L	--	--	--	--	0.3 U	--	--	--	--
Tungsten	NV	µg/L	--	--	--	--	0.1 U	--	--	--	--
Zirconium	NV	µg/L	--	--	--	--	0.3 U	--	--	--	--
ORPs											
Chromium, Hexavalent (Cr6+)	25	µg/L	--	--	1 U	--	1 U	--	--	--	--
Chloride (Cl)	790000	µg/L	--	--	**80600**	--	**182000**	--	--	--	--
Cyanide, Free	52	µg/L	--	--	--	--	--	--	--	--	--
Cyanide, Weak Acid Dissociable	52	µg/L	--	--	--	--	--	--	--	--	--
Mercury	0.1	µg/L	--	--	0.01 U	--	0.01 U	--	--	--	--
PAHs											
1-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
2-(1-)Methylnaphthalene	3.2	µg/L	0.071 U	0.071 U	--	--	0.0283 U	--	--	--	--
2-Methylnaphthalene	NV	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Acenaphthene	4.1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Acenaphthylene	1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Anthracene	1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Benzo(a)anthracene	1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Benzo(a)pyrene	0.01	µg/L	0.01 U	0.01 U	--	--	0.01 U	--	--	--	--
Benzo(b&j)fluoranthene	0.1	µg/L	0.05 U	0.05 U	--	--	--	--	--	--	--
Benzo(b)fluoranthene	0.1	µg/L	--	--	--	--	0.02 U	--	--	--	--
Benzo(g,h,i)perylene	0.2	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Benzo(k)fluoranthene	0.1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Chrysene	0.1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Dibenzo(a,h)anthracene	0.2	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Fluoranthene	0.41	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

		Location					**OW31**				
		Sample ID	OW26S	OW26S	OW26S	OW26S	OW31	OW31	DUP	OW31-E	OW31
		Start Depth (m)	3.08	3.08	3.08	3.08	28.90	28.90	28.90	28.90	28.90
		End Depth (m)	4.60	4.60	4.60	4.60	33.32	33.32	33.32	33.32	33.32
		Sample Type	N	N	N	N	N	N	FD	N	N
		Sample Date	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	19 Sep 2016	08 Sep 2017	08 Sep 2017	17 Oct 2018	02 Mar 2020
Analyte	**Table 6 SCS** [a]	**Unit**									
Fluorene	120	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Indeno(1,2,3-Cd)Pyrene	0.2	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
Naphthalene	7	µg/L	0.05 U	0.05 U	--	--	0.05 U	--	--	--	--
Phenanthrene	1	µg/L	0.03 U	0.03 U	--	--	0.02 U	--	--	--	--
Pyrene	4.1	µg/L	0.05 U	0.05 U	--	--	0.02 U	--	--	--	--
PCBs											
Aroclor 1016	NV	µg/L	--	--	--	--	--	--	--	--	--
Aroclor 1221	NV	µg/L	--	--	--	--	--	--	--	--	--
Aroclor 1232	NV	µg/L	--	--	--	--	--	--	--	--	--
Aroclor 1242	NV	µg/L	--	--	0.02 U	--	0.02 U	--	--	--	--
Aroclor 1248	NV	µg/L	--	--	0.02 U	--	0.02 U	--	--	--	--
Aroclor 1254	NV	µg/L	--	--	0.02 U	--	0.02 U	--	--	--	--
Aroclor 1260	NV	µg/L	--	--	0.02 U	--	0.02 U	--	--	--	--
Aroclor 1262	NV	µg/L	--	--	--	--	--	--	--	--	--
Aroclor 1268	NV	µg/L	--	--	--	--	--	--	--	--	--
PCB, Total	0.2	µg/L	--	--	0.04 U	--	0.04 U	--	--	--	--
PHCs											
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)	420	µg/L	25 U	25 U	25 U	--	--	25 U	25 U	--	--
Petroleum Hydrocarbons F1 (C6-C10)	420	µg/L	25 U	25 U	25 U	--	25 U	25 U	25 U	--	--
Petroleum Hydrocarbons F1+F2	NV	µg/L	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16 less Naphthalene)	NV	µg/L	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F2 (C10-C16)	150	µg/L	100 U	100 U	100 U	--	100 U	100 U	100 U	--	--
Petroleum Hydrocarbons F3 (C16-C34 less PAHs)	NV	µg/L	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3 (C16-C34)	500	µg/L	200 U	200 U	250 U	--	250 U	250 U	250 U	--	--
Petroleum Hydrocarbons F3+F4	NV	µg/L	--	--	--	--	--	--	--	--	--
Petroleum Hydrocarbons F3a (C16-C22)	NV	µg/L	--	--	--	--	--	130 U	130 U	--	--
Petroleum Hydrocarbons F3b (C22-C34)	NV	µg/L	--	--	--	--	--	130 U	130 U	--	--
Petroleum Hydrocarbons F4 (C34-C50)	500	µg/L	200 U	200 U	250 U	--	250 U	250 U	250 U	--	--
Total Petroleum Hydrocarbons (C6 to C50)	NV	µg/L	--	--	370 U	--	--	--	--	--	--
SVOCs											
2-Hexanone	NV	µg/L	--	--	--	--	--	--	--	--	--
Benzo(e)pyrene	NV	µg/L	--	--	--	--	--	--	--	--	--
Chloroethane	NV	µg/L	--	--	--	--	--	--	--	--	--
Chloromethane	NV	µg/L	--	--	--	--	--	--	--	--	--
Perylene	NV	µg/L	--	--	--	--	--	--	--	--	--
VOCs											
1,1,1,2-Tetrachloroethane	1.1	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,1-Trichloroethane	23	µg/L	**2.1**	**1.9**	**1.44**	**1.75**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	5	µg/L	**3.9**	**3.4**	**3.37**	**3.92**	0.5 U	**0.64**	**0.67**	**0.58**	0.5 U
1,1-Dichloroethene	0.5	µg/L	**0.12**	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	0.2	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichlorobenzene	3	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	0.58	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	59	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene	0.5	µg/L	0.28 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	0.5	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dioxane	50	µg/L	--	--	20 U	--	--	20 U	--	--	--
2-Butanone	1800	µg/L	5 U	10 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
4-Methyl-2-Pentanone	640	µg/L	5 U	5 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Acetone	2700	µg/L	10 U	10 U	30 U	30 U	30 U	30 U	30 U	30 U	30 U
Bromodichloromethane	16	µg/L	0.1 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Bromoform	5	µg/L	0.2 U	1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane	0.89	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.2	µg/L	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Chlorobenzene	30	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorodibromomethane	25	µg/L	0.2 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U

Table 6-8. Summary of Sampling Results in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

			Location								
			Sample ID	OW26S	OW26S	OW26S	OW26S	OW31	OW31	DUP	OW31-E	OW31
			Start Depth (m)	3.08	3.08	3.08	3.08	28.90	28.90	28.90	28.90	28.90
			End Depth (m)	4.60	4.60	4.60	4.60	33.32	33.32	33.32	33.32	33.32
			Sample Type	N	N	N	N	N	N	FD	N	N
			Sample Date	18 Nov 2015	26 Oct 2016	31 Aug 2017	26 Feb 2020	19 Sep 2016	08 Sep 2017	08 Sep 2017	17 Oct 2018	02 Mar 2020
Analyte	**Table 6 SCS [a]**	**Unit**										
Chloroform	2	µg/L	0.1 U	**0.57**	**1.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	1.6	µg/L	**0.64**	**0.5**	**0.52 J**	**0.65**	**1.88**	**1.98**	**2.01**	**2.01**	**1.39**
cis-1,3-Dichloropropene	NV	µg/L	0.2 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Dichlorodifluoromethane	590	µg/L	0.5 U	1 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Dichloromethane	26	µg/L	0.5 U	2 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl tert-butyl ether (MTBE)	15	µg/L	0.2 U	0.5 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
n-Hexane	5	µg/L	0.5 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	5.4	µg/L	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	0.5	µg/L	0.1 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,2-Dichloroethene	1.6	µg/L	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NV	µg/L	0.2 U	0.4 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
Trichloroethylene	0.5	µg/L	**0.32**	**0.29**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	150	µg/L	0.2 U	0.5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Chloride	0.5	µg/L	0.2 U	0.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

[a] MECP (2011) Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition, residential/parkland/institutional land use, coarse soil texture.

Source: Ontario Ministry of the Environment, Parks and Conservation (MECP). 2011. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* Ministry of the Environment. April 15.

Notes:

Bold values indicate concentrations detected above the method detection limit

Shaded values indicate the result is greater than the Table 6 SCS.

% = percent

-- = not analyzed

µg/L = microgram(s) per litre

ABNs = acid, base and neutral compounds

BTEX - benzene, toluene, ethylbenzene, and xylene

CPs = chlorophenols

FD = field duplicate

J = associated value is estimated

m = metre(s)

MECP = Ministry of the Environment, Conservation and Parks

mS/cm = milliSiemen(s) per centimetre

N = normal sample

NV = no value

OCPs = organochlorine pesticides

ORPs = other regulated parameters

PCBs = polychlorinated biphenyls

PHCs = petroleum hydrocarbons

SAR = sodium adsorption ratio

SVOCs = semi-volatile organic compounds

U = parameter was not detected above the associated value

VOCs = volatile organic compounds

Table 6-9. Maximum Detected Concentrations in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte Group	Analyte Name	Unit	Maximum Detected Concentration	Location	Sample Name	Sample Type	Sample Date	Start Depth	End Depth	SDG
BTEX	Benzene	µg/l	66.8	MW17-105S	MW17-105S	N	10/31/2017	3.2	4.72	L2017929
BTEX	Ethylbenzene	µg/l	8.46	MW17-109S	MW17-109S	N	3/2/2020	2.79	4.32	L2423564
BTEX	Toluene	µg/l	1.74	MW18-112G	MW-112 G	N	11/22/2018	19.35	20.88	L2200634
BTEX	Xylene, o	µg/l	3.1	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
BTEX	Xylenes, m & p	µg/l	37.4	MW17-105S	MW17-105S	N	10/31/2017	3.2	4.72	L2017929
BTEX	Xylenes, Total	µg/l	38.6	MW17-105S	MW17-105S	N	10/31/2017	3.2	4.72	L2017929
Metals	Barium	µg/l	283	OW13-39D	OW13-39D	N	9/7/2017	10.68	12.2	L1988005
Metals	Boron	µg/l	251	OW13-39D	OW13-39D	N	9/7/2017	10.68	12.2	L1988005
Metals	Cadmium	µg/l	1.33	OW12	OW12	N	9/5/2017	1.76	4.81	L1986110
Metals	Chromium	µg/l	13.3	MW18-114D	MW18-114D	N	12/10/2018	19.2	20.73	L2209758
Metals	Cobalt	µg/l	5.79	OW11-II	DUP3	FD	9/1/2017	6.28	7.8	L1985429
Metals	Copper	µg/l	14.4	OW07-37	OW07-37	N	9/6/2017	3.1	6.15	L1988005
Metals	Lead	µg/l	17	OW09-II	OW9-II	N	12/12/2012	6.33	7.85	B2J7139
Metals	Molybdenum	µg/l	52.4	MW18-114D	MW18-114D	N	12/10/2018	19.2	20.73	L2209758
Metals	Nickel	µg/l	16.2	OW22S	OW22S	N	9/6/2017	1.36	4.1	L1988005
Metals	Selenium	µg/l	6.26	MW17-101S	MW17-101S	N	11/1/2017	1.22	4.27	L2017929
Metals	Thallium	µg/l	0.984	OW07-32	OW07-32	N	9/6/2017	3.17	6.22	L1988005
Metals	Uranium	µg/l	25.9	OW22S	OW22S	N	9/6/2017	1.36	4.1	L1988005
Metals	Vanadium	µg/l	1.66	OW07-31	OW07-31	N	9/5/2017	1.5	6.22	L1986110
Metals	Zinc	µg/l	4500	OW19	OW19	N	3/23/2010	1.77	4.82	B035447
Metals, Ca & Mg	Calcium	µg/l	440000	OW22S	OW 22(S)	N	9/20/2011	1.36	4.1	B1E6126
Metals, Ca & Mg	Magnesium	µg/l	46000	OW14	OW 14	N	9/20/2011	6.29	7.81	B1E6126
Metals, HF	Antimony	µg/l	6.2	MW18-114D	MW18-114D	N	12/10/2018	19.2	20.73	L2209758
Metals, HF	Arsenic	µg/l	45.7	OW07-31	OW07-31	N	9/5/2017	1.5	6.22	L1986110
Metals, Na	Sodium	µg/l	183000	MW18-120D	MW18-120D	N	7/30/2018	18.59	20.11	L2139225
Metals, Other	Bromide	µg/l	1000	OW16	OW16	N	10/7/2010	1.82	4.87	B0E3110
Metals, Other	Cesium (Cs)	µg/l	1.58	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Fluoride	µg/l	3900	OW14	OW14	N	10/7/2010	6.29	7.81	B0E3110
Metals, Other	Iron	µg/l	8900	OW23S	OW23(S)	N	12/12/2012	2.52	5.26	B2J7139
Metals, Other	Lithium	µg/l	68.9	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Manganese	µg/l	1200	OW23S	OW23(S)	N	12/12/2012	2.52	5.26	B2J7139
Metals, Other	Potassium	µg/l	30600	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Rubidium (Rb)	µg/l	99.1	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Silicon	µg/l	968	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Strontium	µg/l	1050	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
Metals, Other	Tin	µg/l	0.88	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
ORPs	Chloride (Cl)	µg/l	327000	OW07-31	OW07-31	N	9/5/2017	1.5	6.22	L1986110
ORPs	Electrical Conductivity	mS/cm	2	OW22S	OW 22(S)	N	9/20/2011	1.36	4.1	B1E6126
ORPs	pH	pH UNITS	8.08	OW31	OW31	N	9/19/2016	28.9	33.32	L1830739
PAH	2-(1-)Methylnaphthalene	µg/l	280	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PAH	Acenaphthene	µg/l	40	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PAH	Acenaphthylene	µg/l	0.553	MW17-109S	MW17-109S	N	11/2/2017	2.79	4.32	L2017929
PAH	Anthracene	µg/l	31	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PAH	Benzo(a)anthracene	µg/l	21	OW23S	OW23S	N	11/20/2015	2.52	5.26	B5N9633
PAH	Benzo(a)pyrene	µg/l	2.4	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
PAH	Benzo(b&j)fluoranthene	µg/l	6.1	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
PAH	Benzo(b)fluoranthene	µg/l	0.248	OW22S	OW22S	N	9/6/2017	1.36	4.1	L1988005
PAH	Benzo(g,h,i)perylene	µg/l	0.1	OW07-31	OW07- 31	N	3/29/2007	1.5	6.22	07T217626
PAH	Benzo(k)fluoranthene	µg/l	0.26	OW25	OW 25	N	9/19/2011	1.98	4.72	B1E6126

Table 6-9. Maximum Detected Concentrations in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Analyte Group	Analyte Name	Unit	Maximum Detected Concentration	Location	Sample Name	Sample Type	Sample Date	Start Depth	End Depth	SDG
PAH	Chrysene	µg/l	38	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
PAH	Dibenzo(a,h)anthracene	µg/l	0.1	OW07-31	OW07- 31	N	3/29/2007	1.5	6.22	07T217626
PAH	Fluoranthene	µg/l	24	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
PAH	Fluorene	µg/l	83	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PAH	Indeno(1,2,3-Cd)Pyrene	µg/l	0.1	OW07-31	OW07- 31	N	3/29/2007	1.5	6.22	07T217626
PAH	Naphthalene	µg/l	27	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PAH	Phenanthrene	µg/l	110	OW23S	OW23S	N	11/20/2015	2.52	5.26	B5N9633
PAH	Pyrene	µg/l	59	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
PCB	Aroclor 1242	µg/l	0.037	MW18-125S	MW18-125S	N	8/2/2018	4.26	5.79	L2141576
PCB	Aroclor 1254	µg/l	0.66	OW26S	OW26S	N	3/24/2010	3.08	4.6	B036036
PCB	Aroclor 1260	µg/l	0.61	OW26S	OW26S	N	3/24/2010	3.08	4.6	B036036
PCB	PCB, Total	µg/l	1.27	OW26S	OW26S	N	3/24/2010	3.08	4.6	B036036
PHC	Petroleum Hydrocarbons F1 (C6-C10)	µg/l	1100	OW24D	OW 24(D)	N	9/20/2011	6.55	7.77	B1E6126
PHC	Petroleum Hydrocarbons F2 (C10-C16)	µg/l	210000	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PHC	Petroleum Hydrocarbons F3 (C16-C34)	µg/l	850000	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
PHC	Petroleum Hydrocarbons F4 (C34-C50)	µg/l	37000	OW22S	OW22S	N	10/25/2016	1.36	4.1	B6N2170
SVOC	Benzo(e)pyrene	µg/l	0.065	OW22S	OW22(S)	N	10/25/2013	1.36	4.1	B3I4530
VOC	1,1,1-Trichloroethane	µg/l	37.1	OW11-II	OW11-II	N	9/1/2017	6.28	7.8	L1985429
VOC	1,1-Dichloroethane	µg/l	29.5	OW11-II	OW11-II	N	9/1/2017	6.28	7.8	L1985429
VOC	1,1-Dichloroethene	µg/l	64	OW24D	OW24D	N	11/20/2015	6.55	7.77	B5N9633
VOC	Acetone	µg/l	14	OW23S	OW23S	N	10/25/2016	2.52	5.26	B6N2170
VOC	Bromodichloromethane	µg/l	7.3	MW18-112G	MW-112 G	N	11/22/2018	19.35	20.88	L2200634
VOC	Chlorodibromomethane	µg/l	7.4	MW18-112G	MW-112 G	N	11/22/2018	19.35	20.88	L2200634
VOC	Chloroform	µg/l	5.8	MW18-112G	MW-112 G	N	11/22/2018	19.35	20.88	L2200634
VOC	cis-1,2-Dichloroethene	µg/l	960	OW24D	OW24D	N	11/20/2015	6.55	7.77	B5N9633
VOC	n-Hexane	µg/l	7.46	MW17-105S	MW17-105S	N	10/31/2017	3.2	4.72	L2017929
VOC	Tetrachloroethene	µg/l	1.14	OW19	OW19	N	3/21/2018	1.77	4.82	L2070926
VOC	trans-1,2-Dichloroethene	µg/l	81	OW24D	OW24D	N	11/20/2015	6.55	7.77	B5N9633
VOC	Trichloroethylene	µg/l	7900	OW24D	OW24D	N	11/20/2015	6.55	7.77	B5N9633
VOC	Vinyl Chloride	µg/l	86	OW24D	OW 24(D)	N	9/20/2011	6.55	7.77	B1E6126

Notes:

µg/l = microgram(s) per litre
ABN - acid, base, and neutral compounds
BTEX = benzene, toluene, ethylbenzene, and xylenes
Ca & Mg = calcium and magnesium
F = fraction
FD = field duplicate
HF = hydride-forming
J = noted result was estimated
mbgs = metre(s) below ground surface
mS/cm = milliSiemen(s) per centimetre
N = normal sample
Na = sodium
ORP = other regulated parameters
PAH = polycyclic aromatic hydrocarbons
PCB = polychlorinated biphenyls
pg/g = picogram(s) per gram
PHC = petroleum hydrocarbons
SAR = sodium adsorption ratio
SDG = sample delivery group
VOC = volatile organic compounds

Table 6-10c. Rationale for the Removal of Groundwater COCs with Subsequent Sampling Events

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
BTEX	Benzene Ethylbenzene	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW22S exceedance in 2016, subsequent two events in 2017 and 2018 meet SCS	Benzene was measured at 1.1 µg/L and ethylbenzene at 7.1 µg/L in 2016 at OW22S. Historical analyses from seven sampling events and two sampling events in 2017 and 2018 at this location met the SCS of 0.5 and 2.4 µg/L, respectively. Based on the available information, these parameters were determined to likely not be present at OW22S at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, they were not carried through for the dataset for the Risk Assessment. The parameters were retained as a COCs for the Phase Two Property based on other locations exceeding the SCS.
METALS	Antimony	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	MW18-114D exceedance in December 2018, subsequent two events in 2018 and 2019 meet SCS	Antimony was measured at a concentration of 6.2 µg/L in December 2018 at the newly installed MW18-114D. Antimony was not detected at concentrations greater than the SCS in the shallower MW18-114S nested with MW18-114D. Two subsequent sampling events in December 2018 and March 2019 had concentrations less than the SCS at 1.54 µg/L and 0.12 µg/L, respectively. The other samples in groundwater (101 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.
METALS	Arsenic	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	MW17-101D exceedance in 2017, subsequent two events in 2018 meet SCS	Arsenic was measured at 44.8 µg/L in 2017 at MW17-101D. Subsequent two sampling events in 2018 are significantly below the SCS of 25 µg/L, at 6.87 and 6.19 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however, it was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
METALS	Cobalt	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW11-II exceedance in 2017, subsequent two events in 2018 meet SCS	Cobalt was measured at 5.79/5.74 µg/L in 2017 at OW11-II. No historical samples at this location were analyzed for cobalt. Subsequent two sampling events in 2018 are less than the SCS of 3.8 µg/L, at 1.36 and < 0.10 µg/L. The other samples in groundwater (90 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.
METALS	Lead	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW07-33 exceedance in 2017, subsequent two events in 2018 meet SCS	Lead was measured at 15/15.6 µg/L in 2017 at OW07-33. A sample collected in 2007 met the SCS of 10 µg/L, with a concentration of 4.07 µg/L along with two subsequent sampling events in 2018, at 8.9 and 7.37/7.68 µg/L. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however, was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
METALS	Uranium	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW22S exceedance in 2017, subsequent two events in 2018 meet SCS	Uranium was measured at 25.9 µg/L in 2017 at OW22S. No historical samples at this location were analyzed for uranium. Subsequent two sampling events in 2018 were less than the SCS of 20 µg/L, at 7.24 and 6.05 µg/L. The other samples in groundwater (84 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.
METALS	Zinc	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW26S exceedance in 2012, subsequent three events meet SCS; OW12 exceedance in 2010, subsequent three events meet SCS.	Zinc was measured at concentrations of 900 µg/L and 910 µg/L at OW26S and OW12, respectively. Historical analyses at these locations had zinc concentrations less than the SCS. Three subsequent sampling events at each location (in 2013, 2014, and 2017 for OW26S; and in 2011 [two samples] and 2017 for OW12) had concentrations of zinc less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at these locations; however, it was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
METALS	Zinc	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW07-37 exceedance in 2007, subsequent two events in 2017 and 2019 meet SCS.	Zinc was measured at a concentration of 1,630 µg/L in 2007 at OW07-37 greater than the SCS of 890 µg/L. Two subsequent sampling events conducted in 2017 and 2019 had concentrations less than the SCS of 681 µg/L and 744 µg/L, respectively. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however, it was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.

Table 6-10c. Rationale for the Removal of Groundwater COCs with Subsequent Sampling Events

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

Parameter Group	Parameter	Category	Sample(s)	Comment/Rationale
PAH	Benzo(a)pyrene	Parameters with existing SCS, previous exceedances and current samples meeting SCS	OW03-I exceedance in various years, subsequent two events in 2017 and 2019 meet SCS	Benzo(a)pyrene has been measured at concentration ranging from 0.0011 to 0.02 µg/L in OW03-I, greater than the SCS of 0.01 µg/L. Concentrations have been nondetect and less than the SCS in two previous sampling events (2012 and 2013) and two subsequent sampling events completed in 2017 and 2019. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however, it was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
PAH	Benzo(a)pyrene Benzo(k)fluoranthene Benzo(b&j)fluoranthene	Parameters with existing SCS, previous exceedances and current samples meeting SCS	OW25 exceedance in various years, subsequent two events in 2019 meet SCS	Benzo(a)pyrene has been measured at concentrations ranging from 0.034 to 1 µg/L in OW25, greater than the SCS of 0.01 µg/L in October 2010 and October 2018. Concentrations have been nondetect in 2010 (March), 2011 (two sampling events), 2012, 2013, 2014, 2015, 2016, 2017, and 2019 (two sampling events). Benzo(k)fluoranthene has been measured at a concentration of 0.26 µg/L, greater than the SCS of 0.1 µg/L in September 2011. Concentrations have been nondetect in three previous sampling events and nine subsequent sampling events. Benzo(b&j)fluoranthene has been measured at concentrations ranging from 1.1 to 3.1 µg/L, greater than the SCS of 0.1 µg/L in November 2015 and October 2016. Concentrations have been nondetect in seven previous sampling events and four subsequent sampling events. Based on the available information, these parameters were determined to likely not be present at concentrations exceeding the SCS at this location; however, they were carried through as a COCs because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
PCB	PCBs, Total	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW26S exceedance in 2010, subsequent two events in 2011 and 2017 meet SCS	PCBs were measured at 1.27 µg/L in 2010 at OW26S. Subsequent sampling events in 2011 and 2017 were reported with nondetect concentrations and RLs less than the SCS of 0.20 µg/L. The other samples in groundwater (24 samples) on the Phase Two Property met the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.
PHCs	PHC F2	Parameters with existing SCS, one exceedance and subsequent samples meeting SCS	OW18-II exceedance in 2015, subsequent two events meet SCS	PHC F2 was measured at 210 µg/L in 2015 at OW18-II in November 2015. Six previous sampling events (2010, 2011 [two samples], 2012, 2013, and 2014) and two subsequent sampling events (2016 and 2017) reported concentrations less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS at this location; however, it was carried through as a COC because of detected concentrations exceeding the SCS at another location on the Phase Two Property.
VOC	Chloroform	Parameter with "introduced" exceedance	1 sample from MW18-112G had a detected exceedance of the SCS from December 2018.	The initial groundwater sample collected on November 22, 2018, from MW18-112D after drilling/bedrock coring, purging, and well development had a concentration of 5.8 µg/L greater than the SCS of 2 µg/L. The source of the chloroform exceedance was believed to be related to the municipal water that was used during the bedrock coring process. Two samples, one from the water truck and one from the water truck hose that was used during the coring activities, were analyzed for VOCs. VOCs were nondetect in these samples apart from bromodichloromethane (12.5 to 12.9 µg/L), dibromochloromethane (11.5 to 11.8 µg/L), and chloroform (9.8 to 10.1 µg/L). These analytes are trihalomethanes that are typically present in municipally treated water. Two subsequent groundwater samples were collected on November 29 and December 3, 2019, with nondetect concentrations of chloroform less than the SCS. The wells across the site were sampled for VOCs in 2020, and each sample reported nondetect concentrations of chloroform less than the SCS. Based on the available information, this parameter was determined to likely not be present at concentrations exceeding the SCS; therefore, at the discretion of the QPESA, it was not considered to be a COC for the Phase Two Property.

Notes:
The rationale for the exclusion of anomalous data listed in this table is based on the data collected as part of the ESA and only applies to this ESA.

µg/L = micrograms per gram
ABN = acid, base, and neutral compound
APEC = area of potential environmental concern
COC = contaminant of concern
COPC = contaminant of potential concern
CP = chlorophenol
ESA = Environmental Site Assessment
mbgs = metre(s) below ground surface
RL = laboratory reporting limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
No. = number
OCP = organochlorine pesticide
PAH = polycyclic aromatic hydrocarbon
PCA = potentially contaminating activity
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
QPESA = MECP Qualified Person for Environmental Site Assessment
RSC = Record of Site Condition
SCS = Site Condition Standards
VOC = volatile organic compound

Table 6-10d. Contaminants of Concern Identified in Groundwater

Phase Two Environmental Site Assessment, 200 Beverley Street, Guelph, Ontario

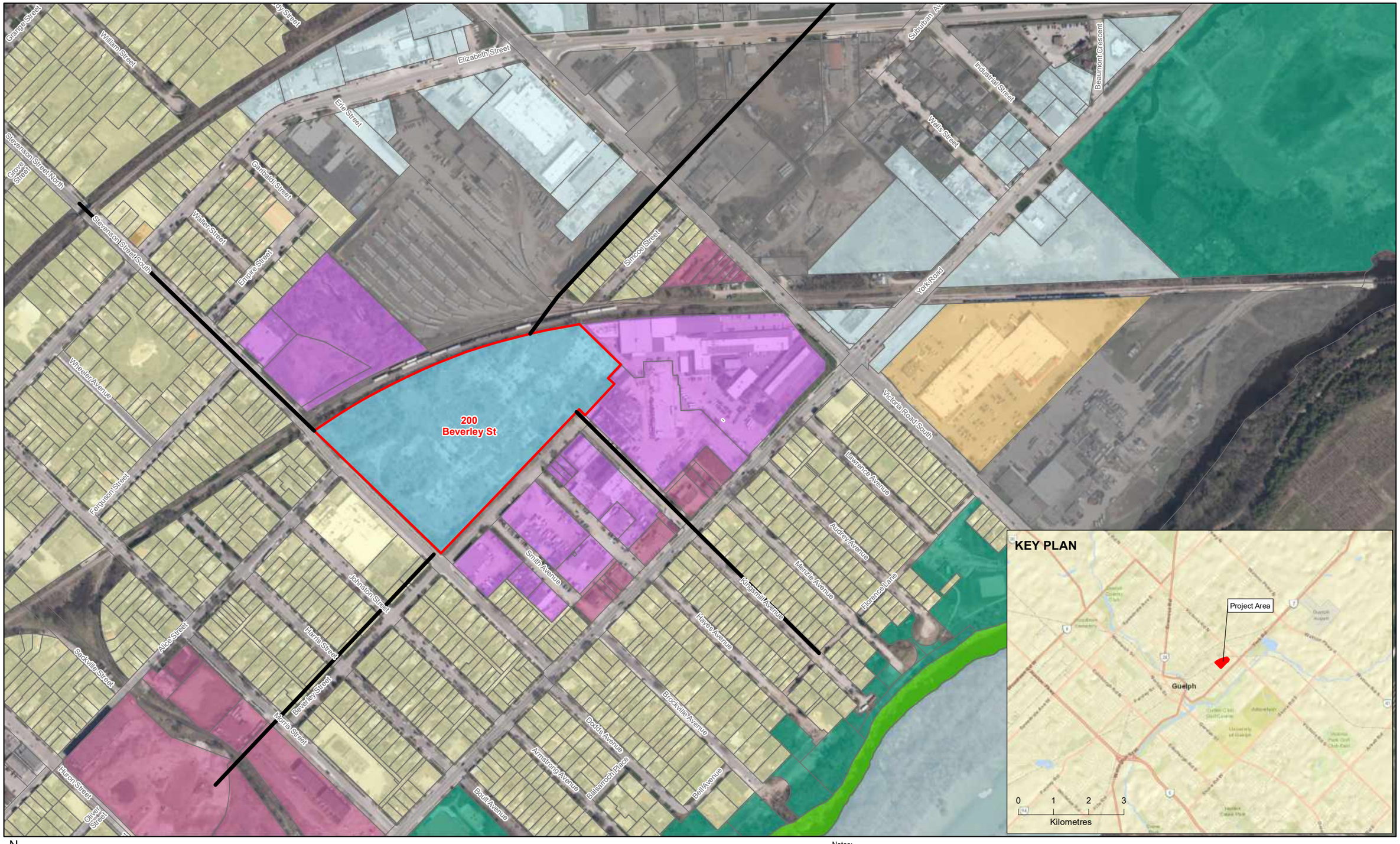
Groundwater COCs	
1,1,1-Trichloroethane	F1 (C6-C10)
1,1-Dichloroethane	F2 (C10-C16)
1,1-Dichloroethene	F3 (C16-C34)
2-(1-)Methylnaphthalene	F4 (C34-C50)
Acenaphthene	Fluoranthene
Anthracene	Lead
Arsenic	Naphthalene
Benzene	n-Hexane
Benzo(a)anthracene	Phenanthrene
Benzo(a)pyrene	Pyrene
Benzo(b&j)fluoranthene	Tetrachloroethene
Benzo(k)fluoranthene	trans-1,2-Dichloroethene
Chrysene	Trichloroethylene
cis-1,2-Dichloroethene	Vinyl Chloride
Ethylbenzene	Zinc

Notes:

COC = contaminant of concern

F = fraction

Figures



N

0 50 100 150
Metres

Reporting Cardinal Directions
Former IMICO Property Boundary
Property Parcel

Land Use
Industrial
Low Density Residential
Mixed Business
Mixed Office Commerical
Neighbourhood Commercial Centre
Open Space and Park
Service Commericial
Significant Natural Area
Special Study Area

Notes:
1. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. Source of Land use: City of Guelph Official Plan, Schedule 2.

Figure 2-1
Site Location
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\SITELOCATION.MXD KA077569 5/5/2020 8:22:13 AM

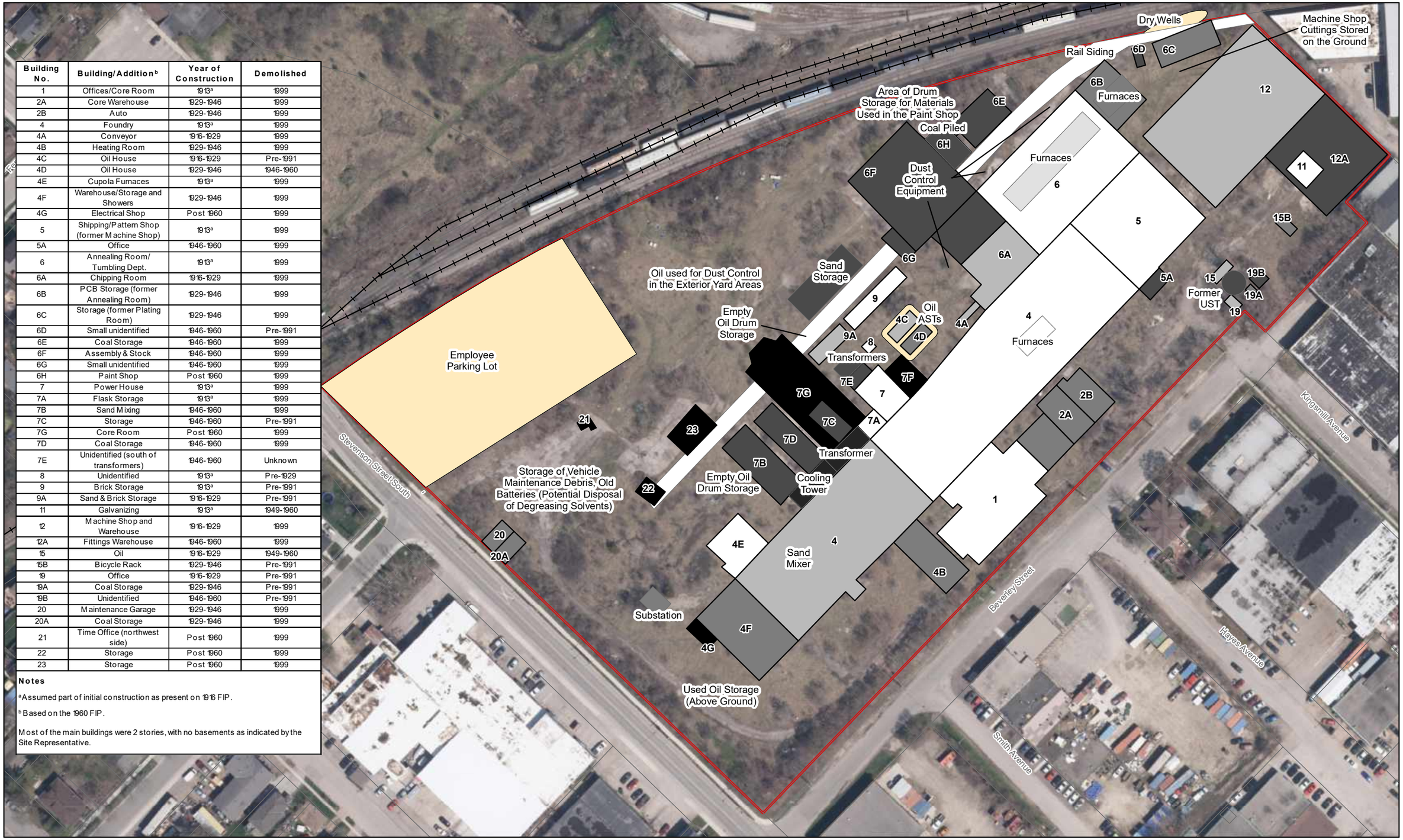
Building No.	Building/Addition[b]	Year of Construction	Demolished
1	Offices/Core Room	1913[a]	1999
2A	Core Warehouse	1929-1946	1999
2B	Auto	1929-1946	1999
4	Foundry	1913[a]	1999
4A	Conveyor	1916-1929	1999
4B	Heating Room	1929-1946	1999
4C	Oil House	1916-1929	Pre-1991
4D	Oil House	1929-1946	1946-1960
4E	Cupola Furnaces	1913[a]	1999
4F	Warehouse/Storage and Showers	1929-1946	1999
4G	Electrical Shop	Post 1960	1999
5	Shipping/Pattern Shop (former Machine Shop)	1913[a]	1999
5A	Office	1946-1960	1999
6	Annealing Room/ Tumbling Dept.	1913[a]	1999
6A	Chipping Room	1916-1929	1999
6B	PCB Storage (former Annealing Room)	1929-1946	1999
6C	Storage (former Plating Room)	1929-1946	1999
6D	Small unidentified	1946-1960	Pre-1991
6E	Coal Storage	1946-1960	1999
6F	Assembly & Stock	1946-1960	1999
6G	Small unidentified	1946-1960	1999
6H	Paint Shop	Post 1960	1999
7	Power House	1913[a]	1999
7A	Flask Storage	1913[a]	1999
7B	Sand Mixing	1946-1960	1999
7C	Storage	1946-1960	Pre-1991
7G	Core Room	Post 1960	1999
7D	Coal Storage	1946-1960	1999
7E	Unidentified (south of transformers)	1946-1960	Unknown
8	Unidentified	1913[a]	Pre-1929
9	Brick Storage	1913[a]	Pre-1991
9A	Sand & Brick Storage	1916-1929	Pre-1991
11	Galvanizing	1913[a]	1949-1960
12	Machine Shop and Warehouse	1916-1929	1999
12A	Fittings Warehouse	1946-1960	1999
15	Oil	1916-1929	1949-1960
15B	Bicycle Rack	1929-1946	Pre-1991
19	Office	1916-1929	Pre-1991
19A	Coal Storage	1929-1946	Pre-1991
19B	Unidentified	1946-1960	Pre-1991
20	Maintenance Garage	1929-1946	1999
20A	Coal Storage	1929-1946	1999
21	Time Office (northwest side)	Post 1960	1999
22	Storage	Post 1960	1999
23	Storage	Post 1960	1999

Notes

[a] Assumed part of initial construction as present on 1916 FIP.

[b] Based on the 1960 FIP.

Most of the main buildings were 2 stories, with no basements as indicated by the Site Representative.



N

0 10 20 30

Metres

Railway
Former IMICO Property Boundary

Reference to Date Building Built

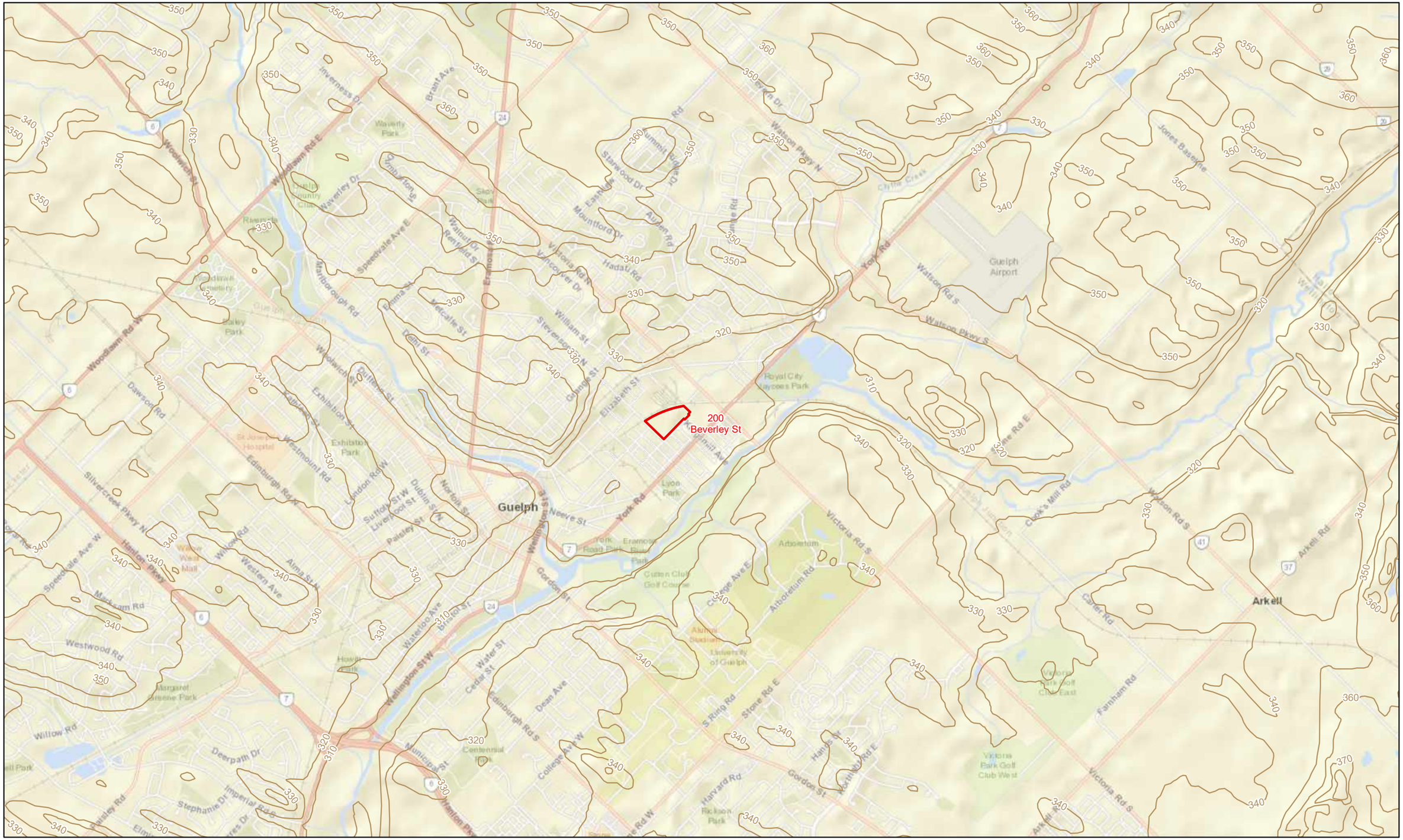
Fire Insurance Plan, 1916
Fire Insurance Plan, Maar. 1922, Reprinted Oct 1929
Fire Insurance Plan, Mar. 1922, Reprinted 1946
Fire Insurance Plan, June 1960
From Procter & Redfern Draft Report, June 10, 1991
Post 1960
Unknown Date
Unknown Date, Extent

Notes:
1. Source of Imagery: Esri, City of Guelph Ortho 2012
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 2-2
Site Plan and Historical Buildings
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\SITEOPERATIONS.MXD KA077569 5/8/2020 2:01:12 PM



N

0 250 500 750 1,000
Metres

Former IMICO Property Boundary
Elevation Contour (10-m Interval)

Notes:
1. Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
2. Topography Contours obtained from Canvec.

Figure 3-1
Regional Topography
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\REGIONALTOPOGRAPHY.MXD KA077569 4/22/2020 12:20:37 PM

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/. http://open.guelph.ca/.

Figure 4-1a
Potentially Contaminating Activities - Onsite
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

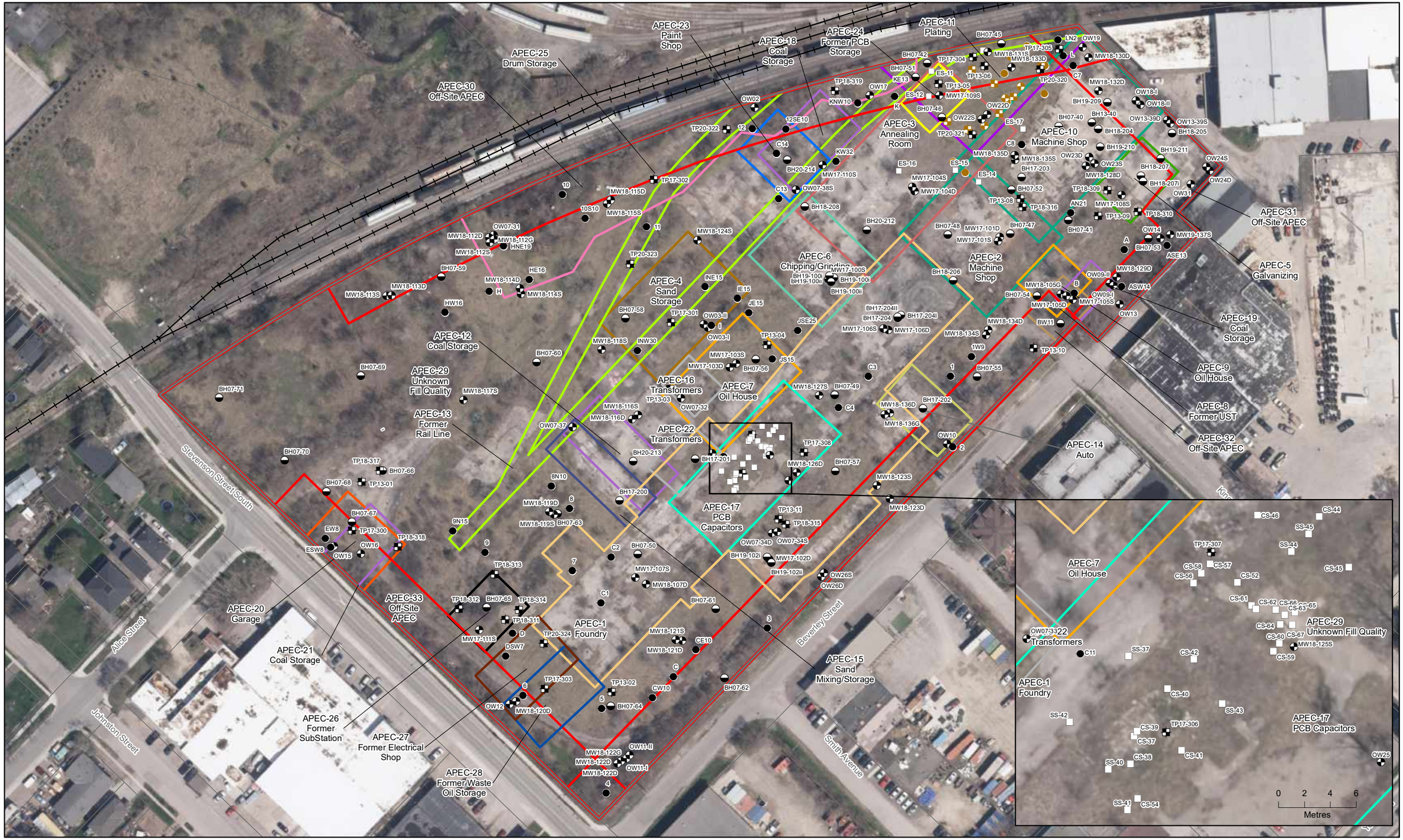
Jacobs

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/. http://open.guelph.ca/.

Figure 4-1b
Potentially Contaminating Activities - Offsite
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\PCA_OFFSITE.MXD KA077569 5/8/2020 12:39:51 PM



N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- Railway
- Former IMICO Property Boundary
- Property Parcel

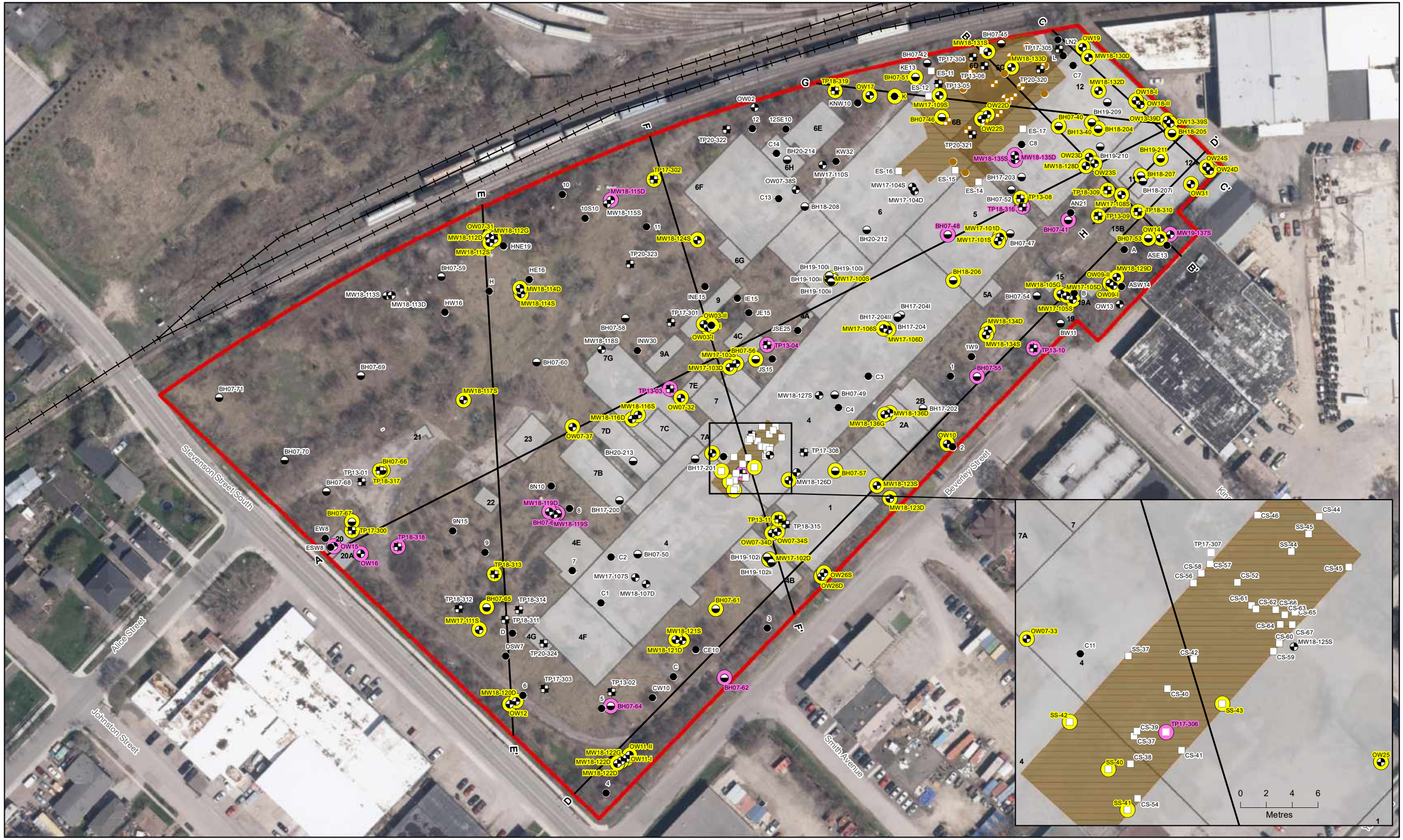
Area of Potential Concern
- Annealing Room
- Auto
- Chipping/Grinding
- Coal Storage
- Drum Storage
- Former Electrical Shop
- Former PCB Storage
- Former Rail Line
- Former SubStation
- Former UST
- Former Waste Oil Storage
- Foundry
- Galvanizing
- Garage
- Machine Shop
- Off-Site APEC
- Oil House
- PCB Capacitors
- Paint Shop
- Plating
- Sand Mixing/Storage
- Sand Storage
- Transformers
- Unknown Fill Quality

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/. http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 4-2
APECs Sampling Locations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\APECS_SAMPLINGLOCATIONS.MXD KA077569 5/5/2020 9:31:38 AM

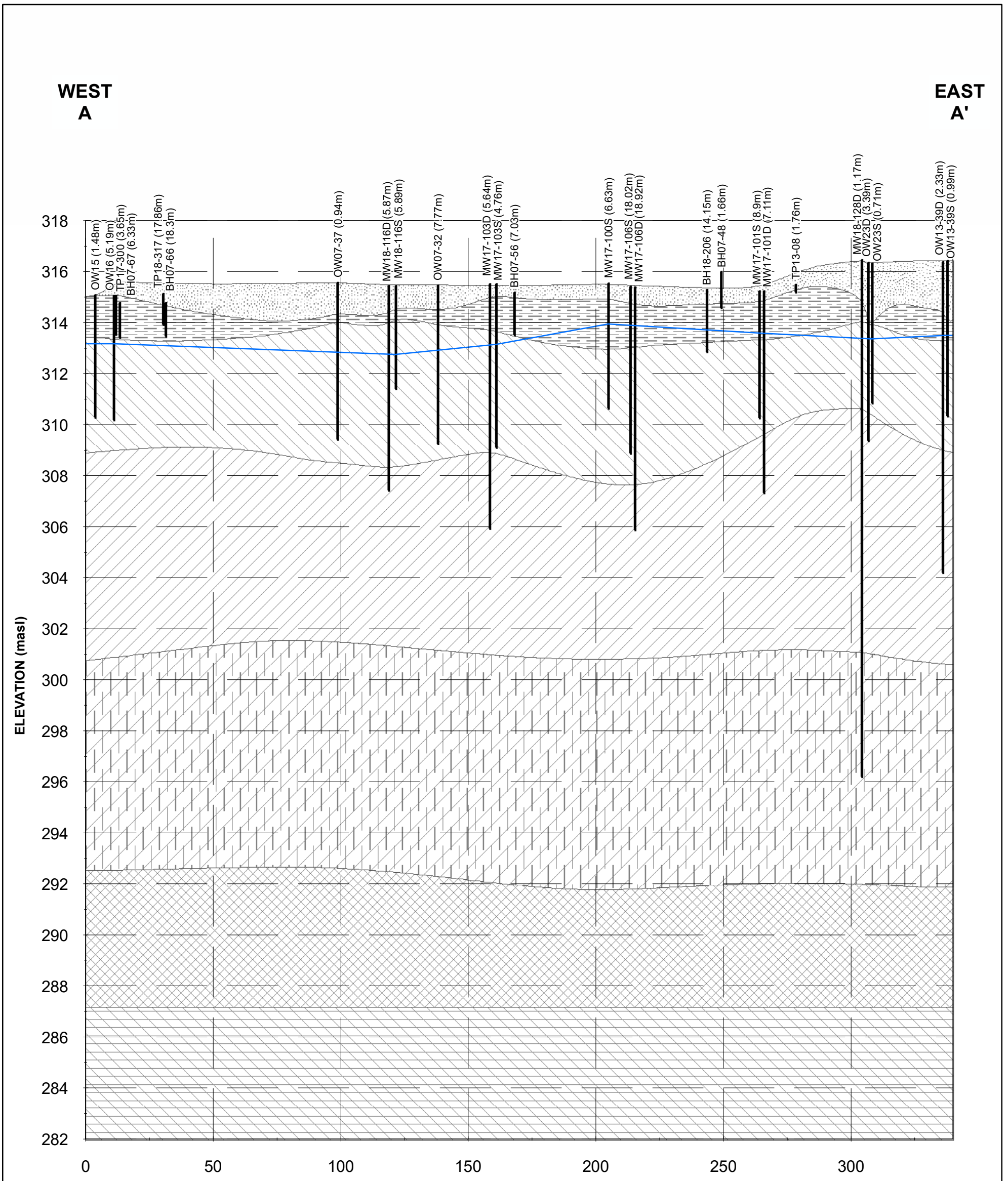


Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.
3. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.

Figure 6-1
Geological Cross-Section Locations
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\CROSSSECTION_LOCATIONS.MXD KA077569 5/5/2020 9:59:03 AM



- Approximate Groundwater Elevation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

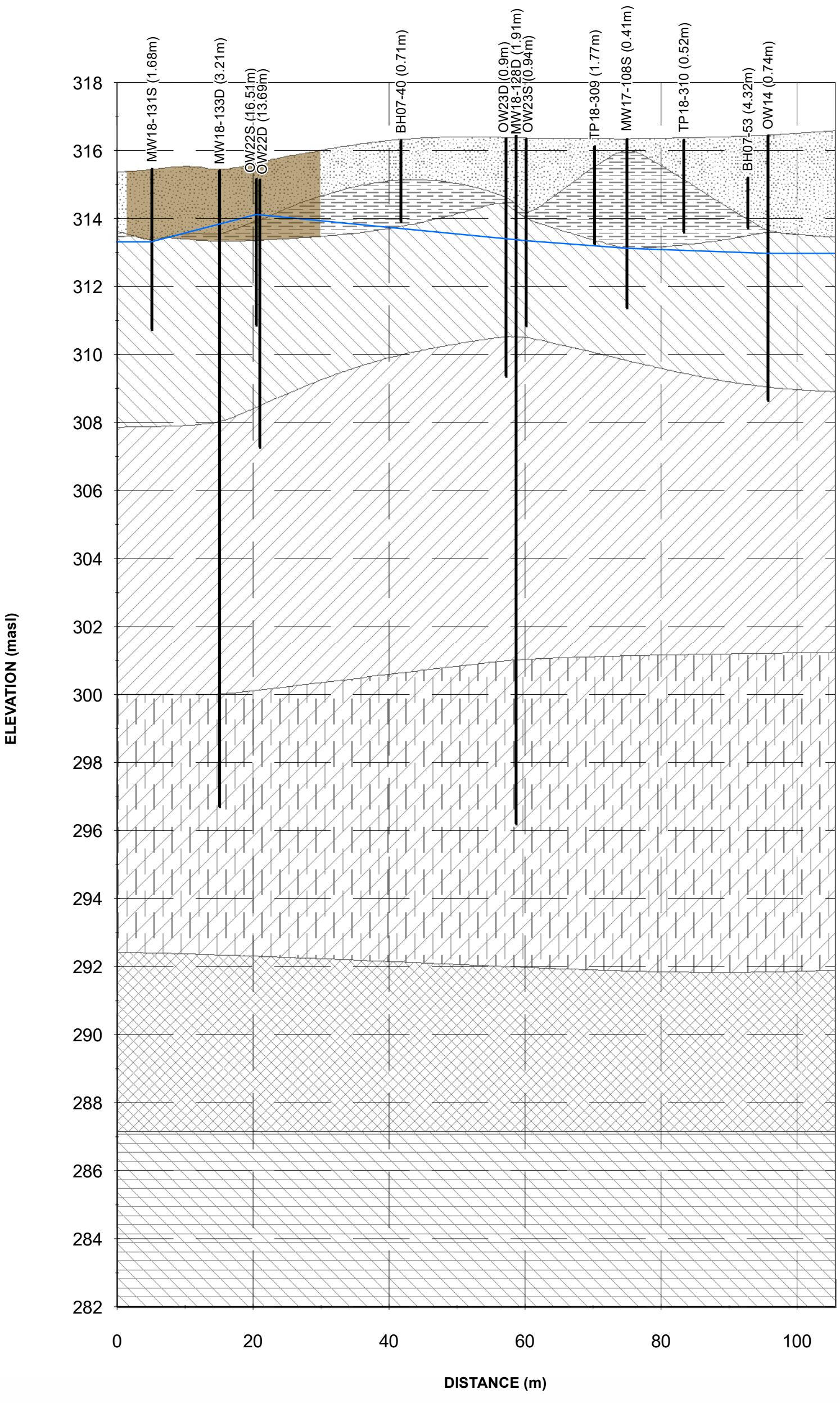
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1a
Section A-A'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

NORTH
B

SOUTH
B'



- Approximate Groundwater Elevation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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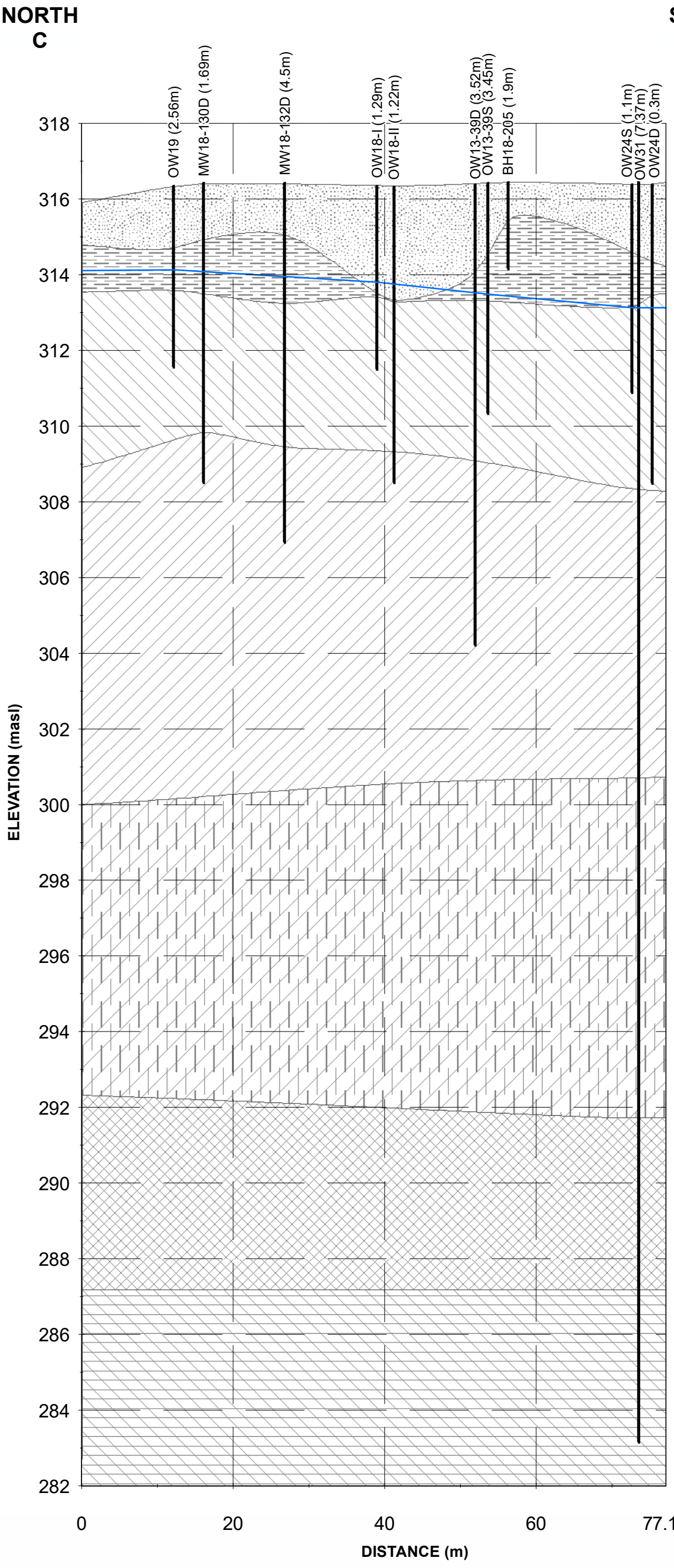
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1b
Section B-B'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



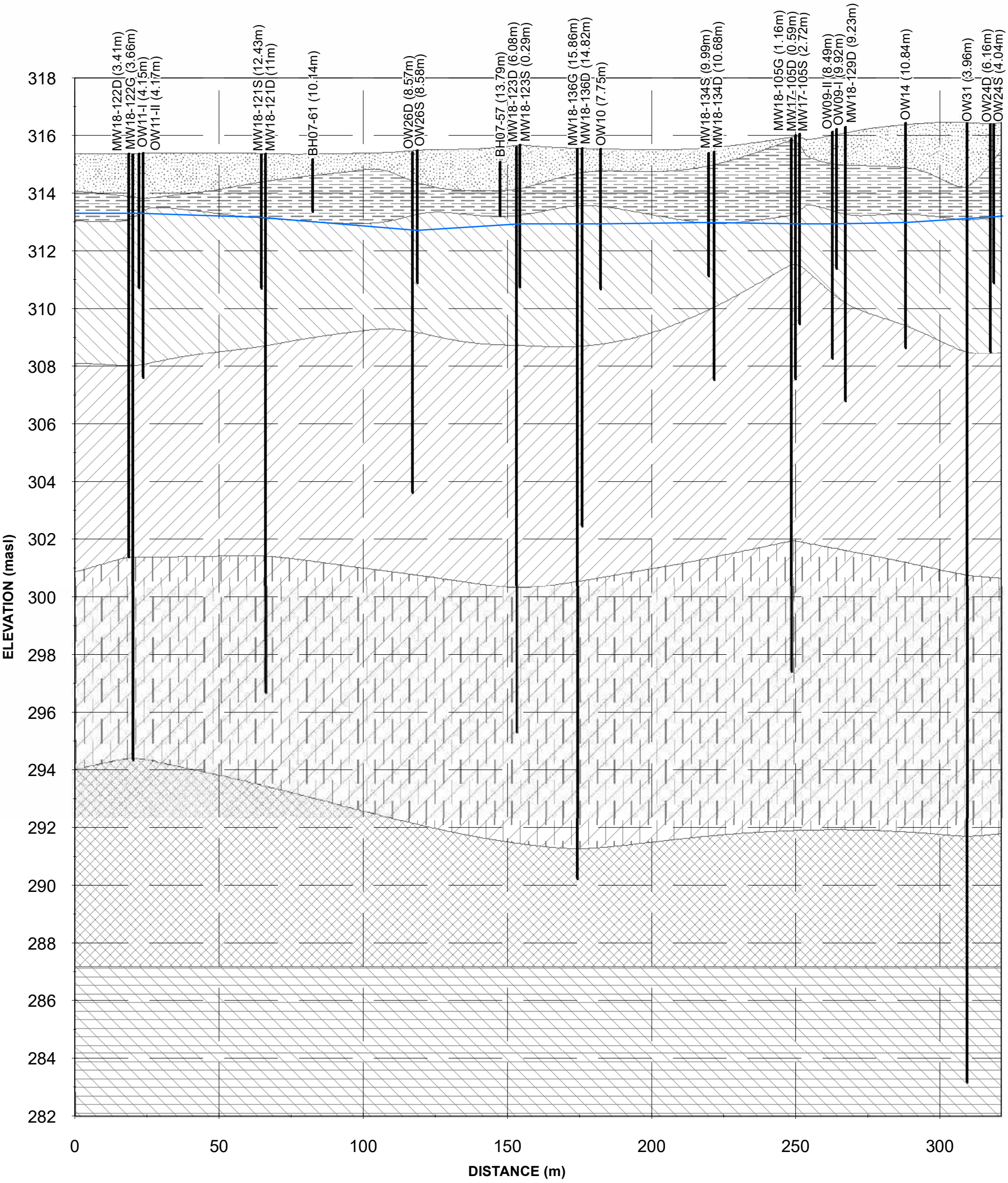
Approximate Groundwater Elevation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1c
Section C-C'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

WEST
D

EAST
D'

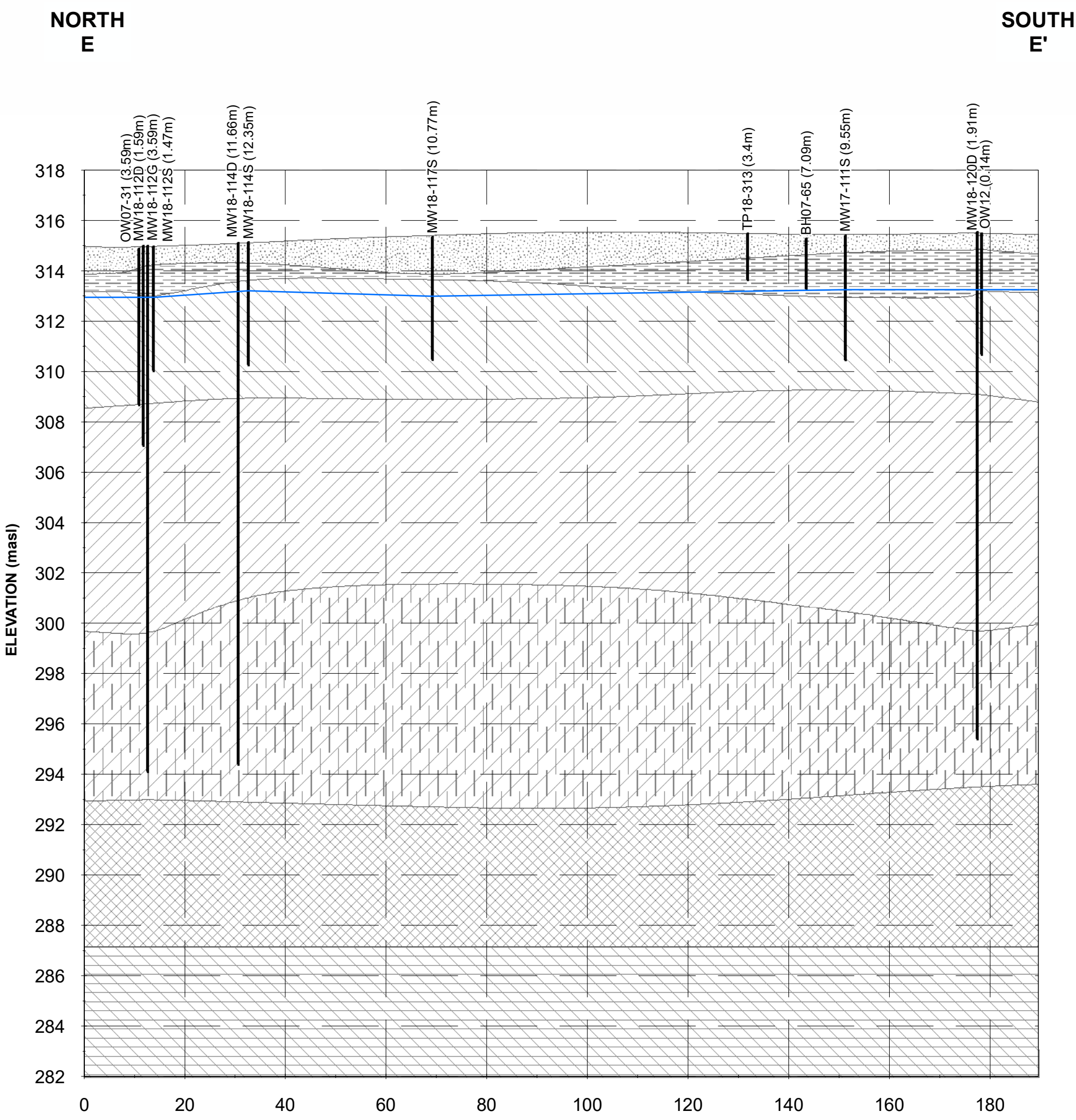


Approximate Groundwater Elevation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1d
Section D-D'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



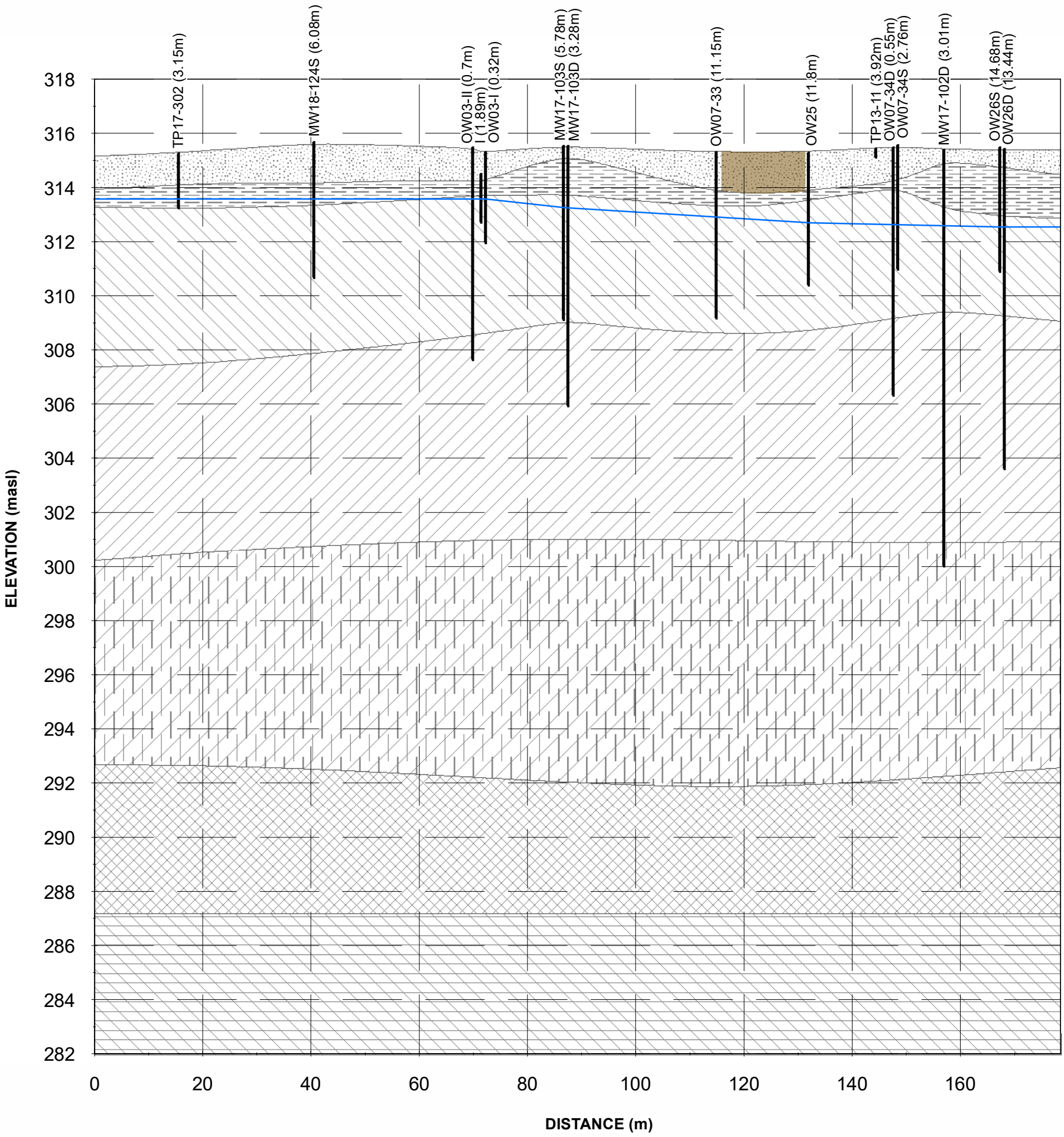
Approximate Groundwater Elevation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1e
Section E-E'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
F

SOUTH
F'



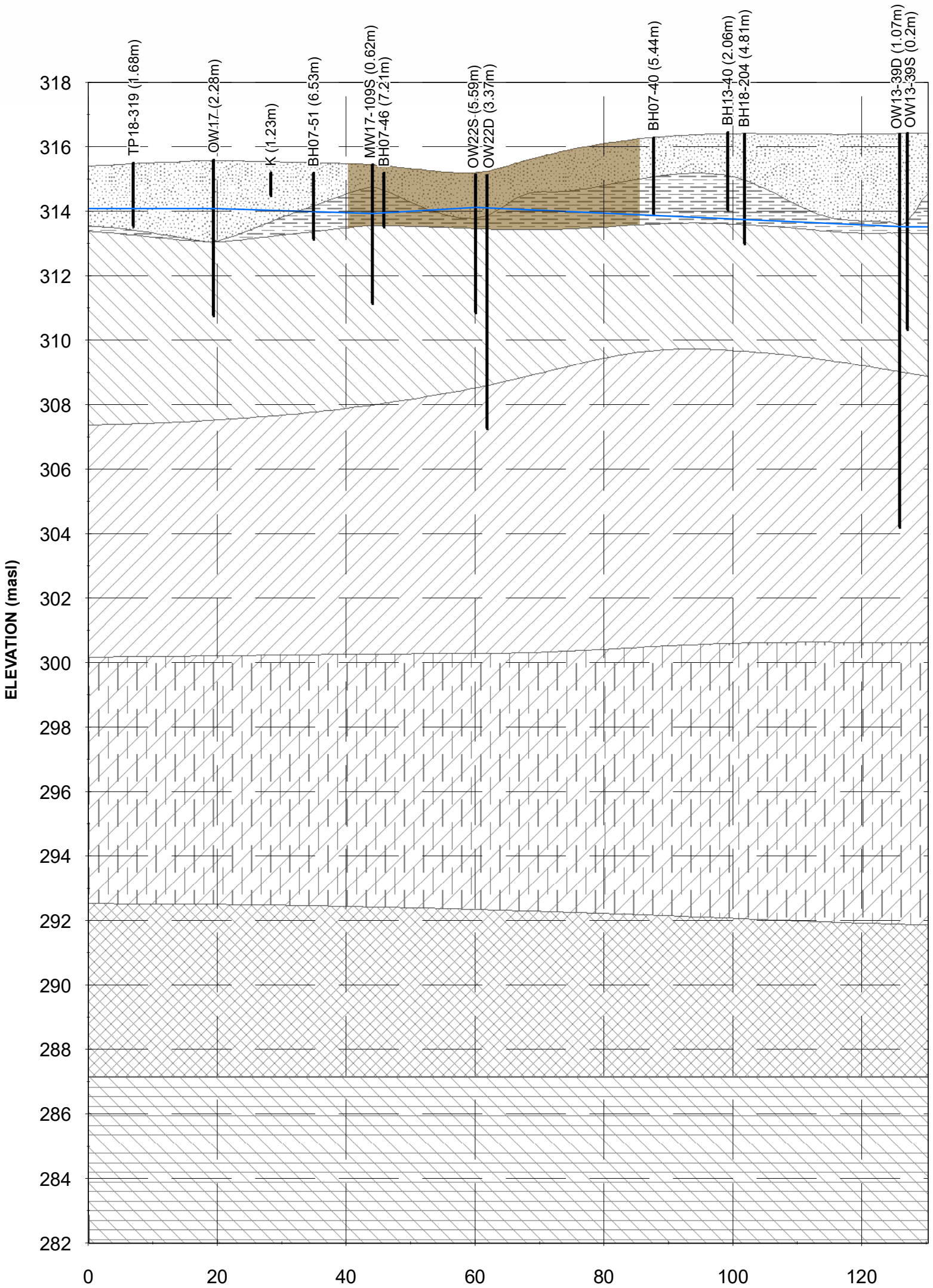
- Approximate Groundwater Elevation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1f
Section F-F'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

WEST
G

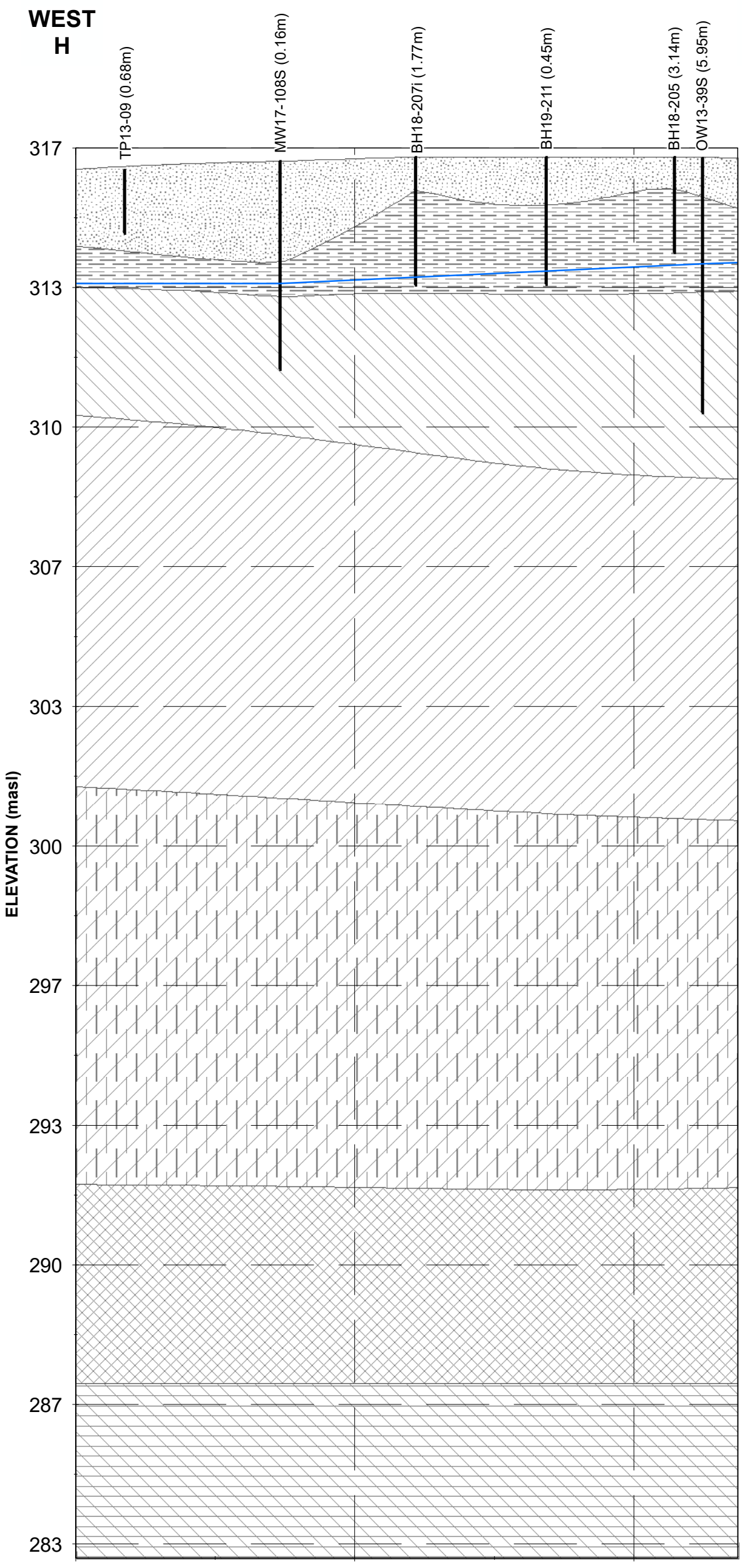
EAST
G'



- Approximate Groundwater Elevation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1g
Section G-G'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



- Approximate Groundwater Elevation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. Groundwater elevation shown is based on the March 2019 water level measurements from wells screened in the overburden and bedrock contact zone.

Figure 6-1h
Section H-H'
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

N

0 10 20 30

Metres

Monitoring Well With Groundater Elevation (masl)

Groundwater Elevation Contour (masl)

Interpreted Groundwater Flow Direction

Former IMICO Property Boundary

Property Parcel

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2a
Water Table (Contact Zone); August 2018
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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N

0 10 20 30
Metres

Monitoring Well With Groundater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Former IMICO Property Boundary
Property Parcel

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2b
Water Table (Contact Zone); March 2019
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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N

0 10 20 30

Metres

Monitoring Well With Groundater Elevation (masl)

Groundwater Elevation Contour (masl)

Interpreted Groundwater Flow Direction

Former IMICO Property Boundary

Property Parcel

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2c
Water Table (Contact Zone); February 2020
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2d
Potentiometric Surface – Vinemount; August 2018
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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N

0 10 20 30
Metres

Monitoring Well With Groundater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Former IMICO Property Boundary
Property Parcel

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2e
Potentiometric Surface – Vinemount; March 2019
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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N

0 10 20 30
Metres

Monitoring Well With Groundater Elevation (masl)
Groundwater Elevation Contour (masl)
Interpreted Groundwater Flow Direction
Former IMICO Property Boundary
Property Parcel

Notes:
1. Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Property boundaries, roads obtained from http://open.guelph.ca/.

Figure 6-2f
Potentiometric Surface – Vinemount; February 2020
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Antimony	7.5µg/g	18.6µg/g	BH07-56
Arsenic	18µg/g	23µg/g	BH07-67
Cadmium	1.2µg/g	83.4µg/g	MW17-108S
Cobalt	22µg/g	393µg/g	C11
Copper	140µg/g	2460µg/g	I
Lead	120µg/g	10100µg/g	BH07-65
Mercury	0.27µg/g	0.319µg/g	BH07-57
Molybdenum	6.9µg/g	35µg/g	K
Nickel	100µg/g	117µg/g	BH07-51
Thallium	1µg/g	6µg/g	AN21
Vanadium	86µg/g	100µg/g	MW17-100S
Zinc	340µg/g	67200µg/g	MW17-108S

N

0 10 20 30
Metres

Borehole
Confirmatory
Monitoring Well
Other
Test Pit

No Exceedance; <Null>
Exceedance

Excavated Locations
Confirmatory
Monitoring Well
Other
Test Pit

Cross Section Location
Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-3 (Part 1)
Soil Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Antimony	7.5µg/g	18.6µg/g	BH07-56
Arsenic	18µg/g	23µg/g	BH07-67
Cadmium	1.2µg/g	83.4µg/g	MW17-108S
Cobalt	22µg/g	393µg/g	C11
Copper	140µg/g	2460µg/g	I
Lead	120µg/g	10100µg/g	BH07-65
Mercury	0.27µg/g	0.319µg/g	BH07-57
Molybdenum	6.9µg/g	35µg/g	K
Nickel	100µg/g	117µg/g	BH07-51
Thallium	1µg/g	6µg/g	AN21
Vanadium	86µg/g	100µg/g	MW17-100S
Zinc	340µg/g	67200µg/g	MW17-108S

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-3 (Part 2)
Soil Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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WEST
A

EAST
A'

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS

0.91-1.22m
Zinc_____803

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS

1.37-1.83m
Vanadium_____100
Zinc_____724

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

BH07-66
09 Feb 2007
0.05-1.22m: Meets SCS

1.22-1.32m
Zinc_____349

07 Mar 2007
0-1.32m: Meets SCS

BH07-67
09 Feb 2007 0.015-0.91m
Arsenic_____23
Cadmium_____2.1
Lead_____336
Zinc_____379

09 Feb 2007 1.22-1.37m
Zinc_____538

OW07-32
22 Feb 2007
0-1.07m: Meets SCS

07 Mar 2007
0-1.65m:Meets SCS

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS

1.22-1.83m
Zinc_____456

BH07-56
09 Feb 2007 0.05-0.91m
Antimony_____18.6
Cadmium_____1.8
Copper_____283
Lead_____545
Zinc_____472

09 Feb 2007 1.22-1.67m
Zinc_____664

BH18-206
23 Jul 2018 0.76-1.37m
Cadmium_____1.43
Zinc_____614

BH07-48
08 Feb 2007 0.1-1.22m
Cadmium_____1.5
Zinc_____483
1.22-1.42m
Zinc_____669

MW17-101D
20 Oct 2017 0.61-0.91m
Cadmium_____6.6
Zinc_____1240

20 Oct 2017 1.22-1.68m
Zinc_____410

TP13-08
03 Dec 2013
0.1-0.3m
Cadmium_____2.2 (1.6)
Lead_____310 (460)
Zinc_____760 (810)

OW13-39S
12 Dec 2013 2.29-2.25m
Cadmium_____1.9
Lead_____220
Zinc_____2400

OW15 (1.48m)
OW16 (5.19m)
TP17-300 (3.65m)
BH07-67 (6.33m)
TP18-317 (17.86m)
BH07-66 (18.3m)
OW07-37 (0.94m)
MW18-116D (5.87m)
MW18-116S (5.89m)
OW07-32 (7.77m)
MW17-103D (5.64m)
MW17-103S (4.76m)
BH07-56 (7.03m)
MW17-100S (6.63m)
MW17-106S (18.02m)
MW17-106D (18.92m)
BH18-206 (14.15m)
BH07-48 (1.66m)
MW17-101S (8.9m)
MW17-101D (7.11m)
TP13-08 (1.76m)
MW18-128D (1.17m)
OW23D (3.39m)
OW23S (0.71m)
OW13-39D (2.33m)
OW13-39S (0.99m)

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

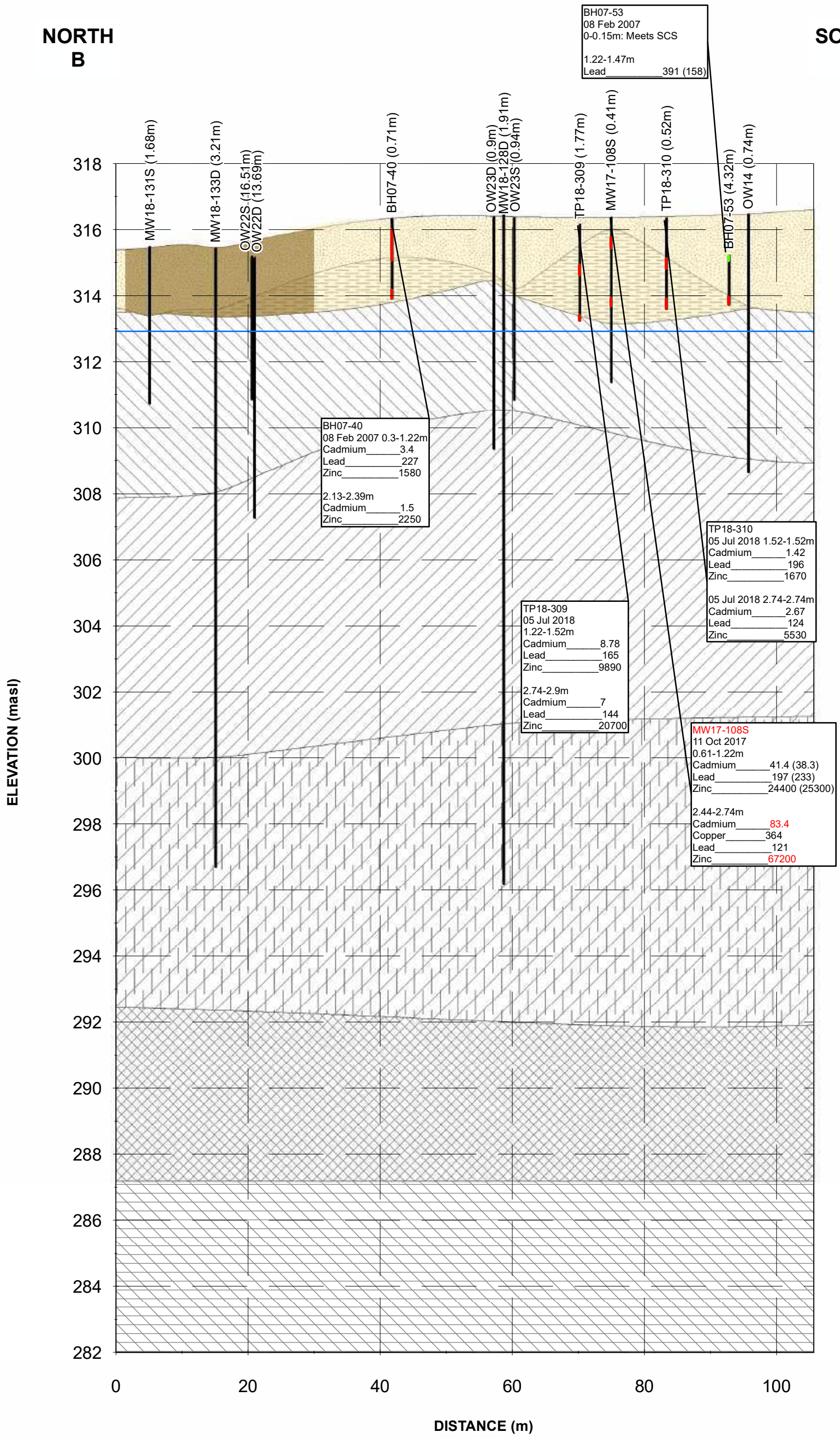
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3a
Section A-A' - Soil Exceedances - Metals Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

NORTH
B

SOUTH
B'

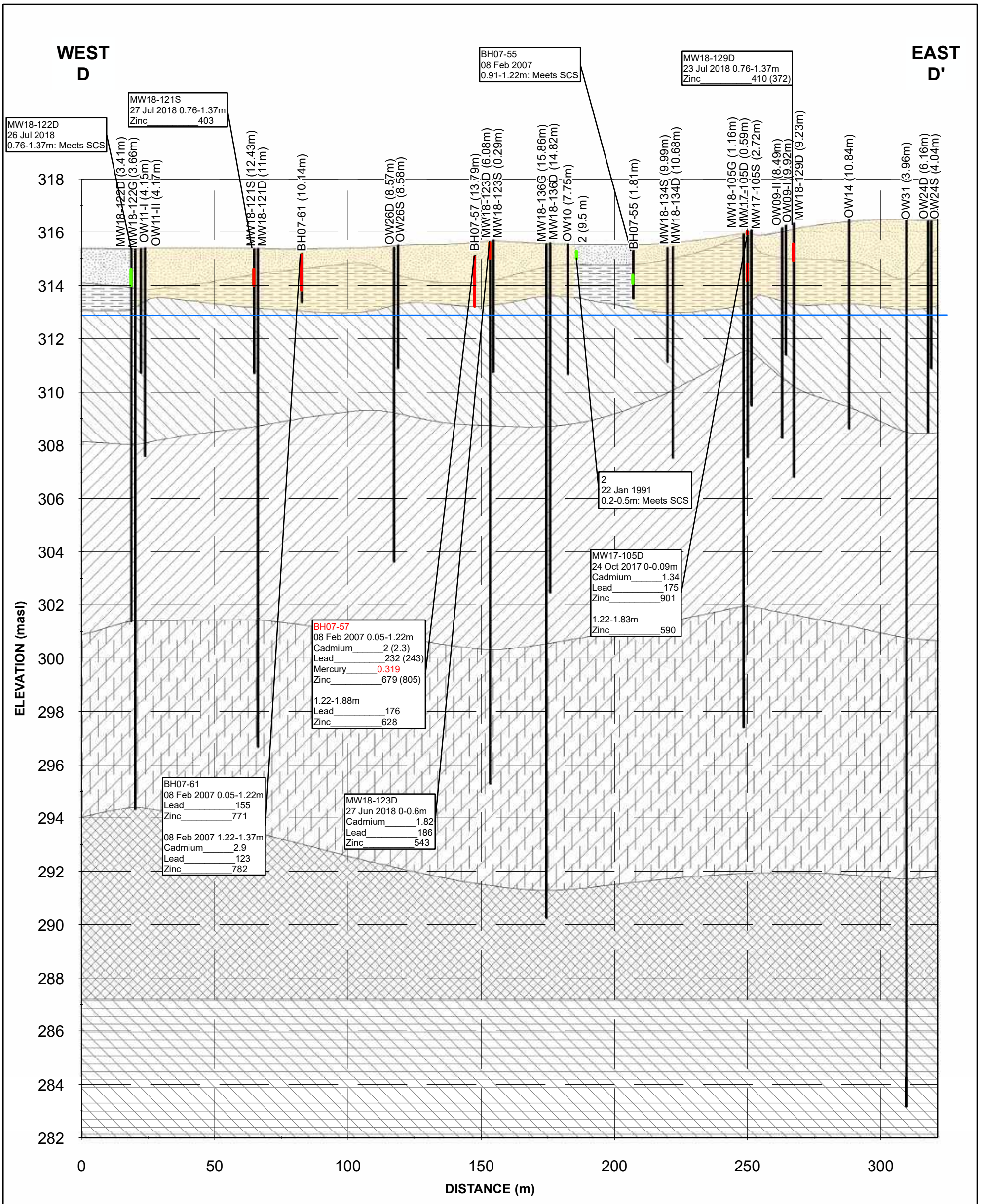


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3b
Section B-B' - Soil Exceedances - Metals
Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

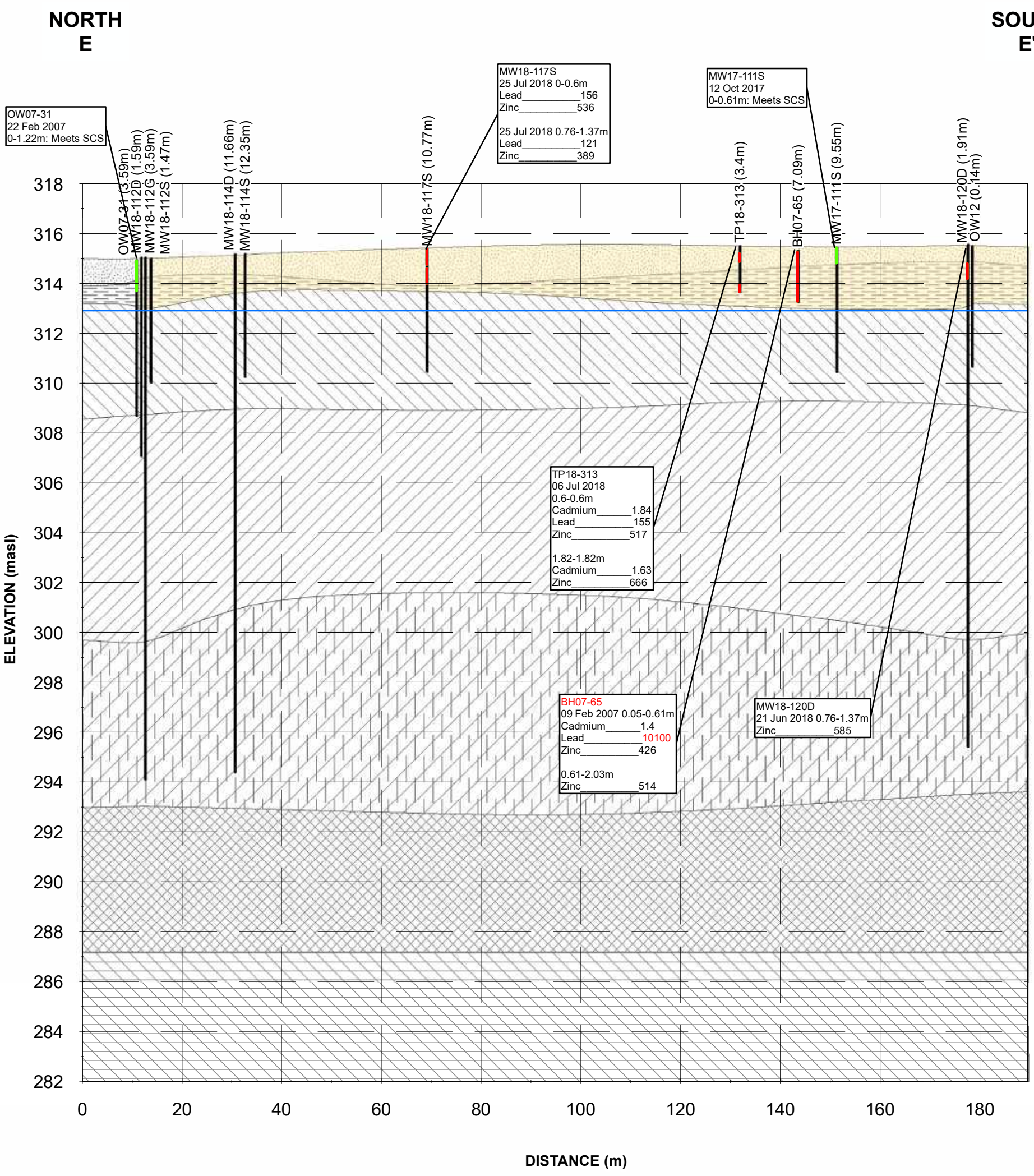
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3c
Section D-D' - Soil Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

NORTH
E

SOUTH
E'

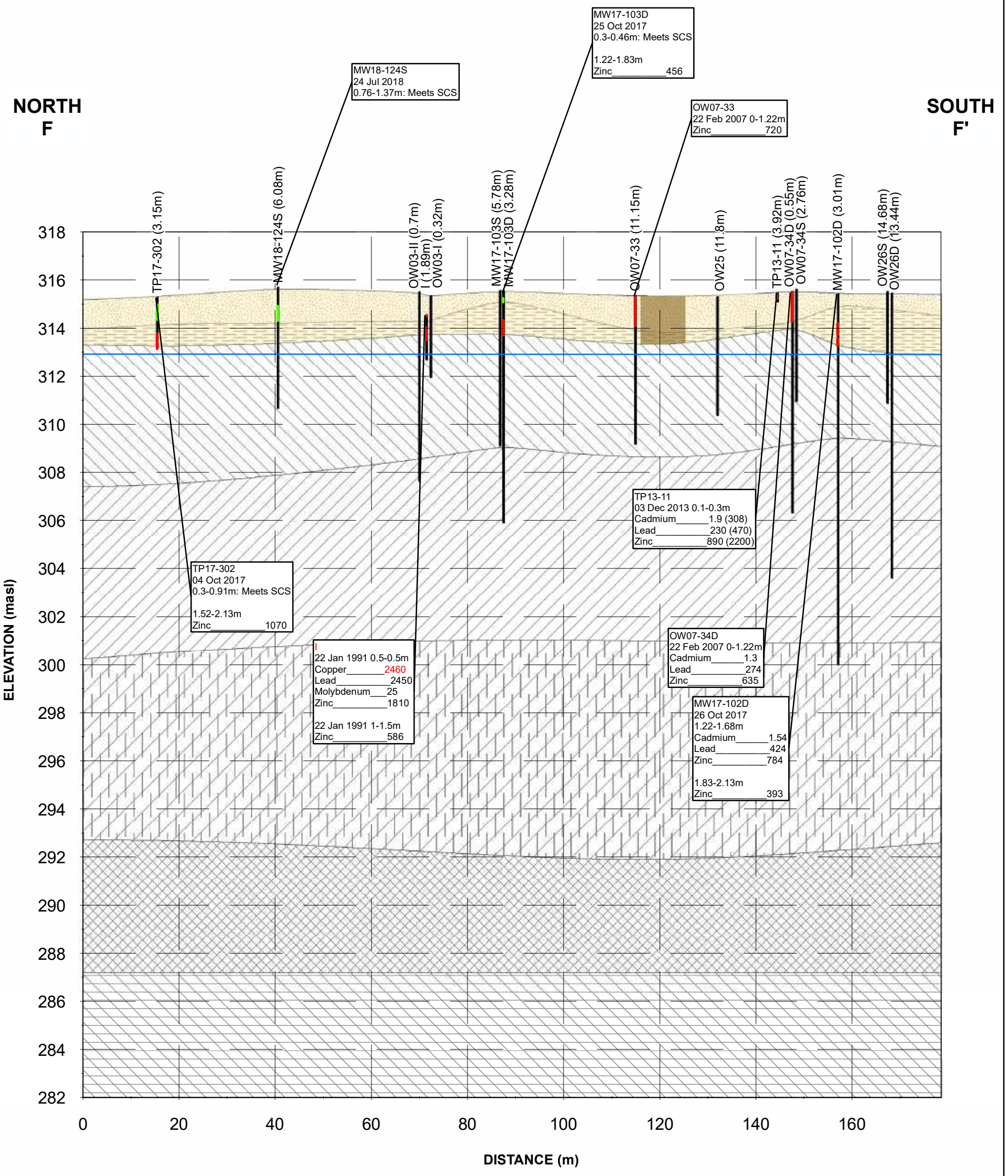


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3d
Section E-E' - Soil Exceedances - Metals
Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3e
Section F-F' - Soil Exceedances - Metals
Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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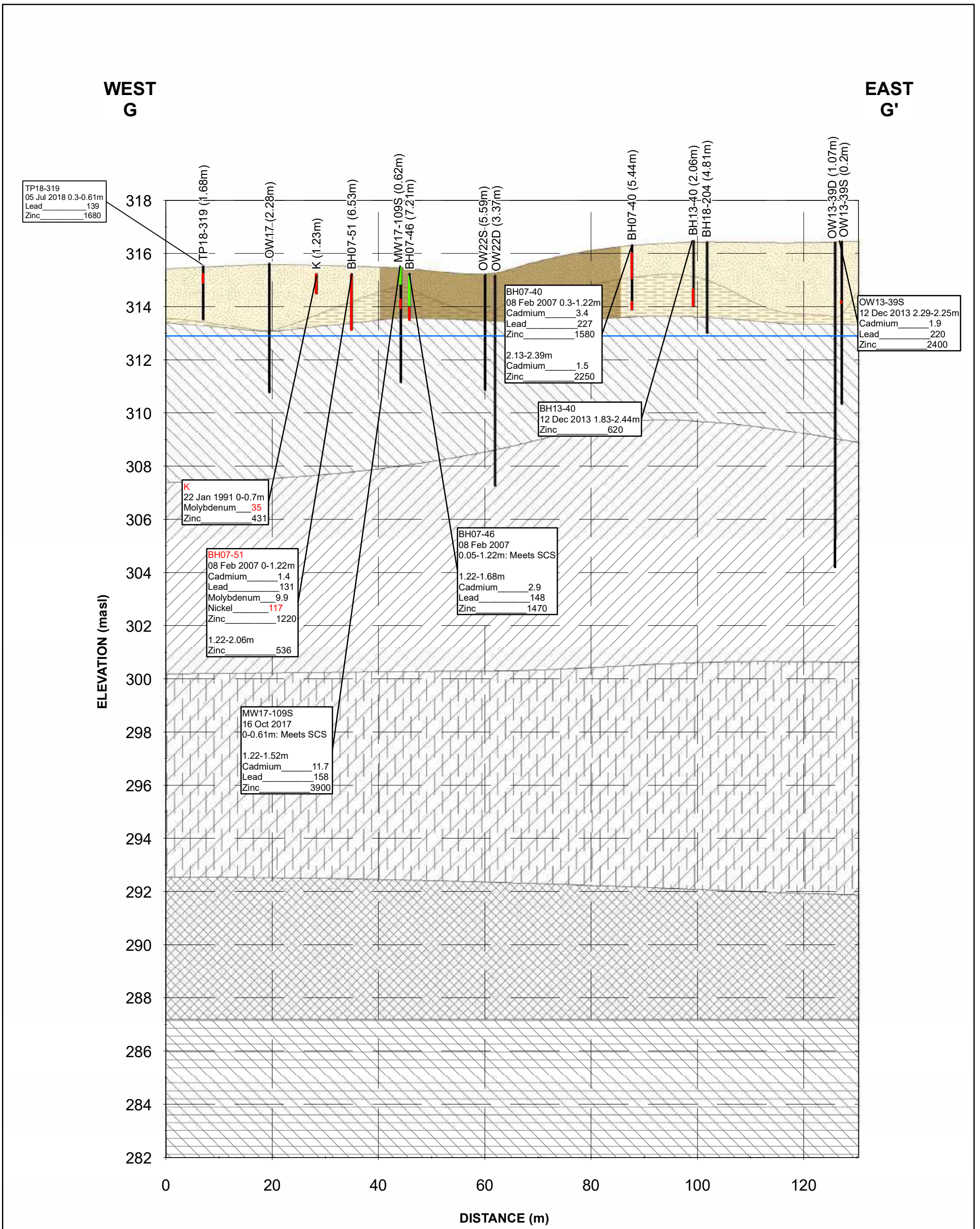

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-3f
Section G-G' - Soil Exceedances - Metals
Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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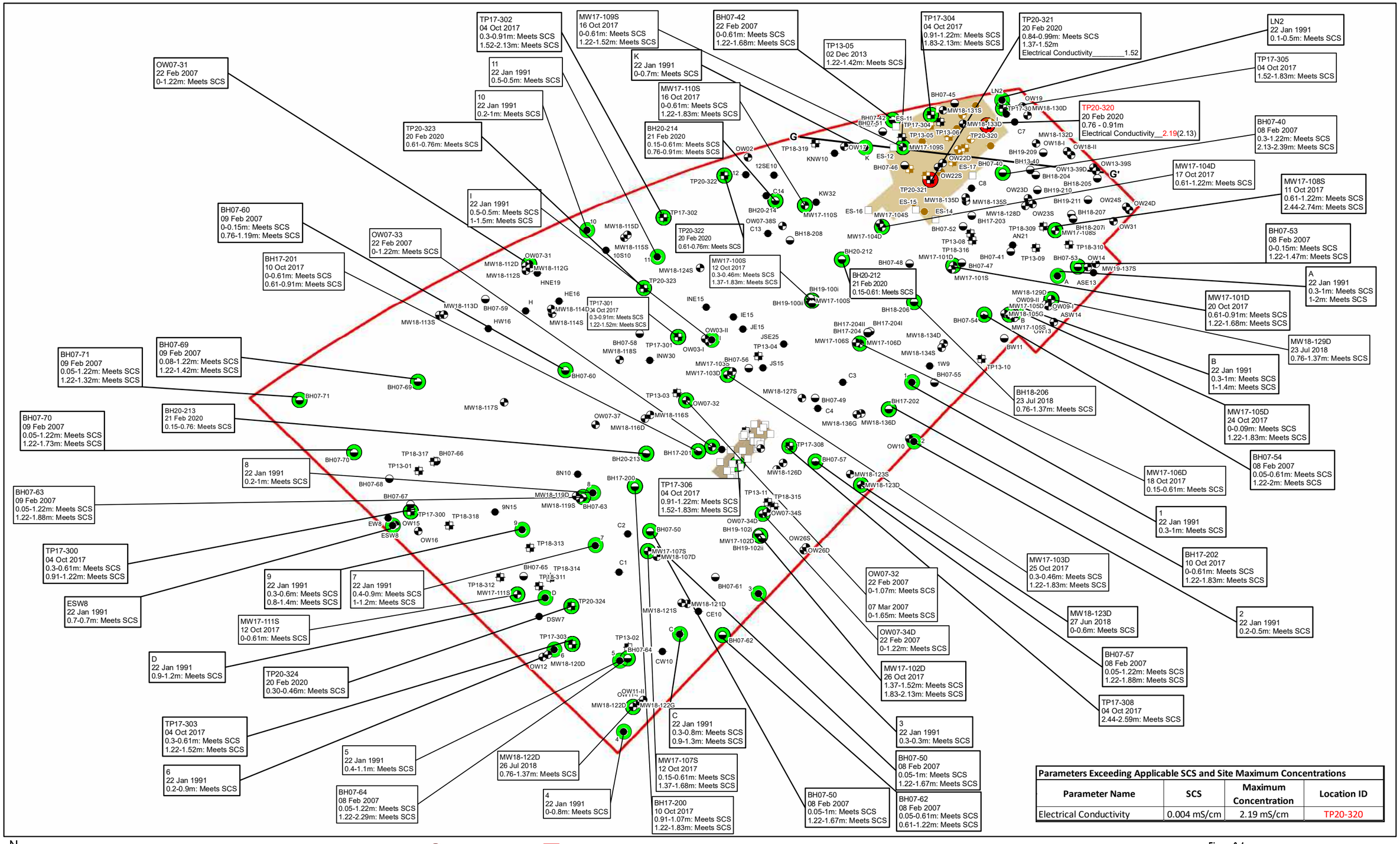

Figure 6-4
Soil Exceedances - Other Regulated Parameters (B-HWS, CN-, EC and SAR)
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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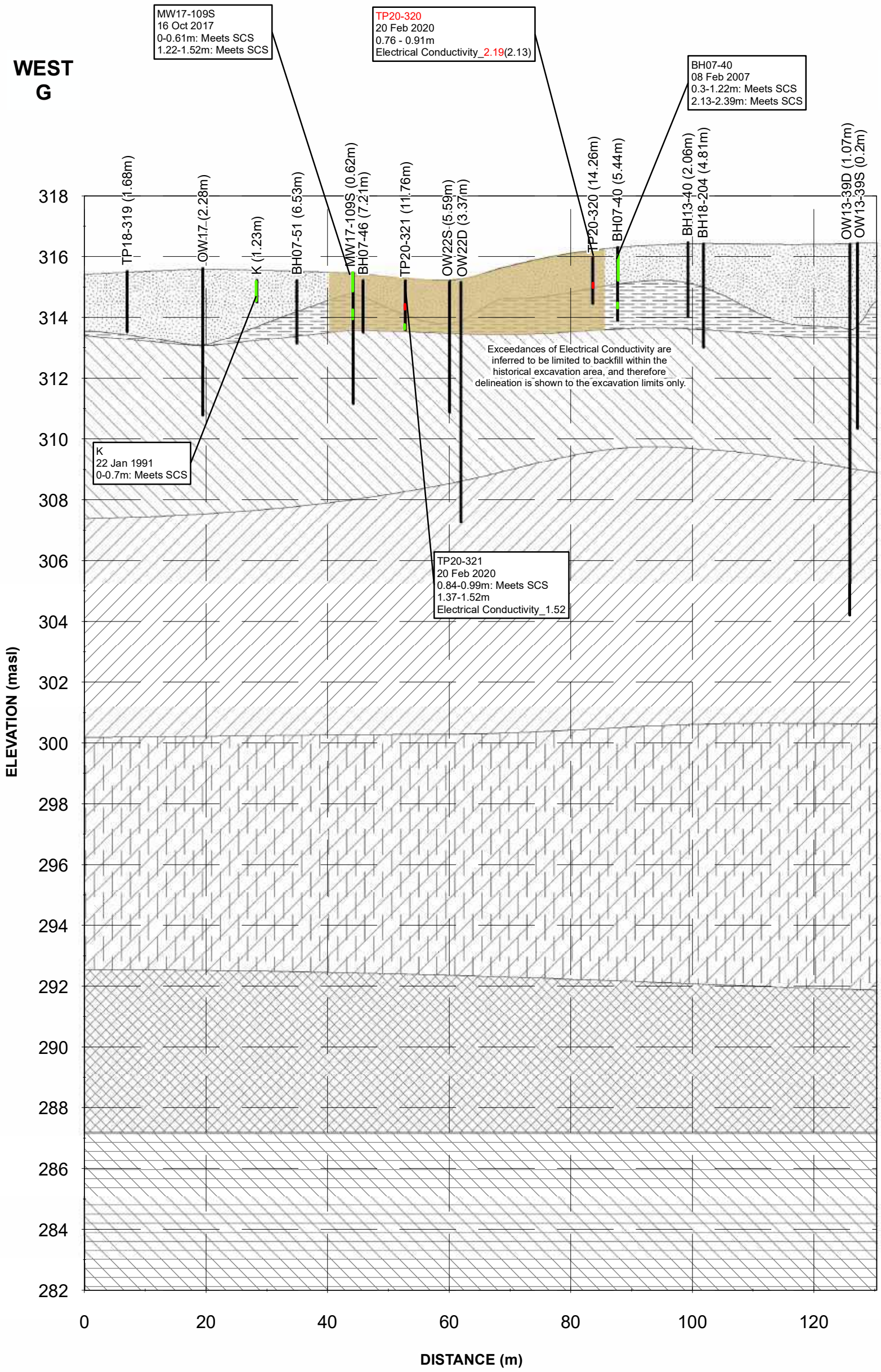

- Approximate Groundwater Elevation
- Non Exceedance
- Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-4a
Section G-G' Soil Exceedances - Other Regulated Parameters (B-HWS, CN-, EC and SAR)
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

TP20-322
20 Feb 2020
0.61-0.76m: Meets SCS

MW17-110S
16 Oct 2017
1.22-1.83m: Meets SCS

OW07-38S
22 Feb 2007
0-1.22m: Meets SCS
1.22-1.8m: Meets SCS

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS
1.52-2.13m: Meets SCS

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS
1.83-2.13m: Meets SCS

BH20-214
21 Feb 2020
0.15-0.61m: Meets SCS
0.76-0.91m: Meets SCS

BH20-212
21 Feb 2020
0.15-0.61m: Meets SCS

TP13-05
02 Dec 2013
1.22-1.42m: Meets SCS

BH07-51
08 Feb 2007
1.22-2.06m: Meets SCS

MW17-109S
16 Oct 2017
1.22-1.52m: Meets SCS

BH07-42
22 Feb 2007
0-0.61m: Meets SCS
1.22-1.68m: Meets SCS

BH07-46
08 Feb 2007
1.22-1.68m: Meets SCS

MW17-104D
17 Oct 2017
1.22-1.83m: Meets SCS

TP17-304
04 Oct 2017
0.91-1.22m: Meets SCS
1.83-2.13m: Meets SCS

TP20-321
20 Feb 2020
0.84-0.99m: Meets SCS
1.37-1.52m: Meets SCS

TP13-06
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-45
08 Feb 2007
1.22-1.78m: Meets SCS

TP20-320
20 Feb 2020
0.76-0.91m: Meets SCS

TP17-305
04 Oct 2017
1.52-1.83m: Meets SCS

BH07-40
08 Feb 2007
0.3-1.22m: Meets SCS
2.13-2.39m: Meets SCS

BH19-209
16 Apr 2019
0.76-0.76m: Meets SCS
2.13-2.13m: Meets SCS
2.9-2.9m: Meets SCS

BH13-40
12 Dec 2013
1.83-2.44m: Meets SCS

BH18-204
23 Jul 2018
1.52-2.13m: Meets SCS
3.04-3.65m: Meets SCS

OW13-39S
12 Dec 2013
2.29-2.25m: Meets SCS

BH18-205
20 Jul 2018
0.76-1.37m: Meets SCS
1.52-2.13m: Meets SCS

BH19-210
16 Apr 2019
0.76-0.76m: Meets SCS
1.83-1.83m: Meets SCS
2.29-2.29m: Meets SCS
2.9-2.9m: Meets SCS

BH19-211
16 Apr 2019
0.76-0.76m: Meets SCS
1.22-1.22m: Meets SCS
3.05-3.05m: Meets SCS

BH18-207i
21 Feb 2020
0.15-0.76m: Meets SCS
1.52-2.13m: Meets SCS
2.29-2.9m: Meets SCS

MW17-108S
11 Oct 2017
2.74-2.9m: Meets SCS
3.05-3.2m: Meets SCS

BH07-53
08 Feb 2007
0-0.15m: Meets SCS
1.22-1.47m: Meets SCS

TP13-09
03 Dec 2013
0.3-0.5m: Meets SCS

BH17-203
11 Oct 2017
0-0.61m: Meets SCS

BH07-41
08 Feb 2007
1.2-2.29m: Meets SCS

TP13-08
03 Dec 2013
0.1-0.3m: Meets SCS

BH07-52
08 Feb 2007
0-1.22m: Meets SCS
1.22-1.83m: Meets SCS

MW17-105D
24 Oct 2017
1.22-1.83m: Meets SCS
1.83-2.13m: Meets SCS

BH07-47
08 Feb 2007
1.22-1.8m: Meets SCS

MW17-101D
20 Oct 2017
1.22-1.68m: Meets SCS

BH07-54
08 Feb 2007
0.05-0.61m: Meets SCS
1.22-2m: Meets SCS

MW17-103D
25 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.83m: Meets SCS

BH07-56
09 Feb 2007
0.05-0.91m: Meets SCS
1.22-1.67m: Meets SCS

TP17-307
04 Oct 2017
2.13-2.44m: Meets SCS

MW18-126D
31 Jul 2018
0.76-1.37m: Meets SCS

BH07-57
08 Feb 2007
0.05-1.22m: Meets SCS

MW18-123D
27 Jun 2018
0.76-1.37m: Meets SCS

BH19-102I
03 Apr 2019
0.15-0.3m: Meets SCS

MW17-102D
26 Oct 2017
0.15-0.3m: Meets SCS
1.83-2.13m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

OW07-34D
22 Feb 2007
0-1.22m: Meets SCS

TP13-11
03 Dec 2013
0.1-0.3m
Benzene___0.23 (0.25)

TP18-315
05 Jul 2018
0.1-0.3m: Meets SCS

TP13-04
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-49
09 Feb 2007
1.22-1.83m: Meets SCS

BH17-202
10 Oct 2017
0.61-1.22m: Meets SCS
1.83-2.13m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

TP13-10
03 Dec 2013
0.1-0.3m: Meets SCS

BH07-55
08 Feb 2007
0.91-1.22m: Meets SCS

TP13-02
02 Dec 2013
1.22-1.42m: Meets SCS

TP17-303
04 Oct 2017
0.3-0.61m: Meets SCS
1.22-1.52m: Meets SCS

BH07-64
08 Feb 2007
0.05-1.22m: Meets SCS

TP20-324
20 Feb 2020
0.30-0.46m: Meets SCS

MW17-111S
12 Oct 2017
0.61-1.22m: Meets SCS
1.83-2.13m: Meets SCS

BH07-65
09 Feb 2007
0.05-0.61m: Meets SCS
0.61-2.03m: Meets SCS

BH07-63
09 Feb 2007
0.05-1.22m: Meets SCS
1.22-1.88m: Meets SCS

TP18-318
06 Jul 2018
0.6-0.6m: Meets SCS

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS
0.91-1.22m: Meets SCS

BH07-67
09 Feb 2007
0.015-0.91m: Meets SCS
1.22-1.37m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

TP13-01
02 Dec 2013
0.1-0.3m: Meets SCS

TP18-317
06 Jul 2018
1.21-1.21m: Meets SCS

BH07-66
09 Feb 2007
0.05-1.22m
Benzene_____0.26
Ethylbenzene_____4.1
Xylenes, Total_____3.9

BH07-70
09 Feb 2007
0.05-1.22m: Meets SCS

MW18-117S
25 Jul 2018
0-0.6m: Meets SCS
0.76-1.37m: Meets SCS

BH07-71
09 Feb 2007
0.05-1.22m: Meets SCS

BH07-69
09 Feb 2007
0.08-1.22m: Meets SCS

OW07-32
22 Feb 2007
0-1.07m: Meets SCS
1.22-1.65m: Meets SCS

TP13-03
02 Dec 2013
0.1-0.3m: Meets SCS

BH07-60
09 Feb 2007
0-0.15m: Meets SCS

BH07-59
09 Feb 2007
0.15-0.3m: Meets SCS

BH07-58
09 Feb 2007
0.05-0.61m: Meets SCS

TP17-301
04 Oct 2017
0.3-0.91m: Meets SCS
1.22-1.52m: Meets SCS

OW07-31
22 Feb 2007
0-1.22m: Meets SCS

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS
1.22-1.42m: Meets SCS

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

TP17-306
04 Oct 2017
0.91-1.22m: Meets SCS

BH17-200
10 Oct 2017
1.07-1.22m: Meets SCS
1.83-1.98m: Meets SCS

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

TP13-02
02 Dec 2013
1.22-1.42m: Meets SCS

BH07-64
08 Feb 2007
0.05-1.22m: Meets SCS

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Benzene	0.21µg/g	0.26µg/g	BH07-66
Ethylbenzene	1.1µg/g	4.1µg/g	BH07-66
Xylenes, Total	3.1µg/g	3.9µg/g	BH07-66

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-5
Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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WEST
A

EAST
A'

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS
0.91-1.22m: Meets SCS

MW18-117S
25 Jul 2018
0-0.6m: Meets SCS
0.76-1.37m: Meets SCS

OW07-37
22 Feb 2007
0-0.61m: Meets SCS
0.61-1.22m: Meets SCS

OW07-32
22 Feb 2007
0-1.07m: Meets SCS
1.22-1.65m: Meets SCS

MW17-100S
12 Oct 2017
0.3-0.46m: Meets SCS
1.83-2.13m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

TP13-08
03 Dec 2013
0.1-0.3m: Meets SCS

OW15 (1.48m)
OW16 (5.19m)
TP17-300 (3.65m)
BH07-67 (6.33m)
TP18-318 (8.98m)
TP18-317 (17.86m)
BH07-66 (18.3m)
MW18-117S (27.2m)
OW07-37 (0.94m)
MW18-116D (5.87m)
MW18-116S (5.89m)
OW07-32 (7.77m)
MW17-103D (5.64m)
MW17-103S (4.76m)
BH07-56 (7.03m)
MW17-100S (6.63m)
MW17-106S (18.02m)
MW17-106D (18.92m)
BH18-206 (14.15m)
BH07-48 (1.66m)
MW17-101S (8.9m)
MW17-101D (7.11m)
TP13-08 (1.76m)
MW18-128D (1.17m)
OW23D (3.39m)
OW23S (0.71m)
OW13-39D (2.33m)
OW13-39S (0.99m)

BH07-66
09 Feb 2007
0.05-1.22m
Benzene 0.26
Ethylbenzene 4.1
Xylenes, Total 3.9

TP18-317
06 Jul 2018
1.21-1.21m: Meets SCS

TP18-318
06 Jul 2018
0.6-0.6m: Meets SCS

BH07-67
09 Feb 2007
0.015-0.91m: Meets SCS
1.22-1.37m: Meets SCS

MW17-103D
25 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.83m: Meets SCS

BH07-48
08 Feb 2007
0.1-1.22m: Meets SCS
1.22-1.42m: Meets SCS

MW17-101D
20 Oct 2017
1.22-1.68m: Meets SCS

BH07-56
09 Feb 2007
0.05-0.91m: Meets SCS
1.22-1.67m: Meets SCS

OW13-39S
12 Dec 2013
2.29-2.25m: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
200
250
300

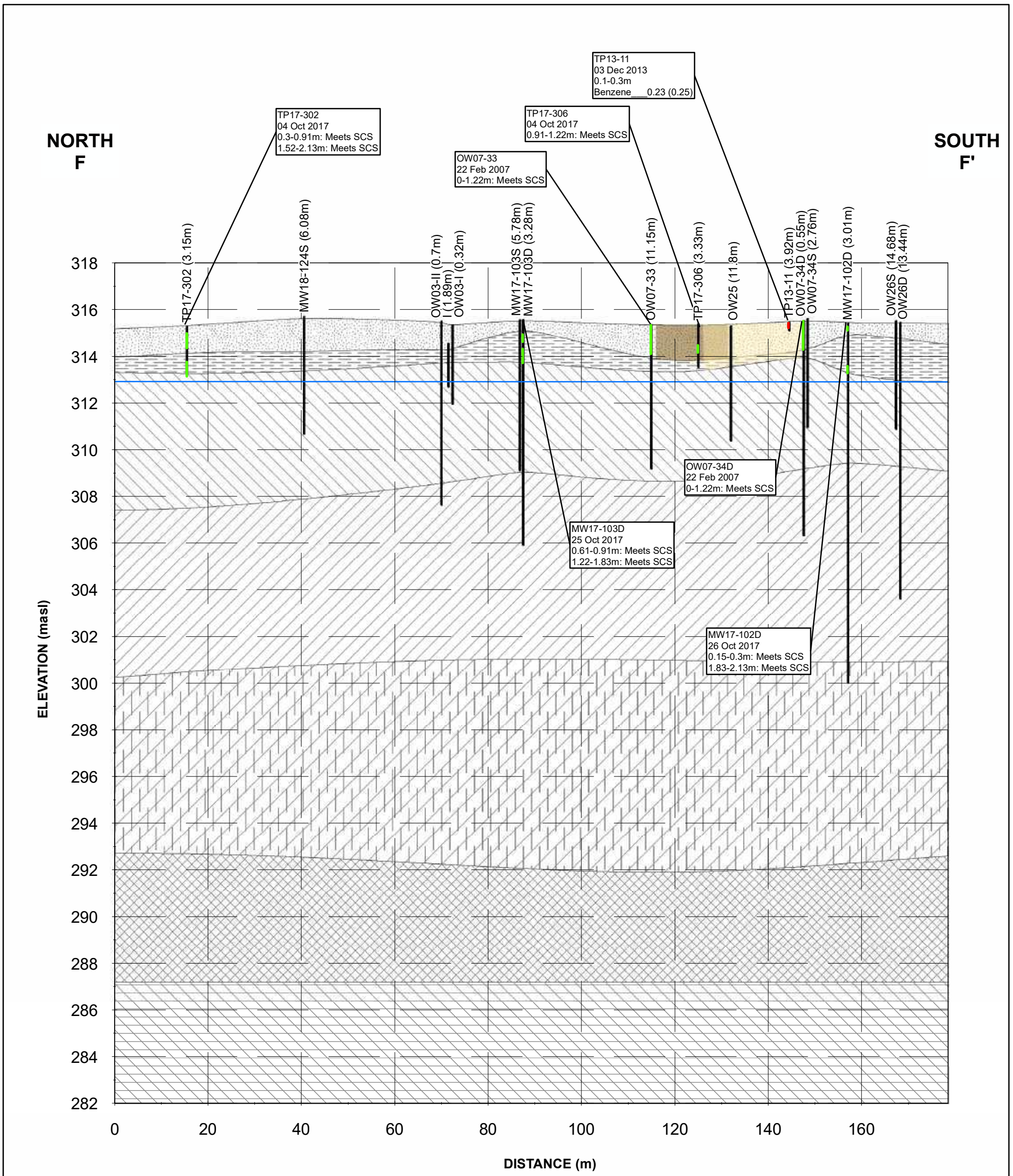
DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-5a
Section A-A' - Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Approximate Excavation Area
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-5b
Section F-F' - Soil Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Petroleum Hydrocarbons F2 (C10-C16)	98µg/g	3600µg/g	BH07-46
Petroleum Hydrocarbons F3 (C16-C34)	300µg/g	23000µg/g	BH07-40
Petroleum Hydrocarbons F4 (C34-C50)	2800µg/g	7300µg/g	BH07-67

N

0 10 20 30

Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-6
Soil Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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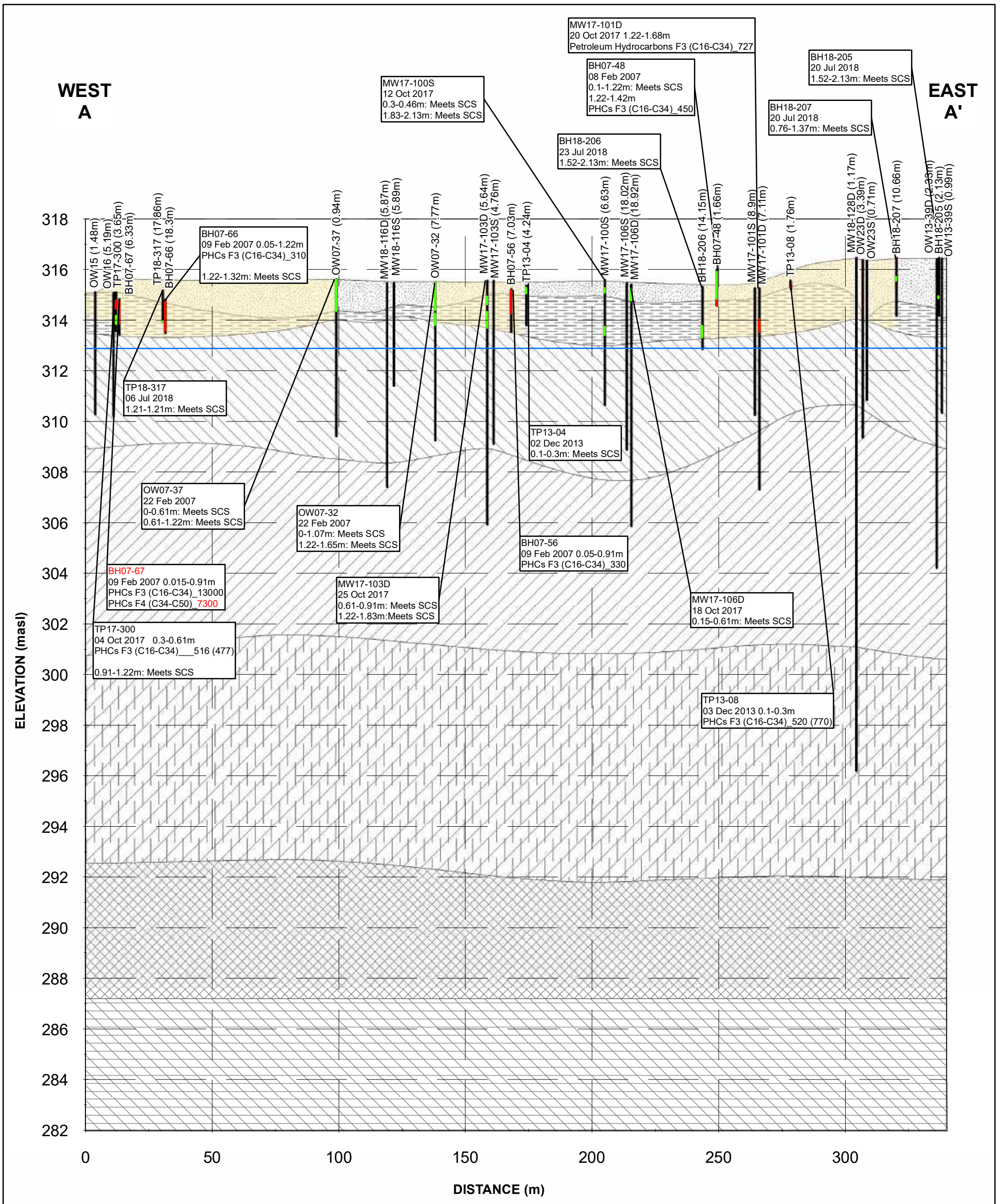
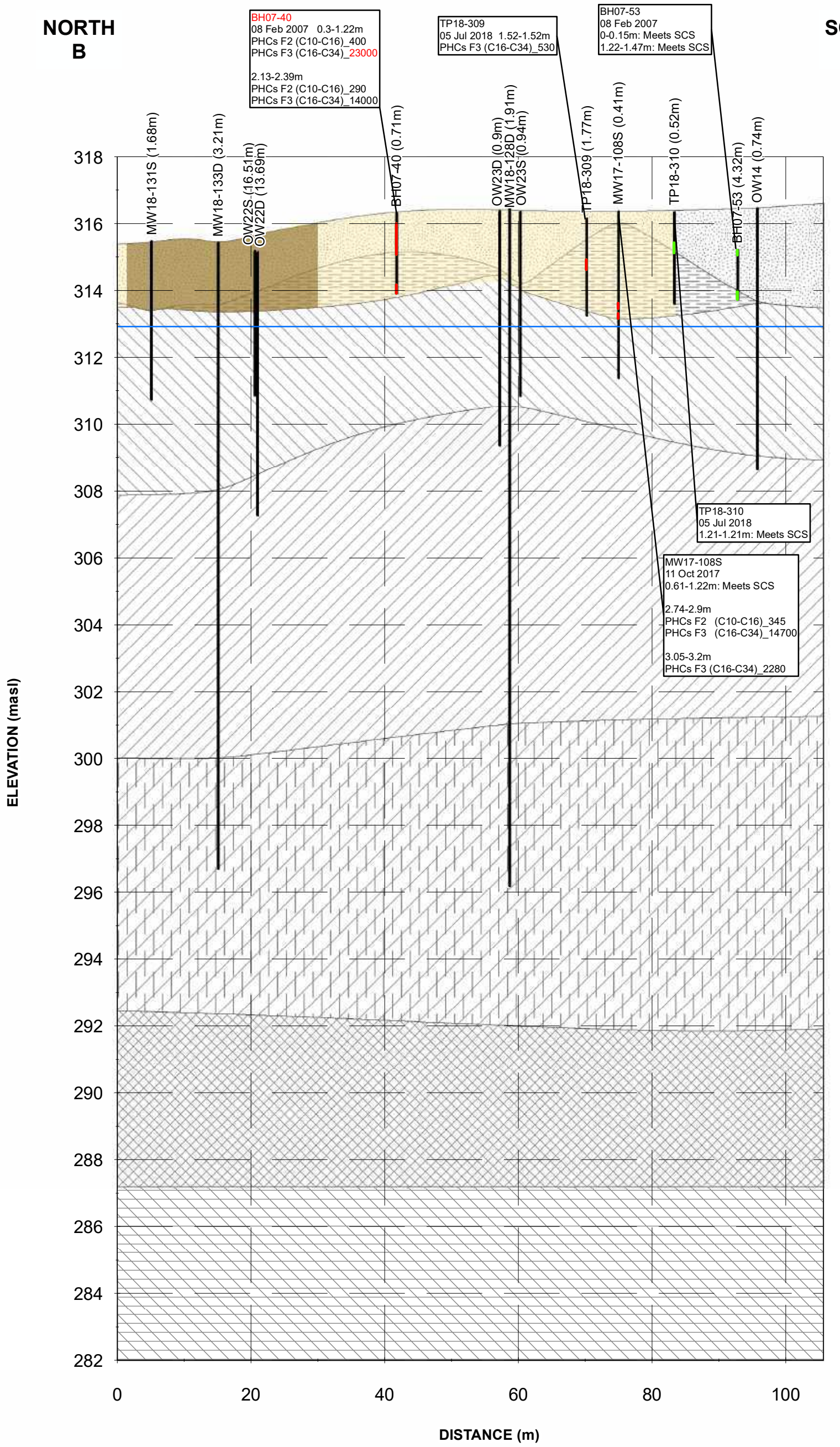


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6a
Section A-A' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

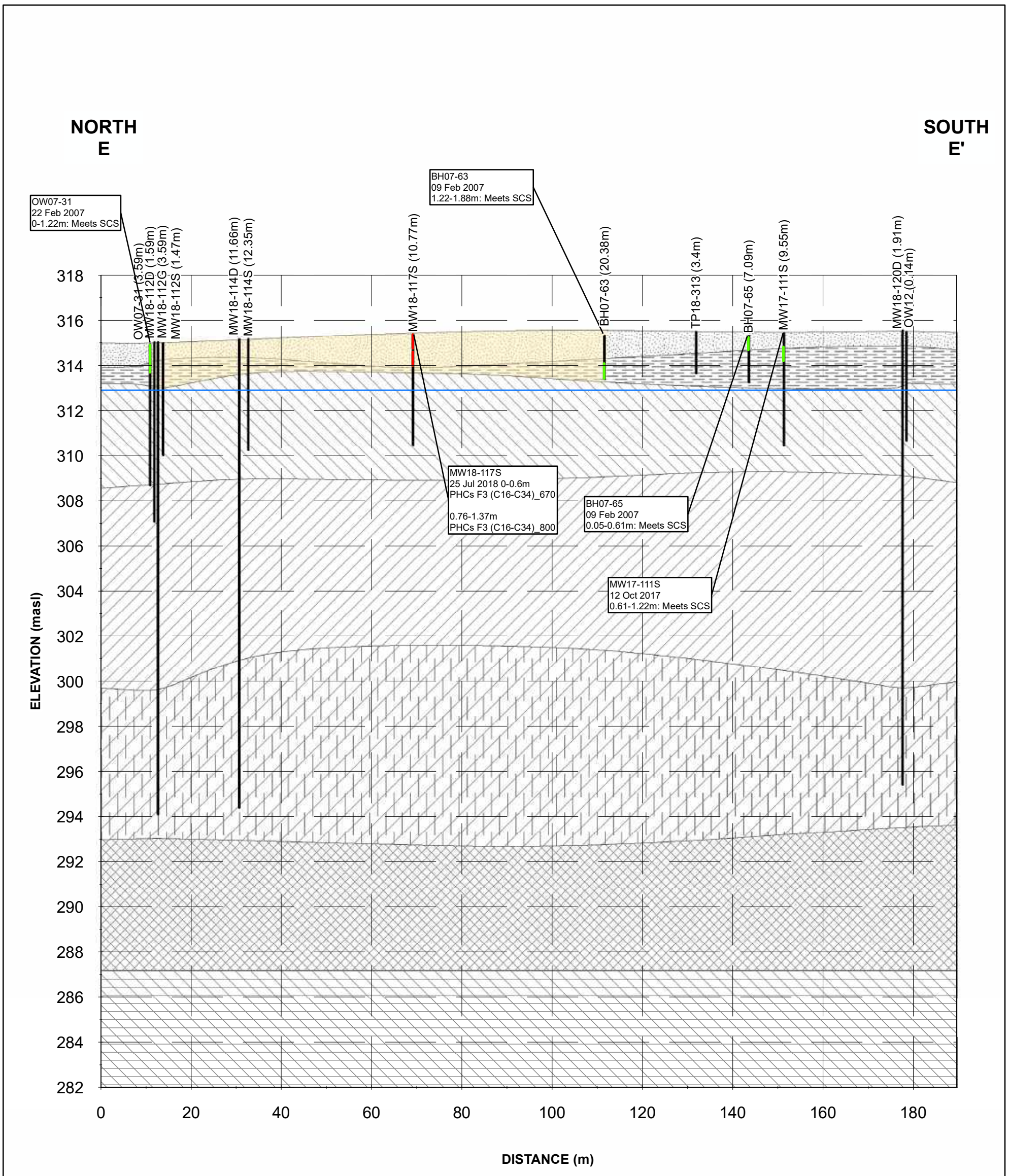


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6b
Section B-B' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6c
Section E-E' - Soil Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
F

SOUTH
F'

TP17-302
04 Oct 2017
0.3-0.91m: Meets SCS
1.52-2.13m: Meets SCS

MW17-103D
25 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.83m:Meets SCS

TP17-306
04 Oct 2017
0.91-1.22m: Meets SCS

TP17-302 (3.15m)
MW18-124S (6.08m)
OW03-II (0.7m)
I (1.89m)
OW03-I (0.32m)
MW17-103S (5.78m)
MW17-103D (3.28m)
OW07-33 (11.15m)
TP17-306 (3.33m)
OW25 (11.8m)
TP13-11 (3.92m)
OW07-34D (0.55m)
OW07-34S (2.76m)
MW17-102D (3.01m)
OW26S (14.68m)
OW26D (13.44m)

TP13-11
03 Dec 2013 0.1-0.3m
PHCs F3 (C16-C34)_370

OW07-34D
22 Feb 2007 0-1.22m
PHCs F3 (C16-C34)_700

OW07-33
22 Feb 2007
0-1.22m: Meets SCS

MW17-102D
26 Oct 2017
0.15-0.3m: Meets SCS
1.83-2.13m: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

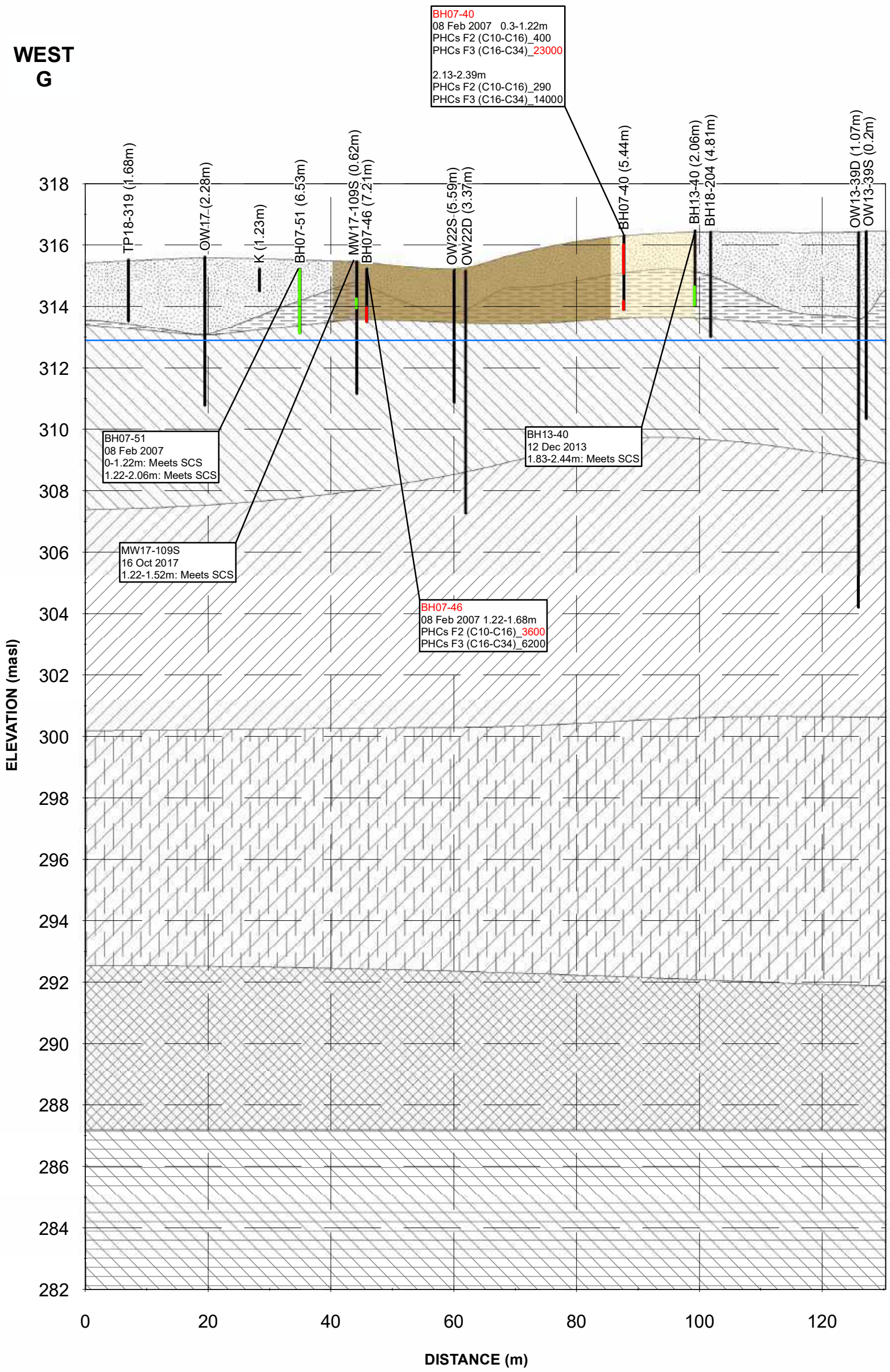
0
20
40
60
80
100
120
140
160

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6d
Section F-F' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-6e
Section G-G' - Soil Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
2-(1-)Methylnaphthalene	0.99µg/g	4.93µg/g	TP17-300
Acenaphthene	7.9µg/g	94µg/g	OW07-34D
Acenaphthylene	0.15µg/g	1µg/g	TP13-08
Anthracene	0.67µg/g	160µg/g	OW07-34D
Benzo(a)anthracene	0.5µg/g	200µg/g	OW07-34D
Benzo(a)pyrene	0.3µg/g	130µg/g	OW07-34D
Benzo(b&j)fluoranthene	0.78µg/g	190µg/g	OW07-34D
Benzo(g,h,i)perylene	6.6µg/g	70µg/g	OW07-34D
Benzo(k)fluoranthene	0.78µg/g	66µg/g	OW07-34D
Chrysene	7µg/g	180µg/g	OW07-34D
Dibenzo(a,h)anthracene	0.1µg/g	26µg/g	OW07-34D
Fluoranthene	0.69µg/g	660µg/g	OW07-34D
Fluorene	62µg/g	150µg/g	OW07-34D
Indeno(1,2,3-Cd)Pyrene	0.38µg/g	80µg/g	OW07-34D
Naphthalene	0.6µg/g	220µg/g	OW07-34D
Phenanthrene	6.2µg/g	900µg/g	OW07-34D
Pyrene	78µg/g	470µg/g	OW07-34D

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

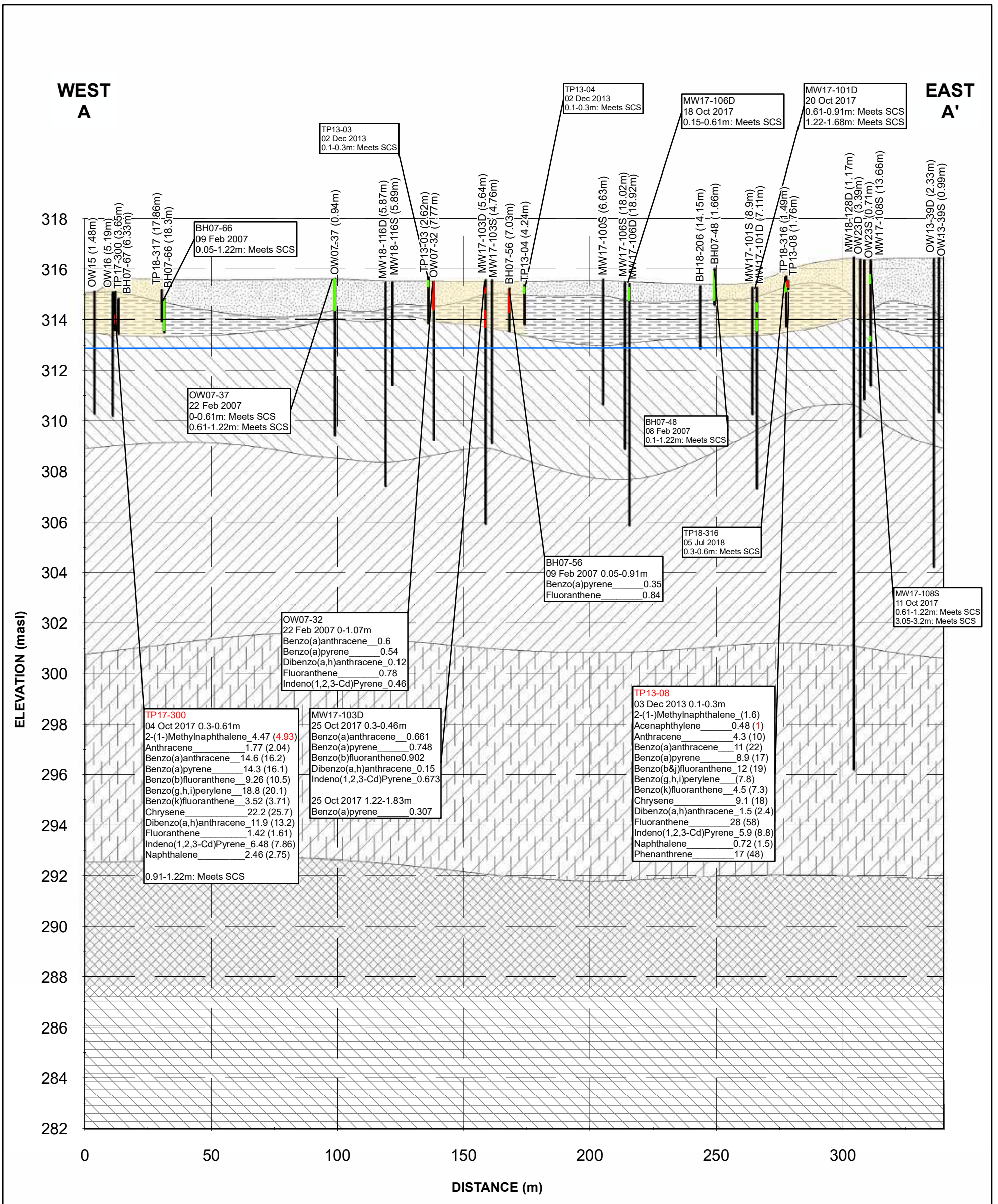
- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-7
Soil Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-7a
Section A-A' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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WEST
D

EAST
D'

BH07-64
08 Feb 2007 0.05-1.22m
Benzo(a)pyrene_____0.44

BH07-62
08 Feb 2007
0.61-1.22m: Meets SCS

BH07-61
08 Feb 2007
0.05-1.22m: Meets SCS

TP13-10
03 Dec 2013
0.1-0.3m: Meets SCS

MW18-129D
23 Jul 2018
1.52-2.13m: Meets SCS

MW18-122D (3.41m)
MW18-122G (3.66m)
OW11-I (4.15m)
OW11-II (4.17m)
BH07-64 (12.74m)
MW18-121S (12.43m)
MW18-121D (11m)
BH07-62 (0m)
BH07-61 (10.14m)
MW17-102D (9.01m)
OW26D (8.57m)
OW26S (8.58m)
BH07-57 (13.79m)
MW18-123D (6.08m)
MW18-123S (0.29m)
MW18-136G (15.86m)
MW18-136D (14.82m)
OW10 (7.75m)
MW18-134S (9.99m)
MW18-134D (10.68m)
TP13-10 (5.55m)
MW18-105G (1.16m)
MW17-105D (0.59m)
MW17-105S (2.72m)
OW09-II (8.49m)
OW09-I (9.92m)
MW18-129D (9.23m)
BH07-53 (7.26m)
OW14 (10.84m)
OW31 (3.96m)
OW24D (6.16m)
OW24S (4.04m)

MW18-122D
26 Jul 2018
0.76-1.37m: Meets SCS

MW17-105D
24 Oct 2017 0.15-0.46m
2-(1-)Methylnaphthalene_1.26
Benzo(a)anthracene__1.37
Benzo(a)pyrene_____1.21
Benzo(b)fluoranthene1.36
Benzo(k)fluoranthene1.07
Fluoranthene_____2.5
Indeno(1,2,3-Cd)Pyrene_1.04

1.22-1.83m: Meets SCS

BH07-53
08 Feb 2007
0-0.15m: Meets SCS
1.22-1.47m: Meets SCS

BH07-57
08 Feb 2007
0.05-1.22m: Meets SCS

MW18-123D
27 Jun 2018
0.76-1.37m: Meets SCS

MW17-102D
26 Oct 2017 0.15-1.22m
Anthracene_____0.69
Benzo(a)anthracene__1.9
Benzo(a)pyrene_____1.65
Benzo(b)fluoranthene1.74
Benzo(k)fluoranthene1.39
Dibenzo(a,h)anthracene_0.25
Fluoranthene_____4.27
Indeno(1,2,3-Cd)Pyrene_1.36

26 Oct 2017 1.83-2.13m
Benzo(a)pyrene_____0.356
Fluoranthene_____1.06

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

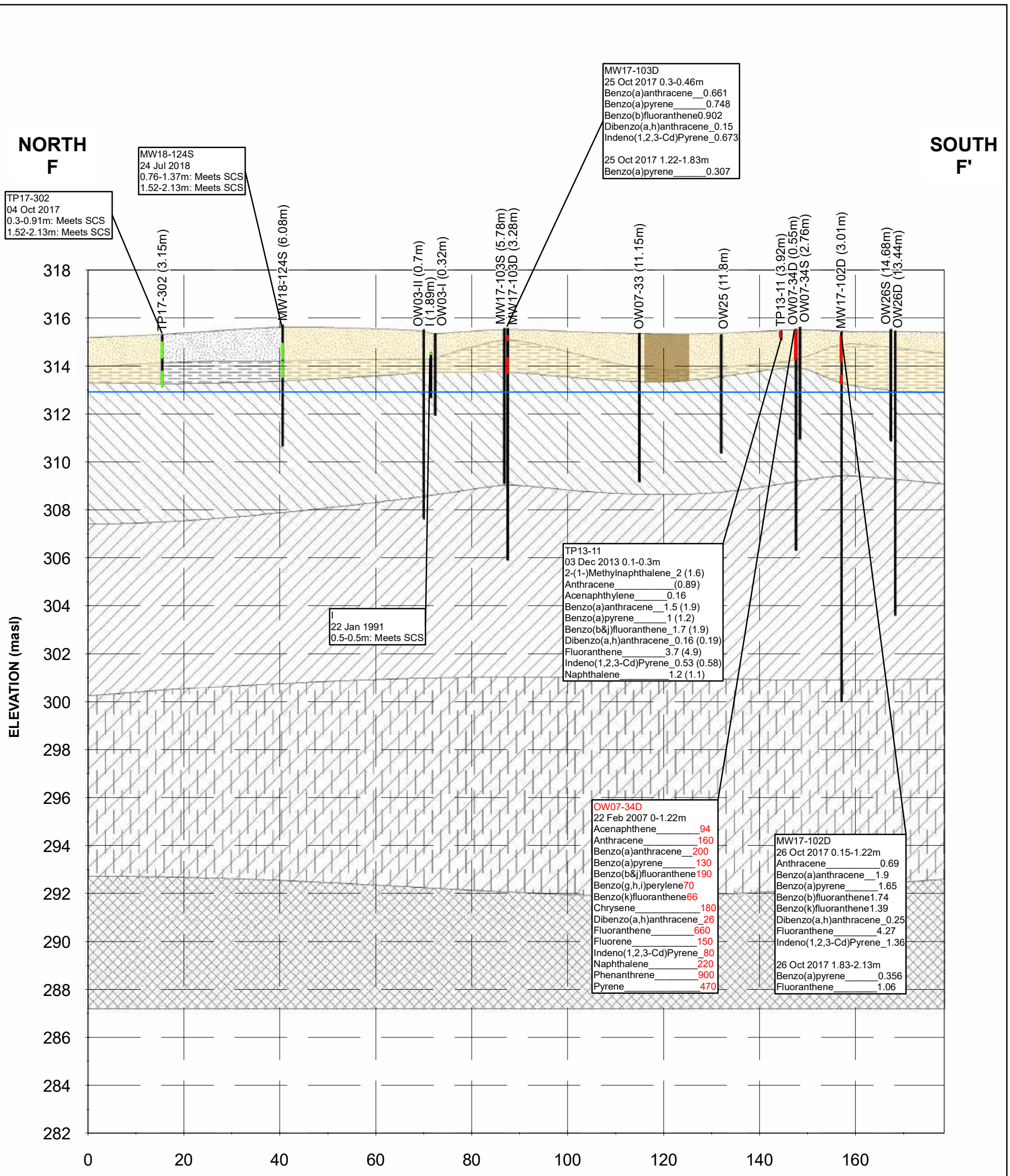
0
50
100
150
200
250
300

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-7b
Section D-D' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-7c
Section F-F' - Soil Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

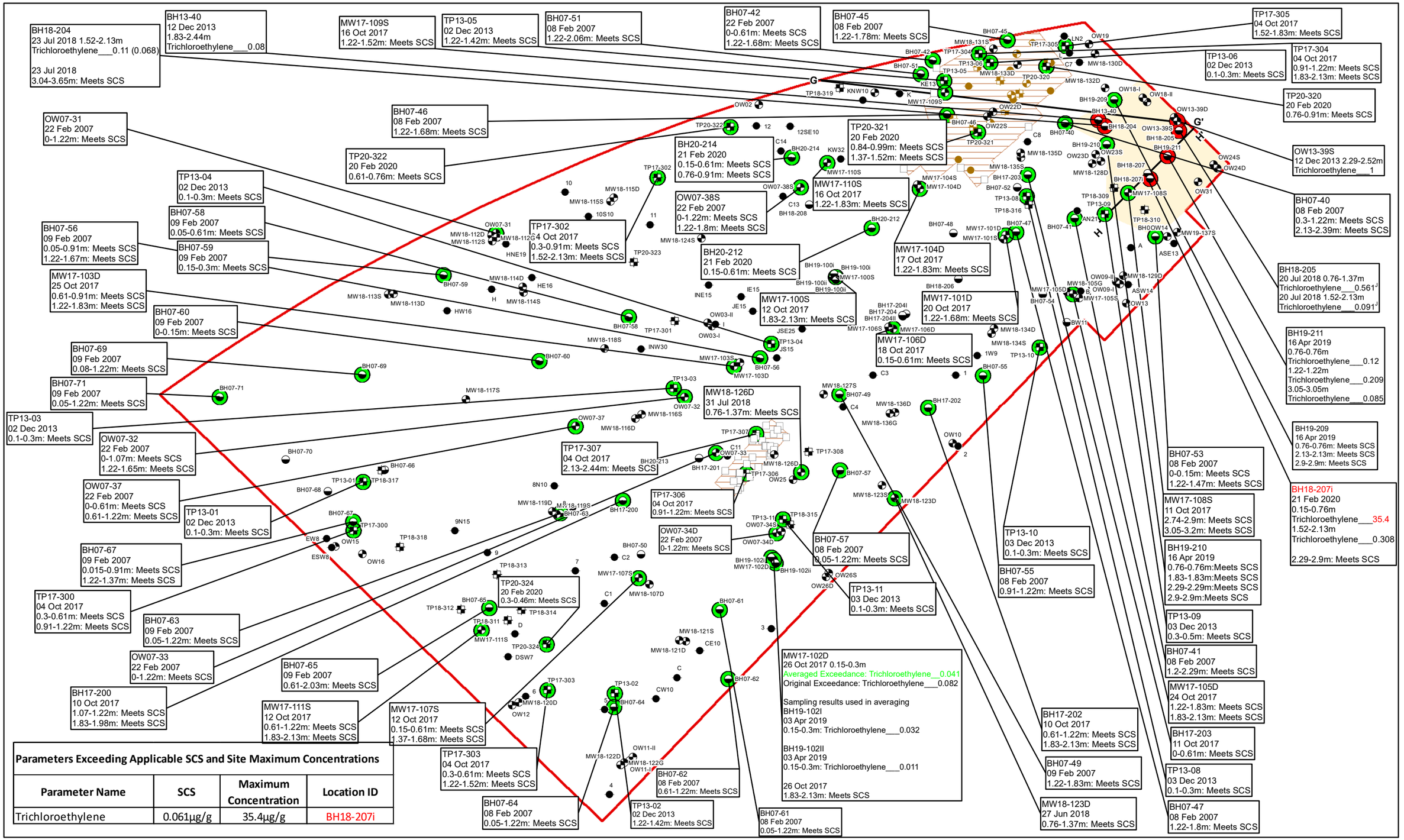


Figure 6-8
Soil Exceedances - VOC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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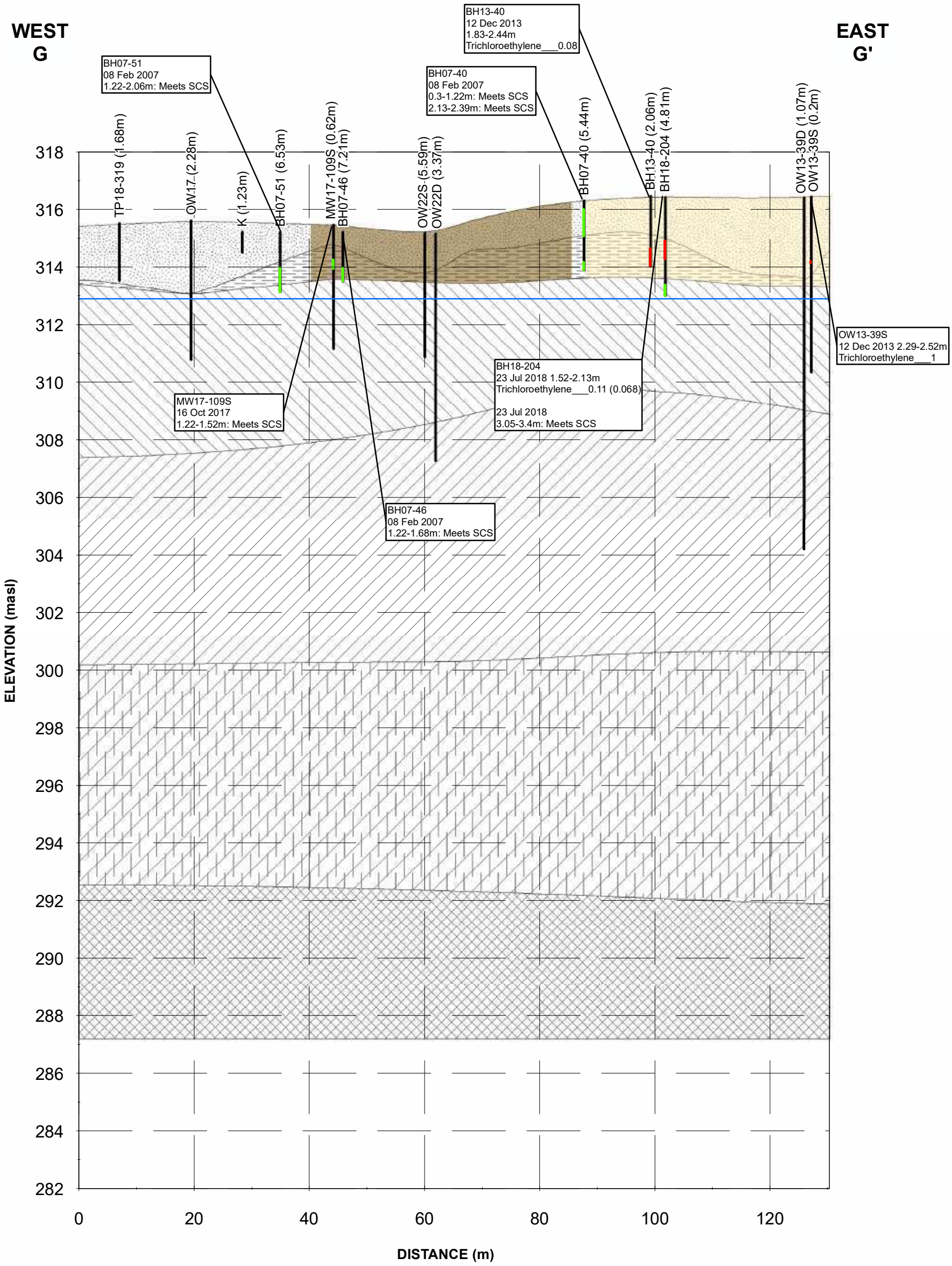
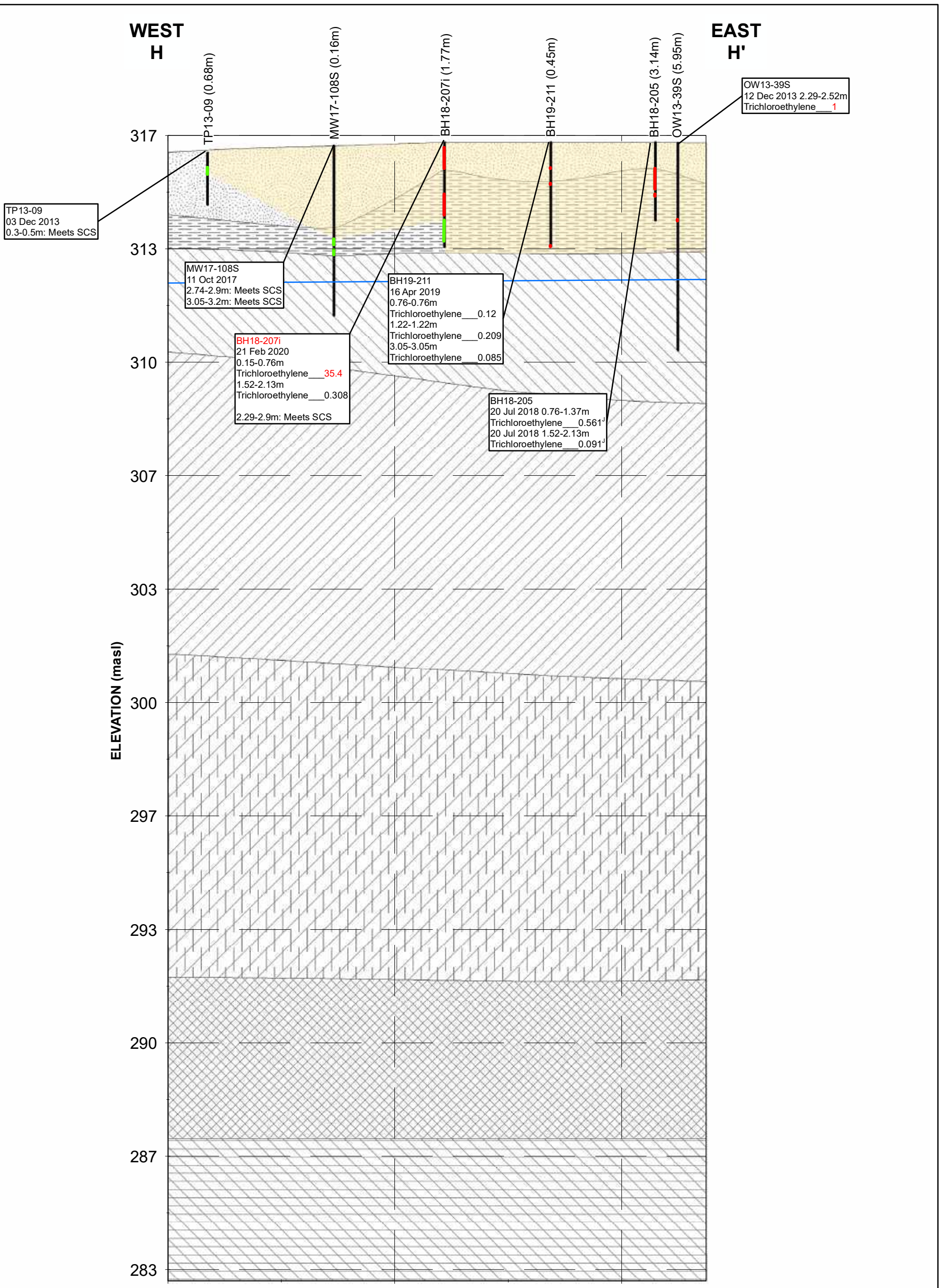


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-8a
Section G-G' - Soil Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. "J" indicates associated value is estimated.

Figure 6-8b
Section H-H' - Soil Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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MW17-104D
17 Oct 2017
0.61-1.22m: Meets SCS

MW17-110S
16 Oct 2017
0-0.61m: Meets SCS

TP17-301
04 Oct 2017
0.3-0.91m: Meets SCS
1.22-1.52m: Meets SCS

BH17-200
10 Oct 2017
0.91-1.07m: Meets SCS
1.22-1.83m: Meets SCS

TP17-300
04 Oct 2017
0.3-0.61m: Meets SCS
0.91-1.22m: Meets SCS

MW17-107S
12 Oct 2017
0.15-0.61m: Meets SCS
1.37-1.68m: Meets SCS

MW17-108S
11 Oct 2017
0.61-1.22m: Meets SCS

MW17-105D
24 Oct 2017
0.15-0.46m: Meets SCS
1.22-1.83m: Meets SCS

MW17-101D
20 Oct 2017
0.61-0.91m: Meets SCS
1.22-1.68m: Meets SCS

MW17-106D
18 Oct 2017
0.15-0.61m: Meets SCS

MW17-103D
25 Oct 2017
0.3-0.46m: Meets SCS
1.22-1.83m: Meets SCS

MW17-102D
26 Oct 2017
0.15-1.22m: Meets SCS

BH20-213
21 Feb 2020
0.15-0.76m: Meets SCS

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

No Exceedance

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-9
Soil Exceedances - CP
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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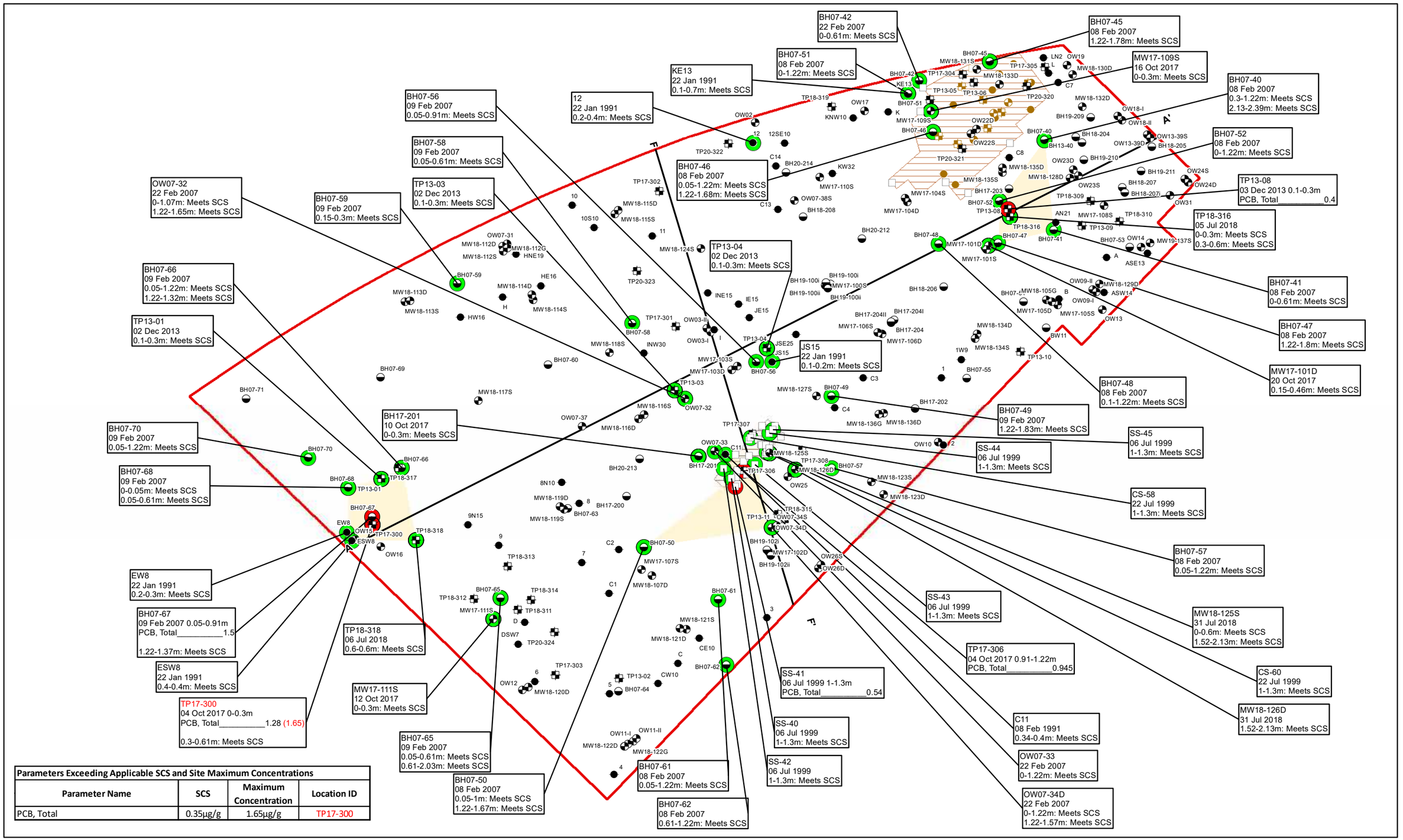

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
PCB, Total	0.35µg/g	1.65µg/g	TP17-300

N

0 10 20 30
Metres

Sample Locations
- Borehole
- Confirmatory
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

- No Exceedance
- Exceedance
- Cross Section Location

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.

Figure 6-10
Soil Exceedances - PCB
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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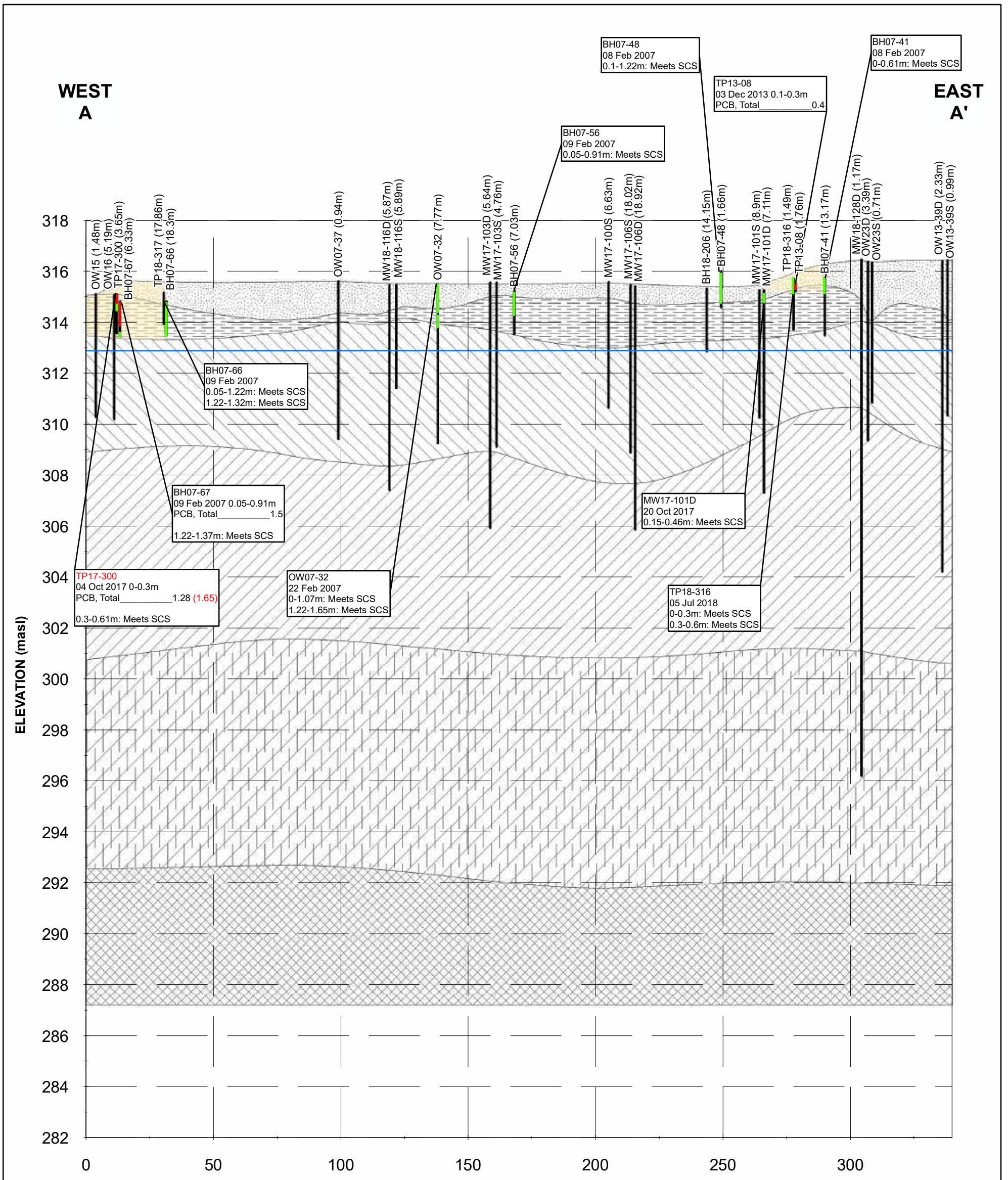

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-10a
Section A-A' - Soil Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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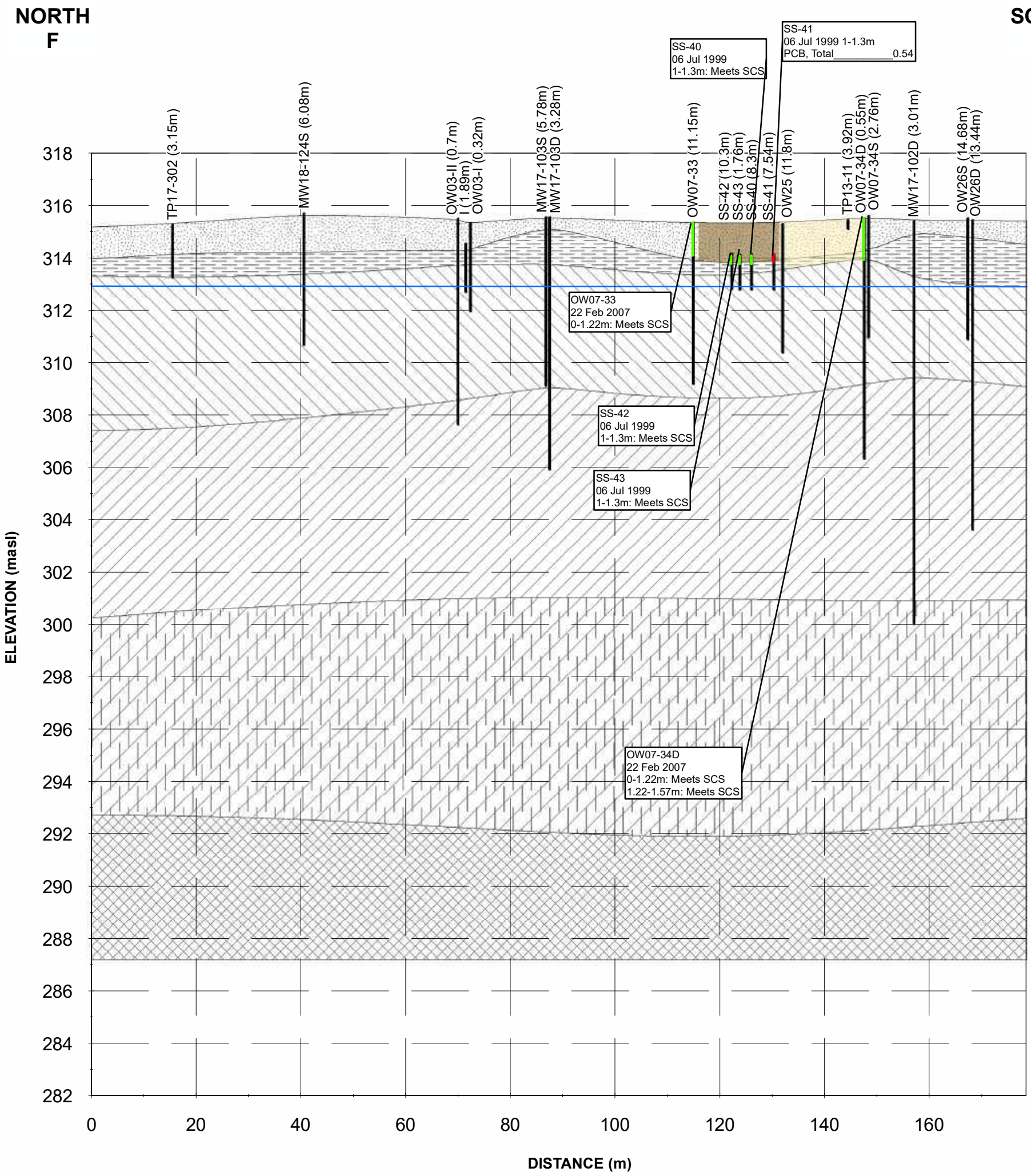
NORTH
F

SOUTH
F'

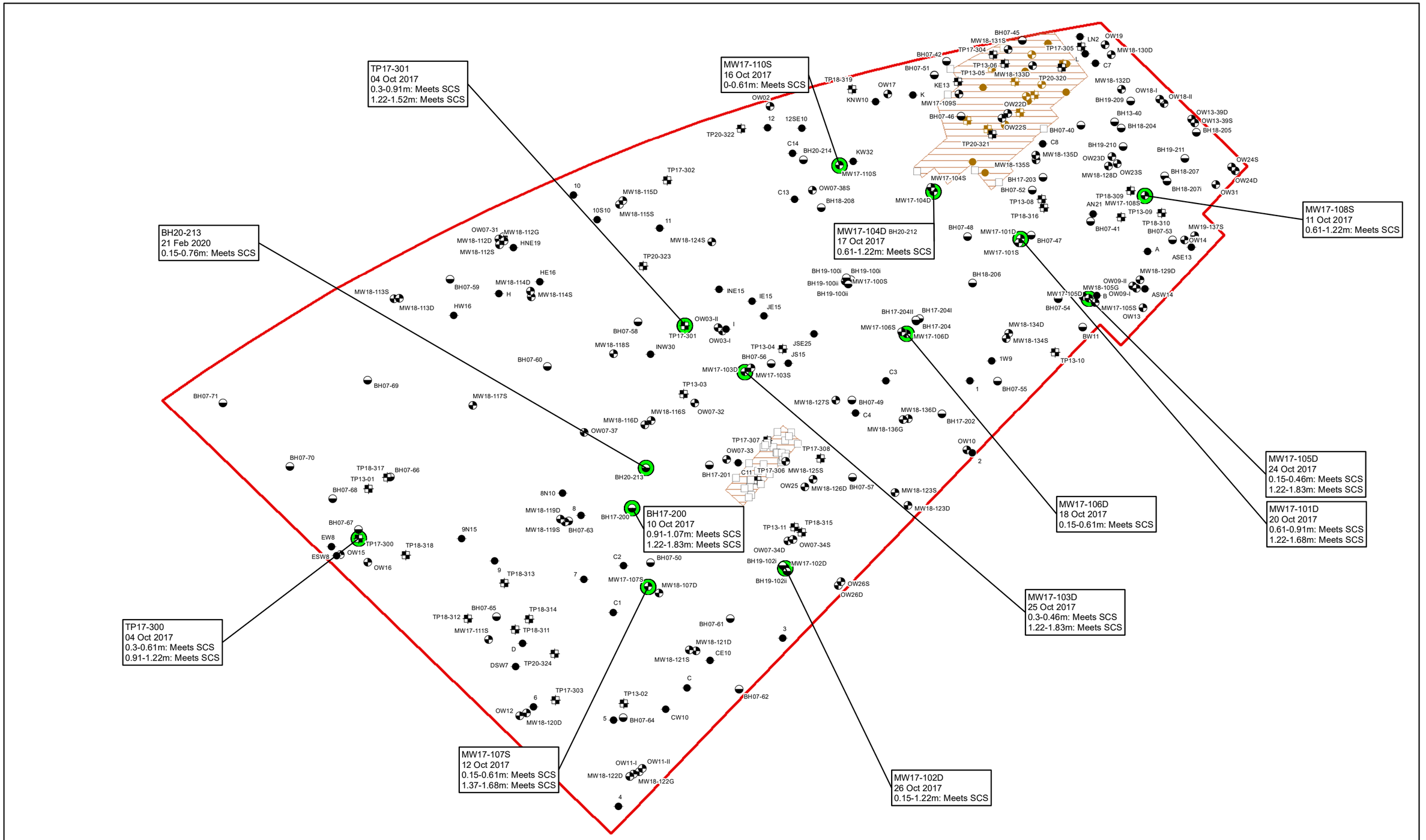


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-10b
Section F-F' - Soil Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-11
Soil Exceedances - ABN
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Parameters Exceeding Ontario Typical Ranges and Maximum Concentrations			
Parameter Name	**OTR**	**Maximum Concentration**	**Location ID**
Bismuth	NV	150 ug/g	TP13-11
Calcium	54,000 ug/g	222,000 ug/g	TP20-320
Iron	38,000 ug/g	128,000 ug/g	I
Magnesium	17,000 ug/g	120,000 ug/g	TP13-06

N

0 10 20 30

Metres

Sample Locations
- Borehole
- Monitoring Well
- Other
- Test Pit

Excavated Locations
- Confirmatory
- Monitoring Well
- Other
- Test Pit

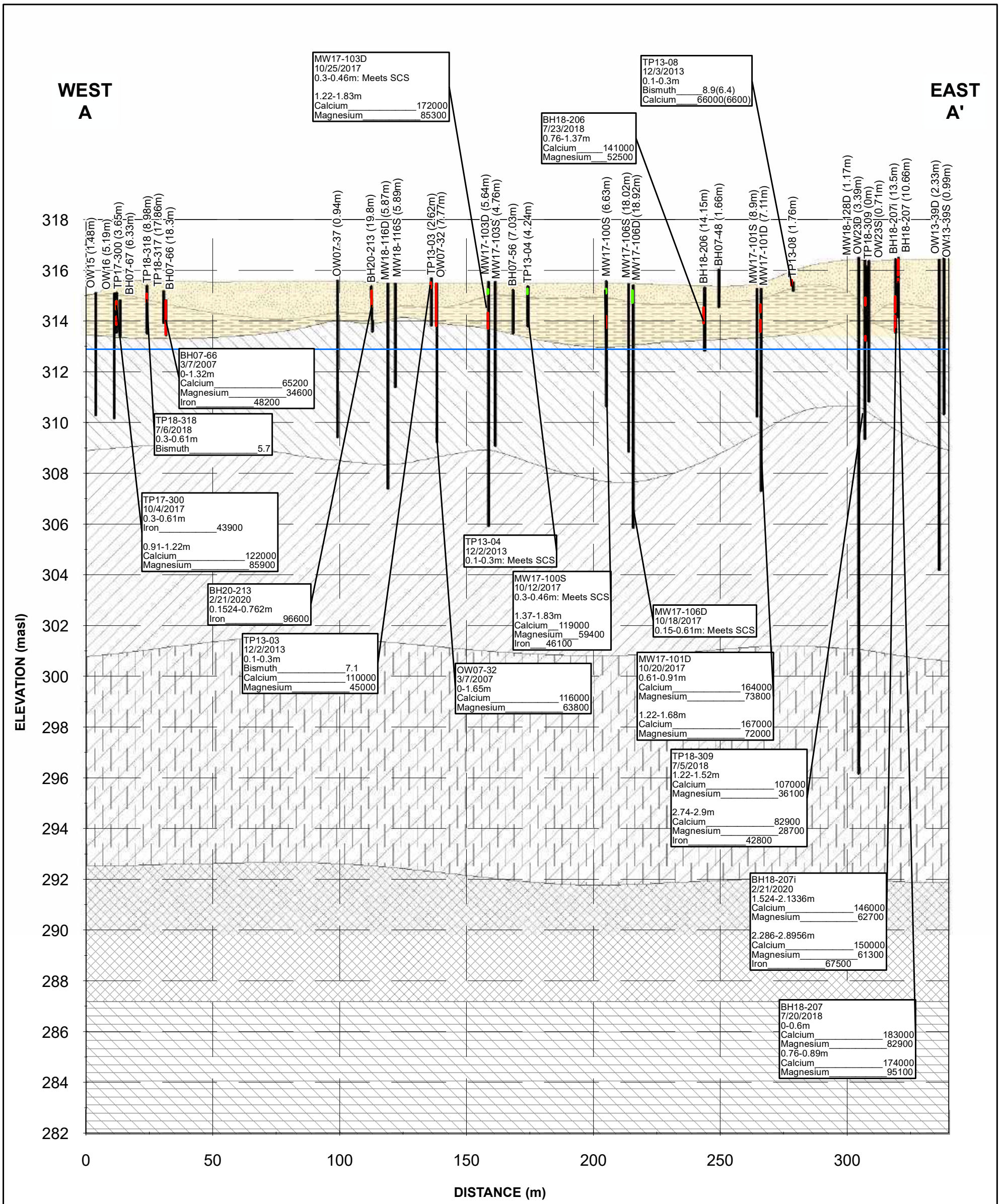
- No Exceedance
- Exceedance

- Former IMICO Property Boundary
- Historical Excavation area, EarthTech, 1999
- Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-12
Parameters in Soil with no SCS
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12a
Section A-A' - Soil Exceedances - Parameters in Soil with no SCS
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

NORTH
B

SOUTH
B'

TP13-06
12/2/2013
0.1-0.3m
Calcium_____220000
Magnesium___120000

TP17-304
10/4/2017
0.91-1.22m
Calcium_____105000
Magnesium___47500

1.83-2m
Calcium_____91800
Magnesium___49000

TP17-304 (3.5m)
MW18-131S (1.68m)
TP13-06 (2.7m)
MW18-133D (3.21m)
TP20-320 (10.5m)
OW22S (16.51m)
OW22D (13.69m)
C8 (12.9m)
BH07-40 (0.71m)
OW23D (0.9m)
MW18-128D (1.91m)
OW23S (0.94m)
TP18-309 (1.77m)
MW17-108S (0.41m)
TP18-310 (0.52m)
BH07-53 (4.32m)
OW14 (0.74m)

C8
2/8/1991
0.14-0.76m: Meets SCS

TP18-310
7/5/2018
1.22-1.52m
Calcium_____68300
Magnesium_____21500

2.44-2.74m
Calcium_____89600
Magnesium_____27000

TP20-320
2/20/2020
0.762-0.9144m
Calcium__222000(212000)
Magnesium_117000(113000)

MW17-108S
10/11/2017
0.61-0.91m
Calcium____139000(142000)
Magnesium__74200(74700)
Iron_____52400(51100)

2.44-2.67m
Calcium_____83500
Magnesium_____40000
Iron_____67100

TP18-309
7/5/2018
1.22-1.52m
Calcium_____107000
Magnesium_____36100

2.74-2.9m
Calcium_____82900
Magnesium_____28700
Iron_____42800

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
80
100

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

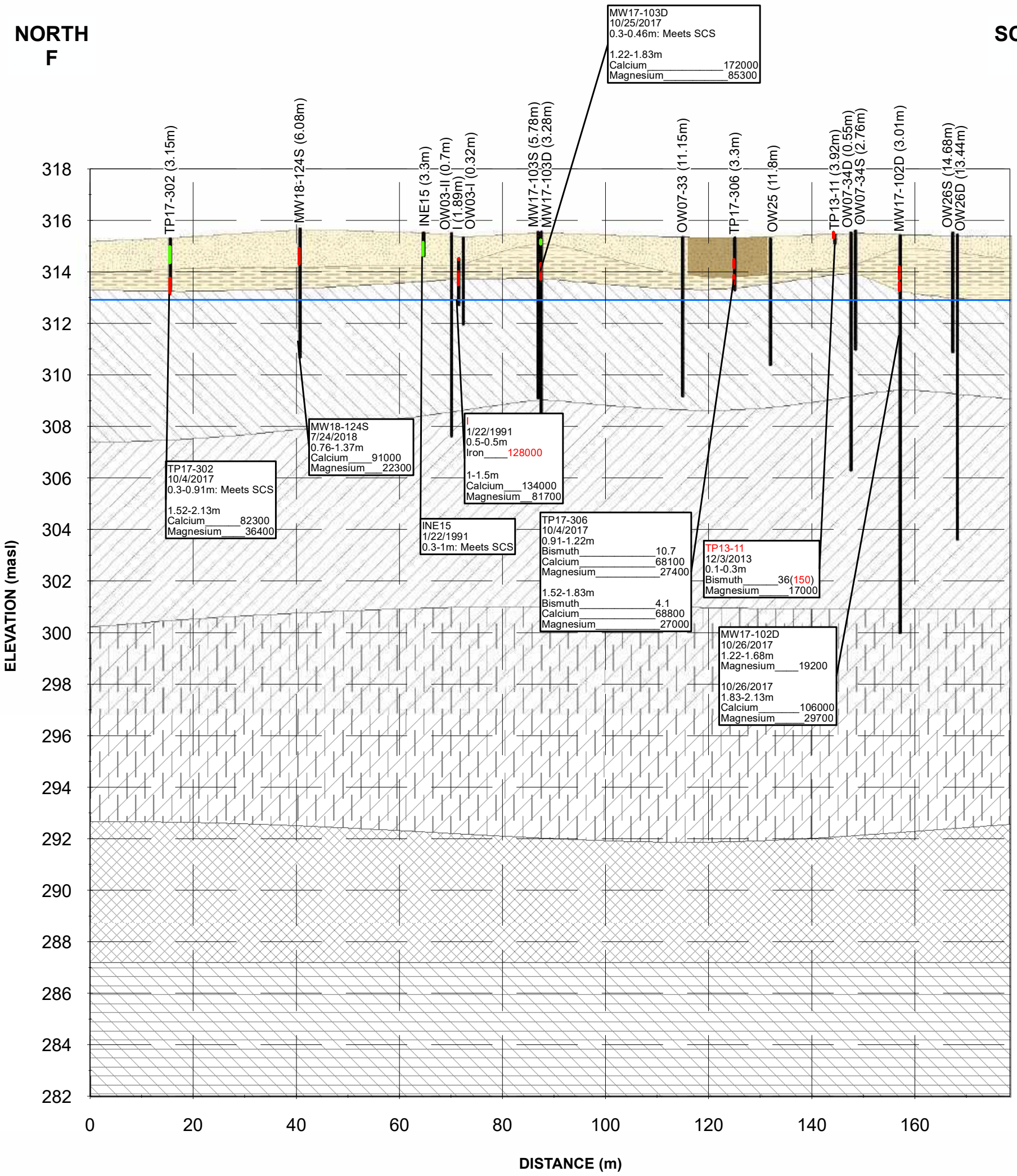
Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12b
Section B-B' - Soil Exceedances - Parameters in Soil with no SCS
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

NORTH
F

SOUTH
F'



- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-12c
Section F-F' - Soil Exceedances - Parameters in Soil with no SCS
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\RA\MAY2021_UNCONVENTIONALMETALS\6-12C_CROSSSECTIONF_SO_PARAMATERS_IN_SOIL_WITH_NOSCS.MXD KA077569 5/15/2021 9:33:52 AM

OW22S
1.36-4.1m
24 Mar 2010
Zinc__2600

17 Jun 2011
Zinc__2900

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__3200

25 Oct 2013: Meets SCS

20 Oct 2014
Zinc__1000

19 Nov 2015
Zinc__1800

25 Oct 2016: Meets SCS

06 Sep 2017
Uranium__25.9

21 Mar 2018
Zinc__1740
Uranium: Meets SCS

13 Apr 2018
Zinc__1390
Uranium: Meets SCS

See Note 6

OW02
0.91-3.96m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
05 Sep 2017: Meets SCS

OW07-31
1.5-6.22m
29 Mar 2007: Meets SCS

05 Sep 2017
Arsenic__45.7

21 Mar 2018
Arsenic__33.9

MW18-112D
6.4-7.92m
02 Aug 2018
Arsenic__32.7

MW18-112G
22 Nov 2018
19.35-20.88m: Meets SCS

MW18-112S
3.42-4.95m
02 Aug 2018
Arsenic__42.5

MW18-113D
17 Dec 2018
18.29-19.81m: Meets SCS

MW18-113S
03 Aug 2018
3.37-4.9m: Meets SCS

MW18-114D
19.2-20.73m
10 Dec 2018
Antimony_____6.2

21 Dec 2018: Meets SCS
27 Mar 2019: Meets SCS

See Note 6

MW18-116D
03 Aug 2018
6.5-8.02m: Meets SCS

MW18-117S
02 Aug 2018
3.35-4.87m: Meets SCS

OW07-37
3.1-6.15m
29 Mar 2007
Zinc__1630

06 Sep 2017: Meets SCS
27 Mar 2019: Meets SCS

See Note 6

OW07-33
3.1-6.15m
29 Mar 2007: Meets SCS

31 Aug 2017
Lead__15

01 Sep 2017
Lead__15.6

20 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS

See Note 6

OW16
1.82-4.87m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
05 Sep 2017: Meets SCS

OW12
1.76-4.81m
23 Mar 2010: Meets SCS

07 Oct 2010
Zinc___910

16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
05 Sep 2017: Meets SCS

See Note 6

OW23D
6.55-7.77m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

MW18-115D
12 Dec 2018
19.2-20.73m: Meets SCS

MW18-115S
02 Aug 2018
3.2-4.72m: Meets SCS

OW03-II
6.33-7.85m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

OW03-I
1.07-3.35m
12 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

MW18-114S
02 Aug 2018
3.37-4.9m: Meets SCS

MW18-118S
02 Aug 2018
3.25-4.77m: Meets SCS

MW18-116S
03 Aug 2018
2.51-4.03m: Meets SCS

MW17-103S
02 Nov 2017
2.44-3.96m: Meets SCS

OW07-32
3.17-6.22m
29 Mar 2007
Zinc__1290

06 Sep 2017
Zinc__1270

OW07-34S
1.55-4.6m
29 Mar 2007: Meets SCS
01 Sep 2017: Meets SCS

MW18-119S
03 Aug 2018
3.45-4.97m: Meets SCS

OW15
05 Sep 2017
1.75-4.8m: Meets SCS

MW17-107S
01 Nov 2017
2.72-4.85m: Meets SCS

MW17-111S
02 Nov 2017
3.43-4.95m: Meets SCS

MW18-120D
30 Jul 2018
18.59-20.11m: Meets SCS

MW18-121S
03 Aug 2018
3.12-4.64m: Meets SCS

OW11-II
6.28-7.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS

01 Sep 2017
Cobalt__5.74 (5.79)

20 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS

See Note 6

OW11-I
1.6-4.65m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
01 Sep 2017: Meets SCS

OW07-34D
6.12-9.17m
29 Mar 2007: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
01 Sep 2017: Meets SCS

OW26D
10.28-11.8m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
31 Aug 2017: Meets SCS

OW22D
6.71-7.47m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
06 Sep 2017: Meets SCS

MW17-109S
02 Nov 2017
2.79-4.32m: Meets SCS

OW17
05 Sep 2017
1.79-4.84m: Meets SCS

OW07-38S
29 Mar 2007
1.79-4.84m: Meets SCS

MW17-110S
02 Nov 2017
3-4.52m: Meets SCS

MW17-104S
01 Nov 2017
1.22-3.66m: Meets SCS

OW07-38S
06 Sep 2017
1.79-4.84m: Meets SCS

MW17-104D
01 Nov 2017
6.1-7.62m: Meets SCS

OW23S
2.52-5.26m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Mar 2018: Meets SCS

MW17-100S
31 Oct 2017
3.38-4.9m: Meets SCS

MW17-106S
01 Nov 2017
3.05-4.57m: Meets SCS

MW18-131S
3.2-4.72m
31 Jul 2018
Zinc__1160

MW18-130D
31 Jul 2018
6.4-7.92m: Meets SCS

MW18-133D
31 Jul 2018
17.17-18.69m: Meets SCS

MW18-135S
11 Dec 2018
4.27-5.79m: Meets SCS

MW17-101S
01 Nov 2017
1.22-4.27m: Meets SCS

MW17-101D
6.3-7.82m
01 Nov 2017
Arsenic__44.8

21 Mar 2018: Meets SCS
13 Apr 2018: Meets SCS
See Note 6

MW17-105D
31 Oct 2017
6.93-8.46m: Meets SCS

MW17-105S
31 Oct 2017
3.2-4.72m: Meets SCS

OW09-II
6.33-7.85m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS

16 Jun 2011
Lead__16

20 Sep 2011
Lead__11

12 Dec 2012
Lead__17

24 Oct 2013: Meets SCS
22 Oct 2014: Meets SCS
18 Nov 2015: Meets SCS
24 Oct 2016: Meets SCS
30 Aug 2017: Meets SCS
20 Mar 2018: Meets SCS

13 Apr 2018
Lead__14.3

OW09-I
1.79-4.84m
24 Mar 2010: Meets SCS

07 Oct 2010
Zinc__1800

16 Jun 2011
Zinc__1500

19 Sep 2011
Zinc__2000

12 Dec 2012
Zinc__1900

24 Oct 2013
Zinc__2500

22 Oct 2014
Zinc__2600

18 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__2600

30 Aug 2017
Zinc__1180

OW10
1.8-4.85m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

OW25
1.98-4.72m
24 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS
11 Dec 2012: Meets SCS
24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
01 Sep 2017: Meets SCS

OW26S
3.08-4.6m
24 Mar 2010: Meets SCS
16 Jun 2011: Meets SCS
19 Sep 2011: Meets SCS

11 Dec 2012
Zinc___900

24 Oct 2013: Meets SCS
24 Oct 2014: Meets SCS
31 Aug 2017: Meets SCS

See Note 6

MW18-132D
31 Jul 2018
7.97-9.49m: Meets SCS

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW19
1.77-4.82m
23 Mar 2010
Zinc__4500

16 Jun 2011
Zinc__2600

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__1800

25 Oct 2013
Zinc__1900

22 Oct 2014
Zinc__2500

20 Nov 2015
Zinc__3700

25 Oct 2016
Zinc__2700

07 Sep 2017
Zinc__1360

OW24D
6.55-7.77m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
21 Oct 2014: Meets SCS

07 Sep 2017
Zinc__949

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS

20 Sep 2011
Zinc__1300

12 Dec 2012: Meets SCS

25 Oct 2013
Zinc__1100

21 Oct 2014
Zinc__1200

07 Sep 2017: Meets SCS

OW31
19 Sep 2016
28.9-33.32m: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010
Zinc__1300

16 Jun 2011
Zinc__1100

20 Sep 2011
Zinc__1300

12 Dec 2012
Zinc__1100

25 Oct 2013
Zinc__1100

24 Oct 2014
Zinc__900

20 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__1600

29 Aug 2017
Zinc__1720

OW14
6.29-7.81m
23 Mar 2010
Zinc__1300

07 Oct 2010
Zinc__3700

16 Jun 2011
Zinc__2100

20 Sep 2011
Zinc__3200

30 Aug 2017
Zinc__1300

OW18-II
6.32-7.84m
23 Mar 2010
Zinc__960

17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2013
Zinc__910

24 Oct 2014: Meets SCS

25 Oct 2016
Zinc__1000

29 Aug 2017: Meets SCS

MW17-108S
31 Oct 2017
1.93-4.98m: Meets SCS

OW13
6.48-8m
24 Mar 2010
Zinc__1700

07 Oct 2010
Zinc__1900

16 Jun 2011
Zinc__1500

20 Sep 2011
Zinc__1900

12 Dec 2012: Meets SCS

30 Aug 2017
Zinc__1010

MW18-129D
30 Jul 2018
7.97-9.49m: Meets SCS

Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Arsenic	25µg/L	45.7µg/L	OW07-31
Lead	10µg/L	17µg/L	OW09-II
Zinc	890µg/L	4500µg/L	OW19

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

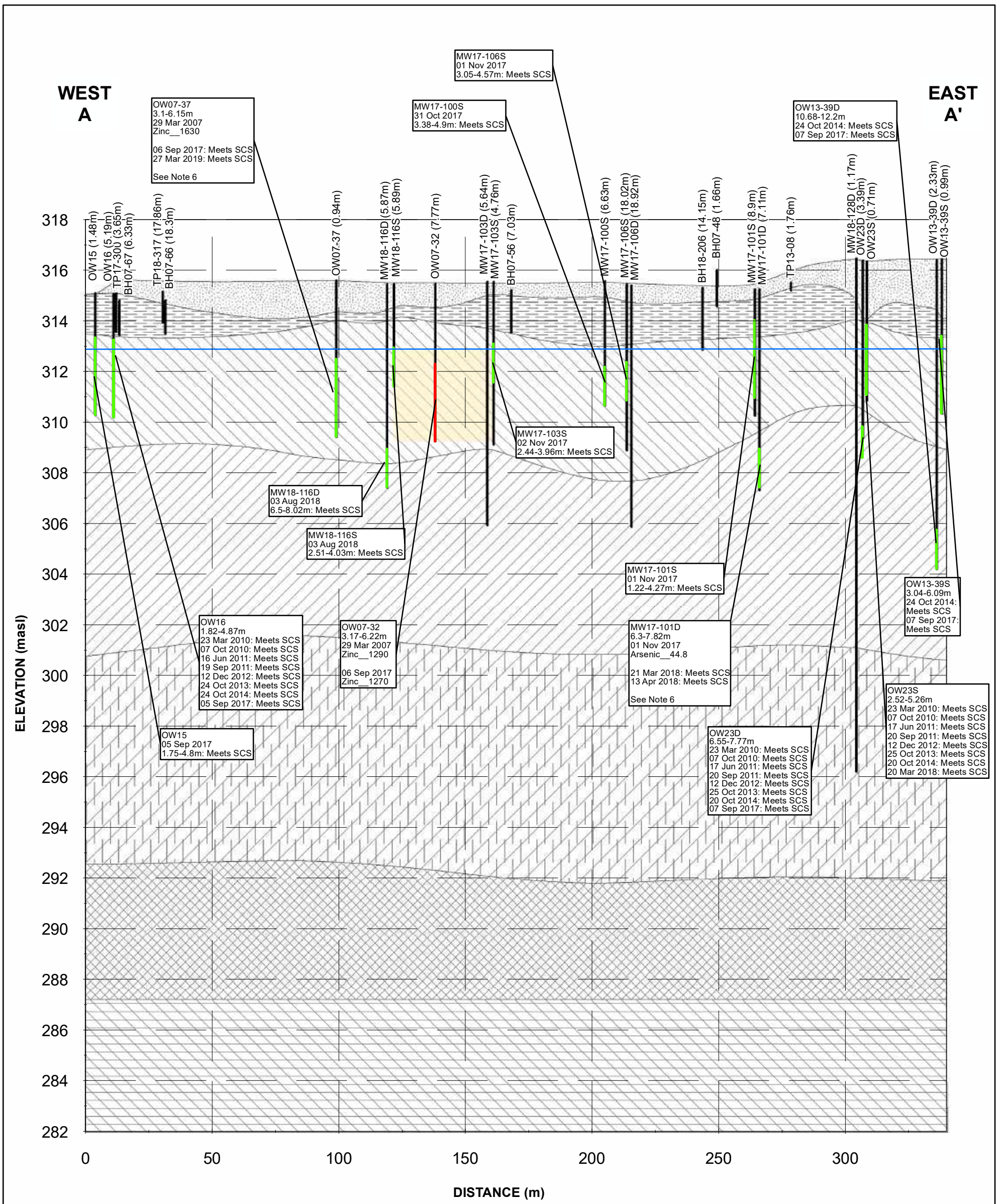
Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-13
Groundwater Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\GW_METALS.MXD KA077569 5/11/2020 11:14:59 AM



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
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4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-13a
Section A-A' - Groundwater Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\CROSSSECTIONA_GW_METALS.MXD KA077569 5/11/2020 11:40:11 AM

NORTH
C

SOUTH
C'

OW19 (2.56m)
MW18-130D (1.69m)
MW18-132D (4.5m)
OW18-I (1.29m)
OW18-II (1.22m)
OW13-39D (3.52m)
OW13-39S (3.45m)
BH18-205 (1.9m)
OW24S (1.1m)
OW31 (7.37m)
OW24D (0.3m)

OW19
1.77-4.82m
23 Mar 2010
Zinc__4500

16 Jun 2011
Zinc__2600

20 Sep 2011: Meets SCS

12 Dec 2012
Zinc__1800

25 Oct 2013
Zinc__1900

22 Oct 2014
Zinc__2500

20 Nov 2015
Zinc__3700

25 Oct 2016
Zinc__2700

07 Sep 2017
Zinc__1360

OW24S
2.6-5.34m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS

20 Sep 2011
Zinc__1300

12 Dec 2012: Meets SCS

25 Oct 2013
Zinc__1100

21 Oct 2014
Zinc__1200

07 Sep 2017: Meets SCS

OW13-39S
3.04-6.09m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

MW18-130D
31 Jul 2018
6.4-7.92m: Meets SCS

OW24D
6.55-7.77m
23 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
21 Oct 2014: Meets SCS

07 Sep 2017
Zinc__949

MW18-132D
31 Jul 2018
7.97-9.49m: Meets SCS

OW18-I
1.81-4.86m
23 Mar 2010
Zinc__1300

16 Jun 2011
Zinc__1100

20 Sep 2011
Zinc__1300

12 Dec 2012
Zinc__1100

25 Oct 2013
Zinc__1100

24 Oct 2014
Zinc__900

20 Nov 2015
Zinc__1700

24 Oct 2016
Zinc__1600

29 Aug 2017
Zinc__1720

OW13-39D
10.68-12.2m
24 Oct 2014: Meets SCS
07 Sep 2017: Meets SCS

OW18-II
6.32-7.84m
23 Mar 2010
Zinc__960

17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2013
Zinc__910

24 Oct 2014: Meets SCS

25 Oct 2016
Zinc__1000

29 Aug 2017: Meets SCS

OW31
19 Sep 2016
28.9-33.32m: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
20
40
60
77.14

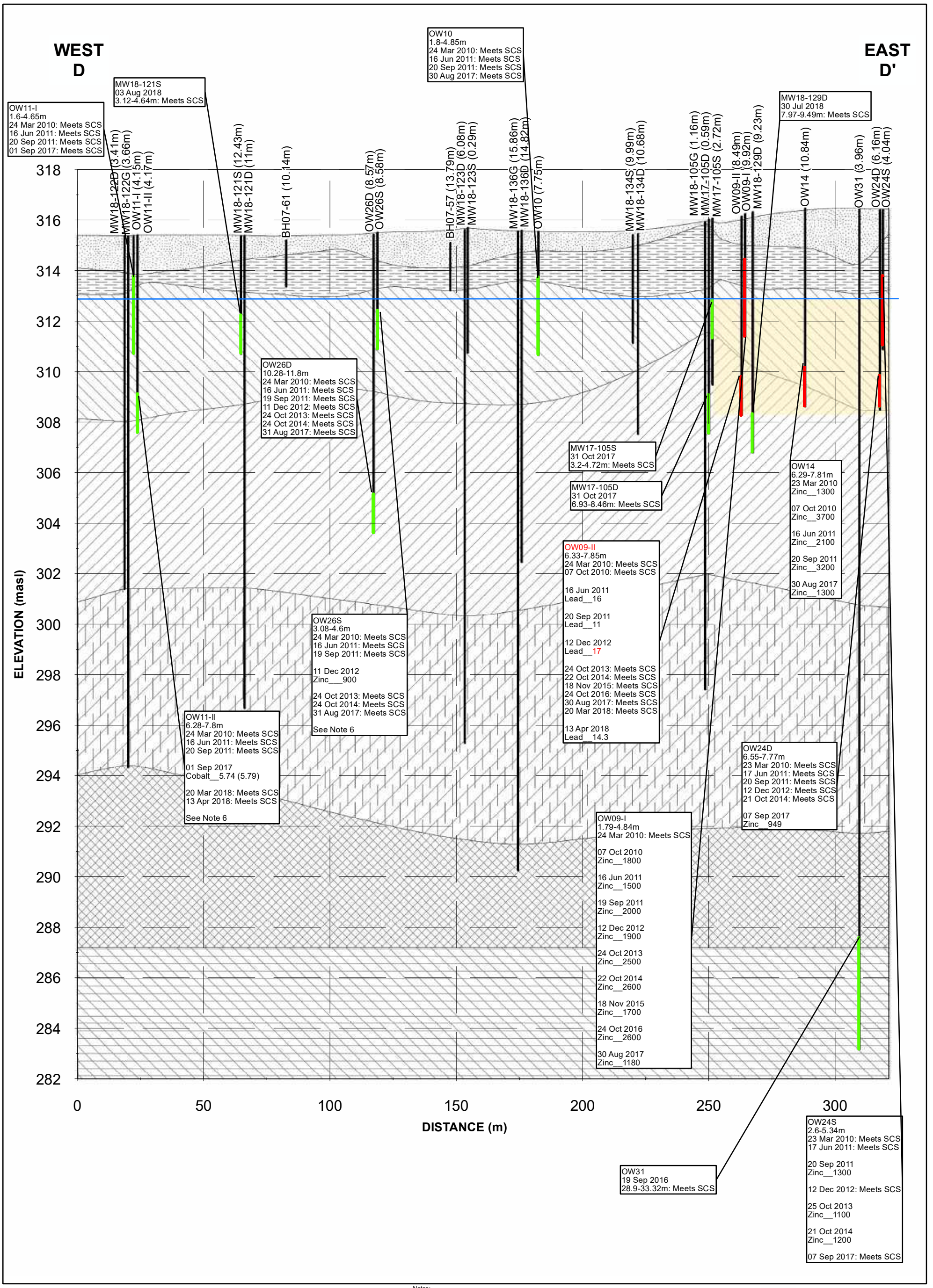
DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-13b
Section C-C' - Groundwater Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

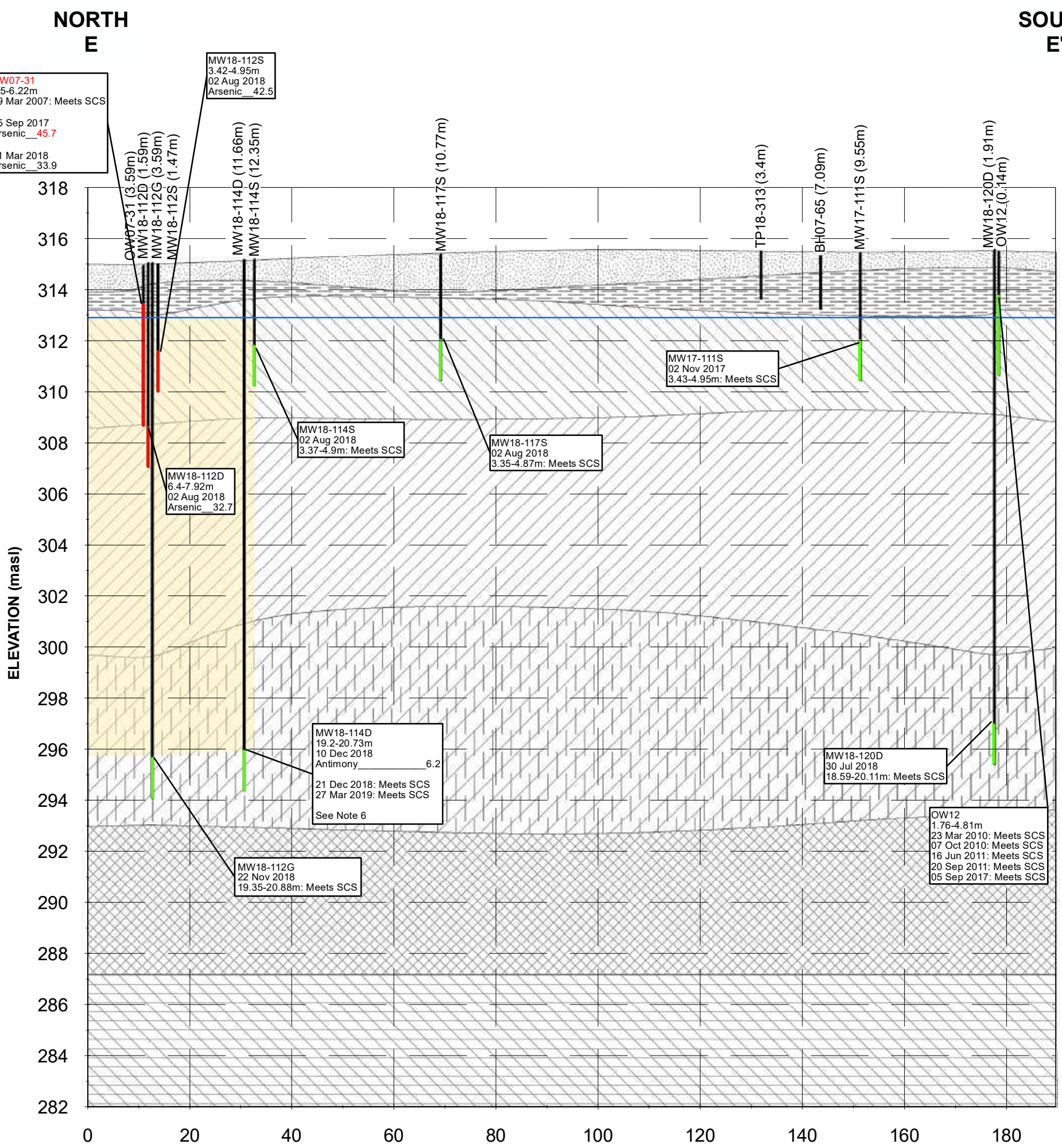
Figure 6-13c
Section D-D' - Groundwater Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\CROSSSECTIOND_GW_METAL.MXD KA077569 5/6/2020 3:07:08 PM

NORTH
E

SOUTH
E'



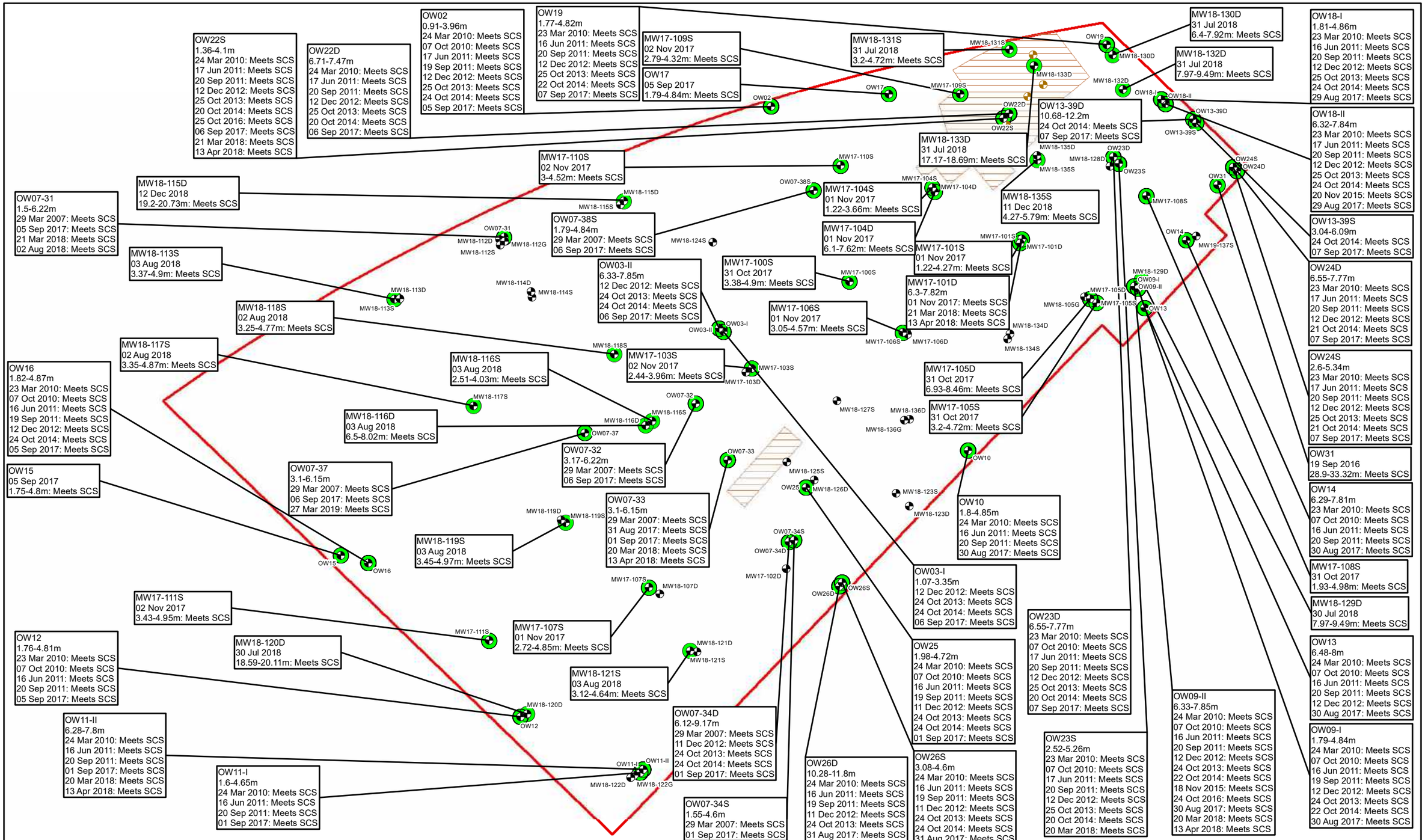
- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-13d
Section E-E' - Groundwater Exceedances - Metals, Hydride-Forming Metals, Mercury and Chromium VI
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\CROSSSECTIONE_GW_METAL.MXD KA077569 5/11/2020 12:11:54 PM



Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-14
Groundwater Exceedances - Sodium, Chloride and CN
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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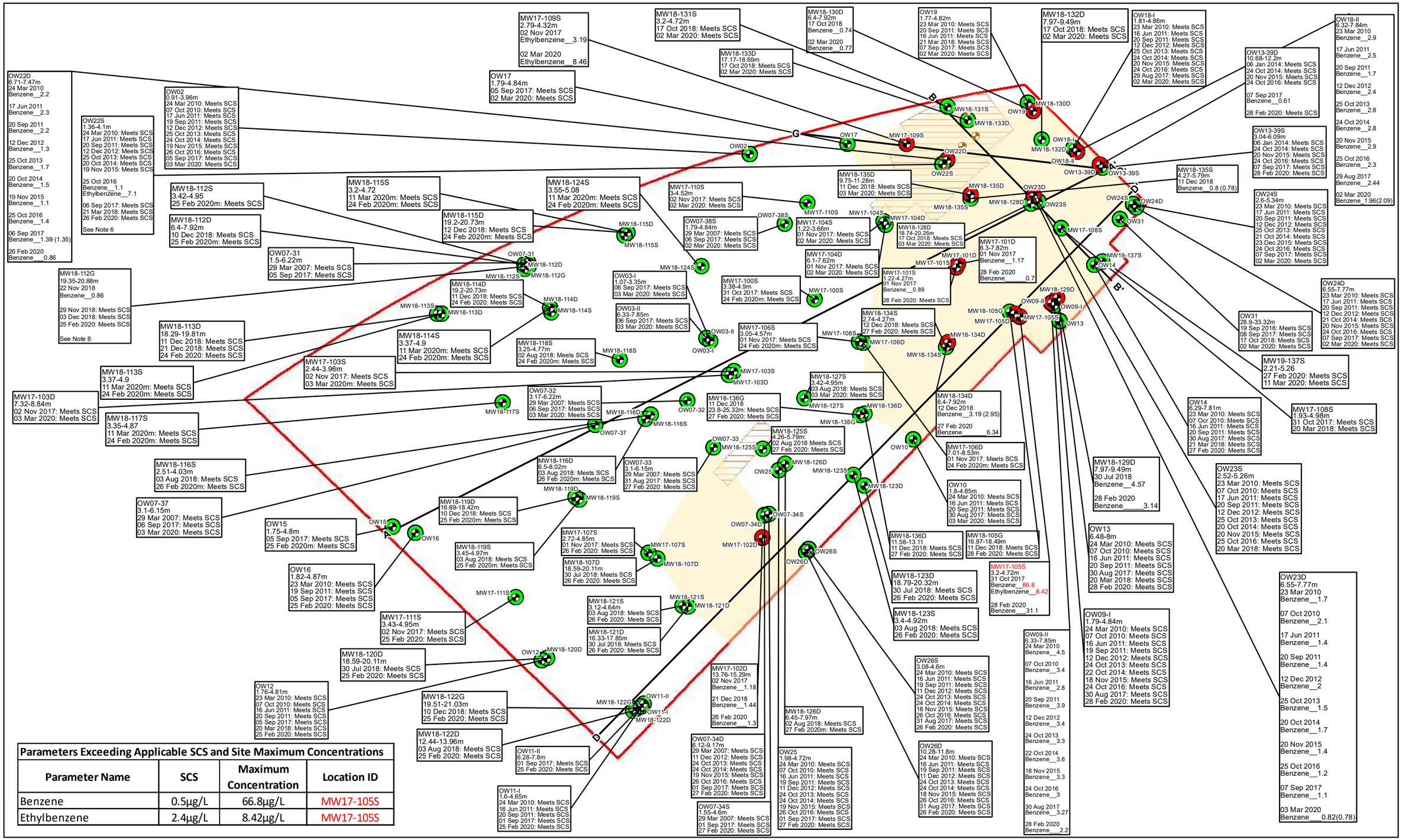

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
Benzene	0.5µg/L	66.8µg/L	MW17-105S
Ethylbenzene	2.4µg/L	8.42µg/L	MW17-105S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-15
Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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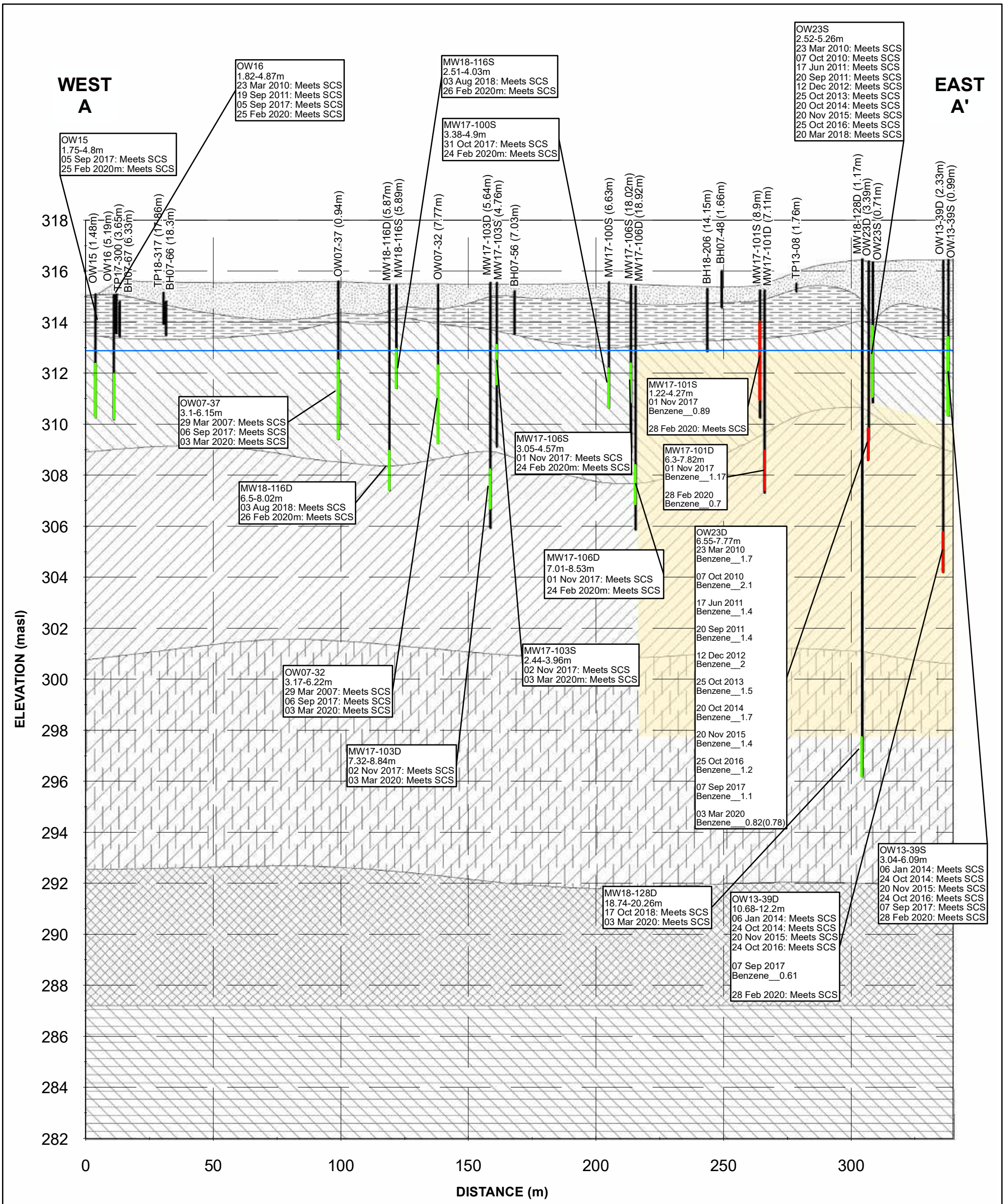

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15a
Section A-A' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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NORTH
B

SOUTH
B'

MW18-131S
3.2-4.72m
17 Oct 2018: Meets SCS
02 Mar 2020: Meets SCS

MW18-133D
17.17-18.69m
17 Oct 2018: Meets SCS
02 Mar 2020: Meets SCS

MW18-128D
18.74-20.26m
17 Oct 2018: Meets SCS
03 Mar 2020: Meets SCS

MW18-131S (1.68m)
MW18-133D (3.21m)
OW22S (16.51m)
OW22D (13.69m)
BH07-40 (0.71m)
OW23D (0.9m)
MW18-128D (1.91m)
OW23S (0.94m)
TP18-309 (1.77m)
MW17-108S (0.41m)
TP18-310 (0.52m)
BH07-53 (4.32m)
OW14 (0.74m)

OW22D
6.71-7.47m
24 Mar 2010
Benzene__2.2

17 Jun 2011
Benzene__2.3

20 Sep 2011
Benzene__2.2

12 Dec 2012
Benzene__1.3

25 Oct 2013
Benzene__1.7

20 Oct 2014
Benzene__1.5

19 Nov 2015
Benzene__1.1

25 Oct 2016
Benzene__1.4

06 Sep 2017
Benzene__1.39 (1.35)

26 Feb 2020
Benzene___0.86

OW23D
6.55-7.77m
23 Mar 2010
Benzene__1.7

07 Oct 2010
Benzene__2.1

17 Jun 2011
Benzene__1.4

20 Sep 2011
Benzene__1.4

12 Dec 2012
Benzene__2

25 Oct 2013
Benzene__1.5

20 Oct 2014
Benzene__1.7

20 Nov 2015
Benzene__1.4

25 Oct 2016
Benzene__1.2

07 Sep 2017
Benzene__1.1

03 Mar 2020
Benzene___0.82(0.78)

MW17-108S
1.93-4.98m
31 Oct 2017: Meets SCS
20 Mar 2018: Meets SCS

OW23S
2.52-5.26m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
20 Mar 2018: Meets SCS

OW14
6.29-7.81m
23 Mar 2010: Meets SCS
07 Ocr 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS
21 Mar 2018: Meets SCS
27 Feb 2020: Meets SCS

OW22S
1.36-4.1m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS

25 Oct 2016
Benzene__1.1
Ethylbenzene__7.1

06 Sep 2017: Meets SCS
21 Mar 2018: Meets SCS

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

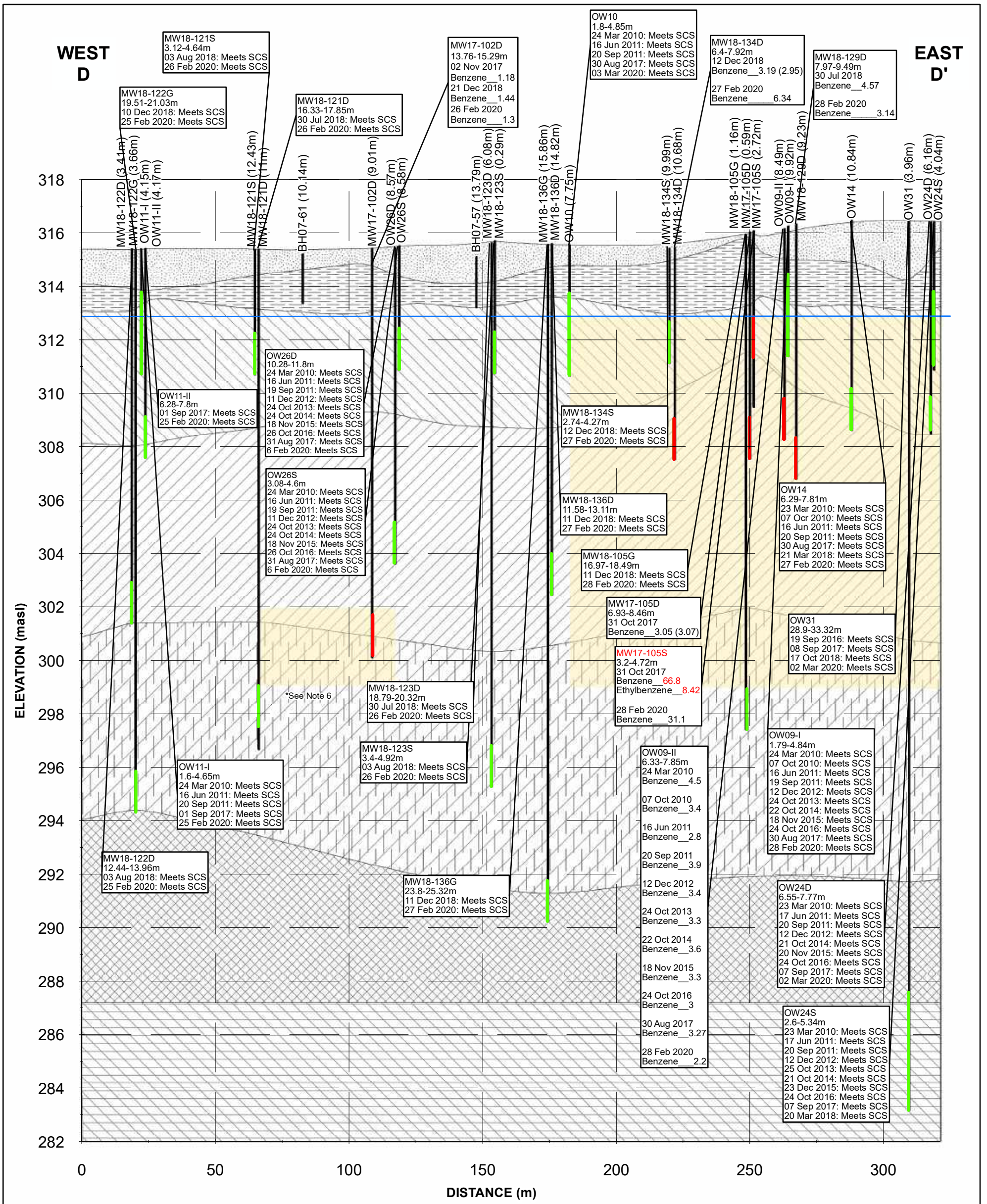
0
20
40
60
80
100

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-15b
Section B-B' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6.The exceedance at MW17-102D is considered anomalous as benzene is not present in the soil or shallow groundwater in this area of the Site. See further discussions in the CSM.

Figure 6-15c
Section D-D' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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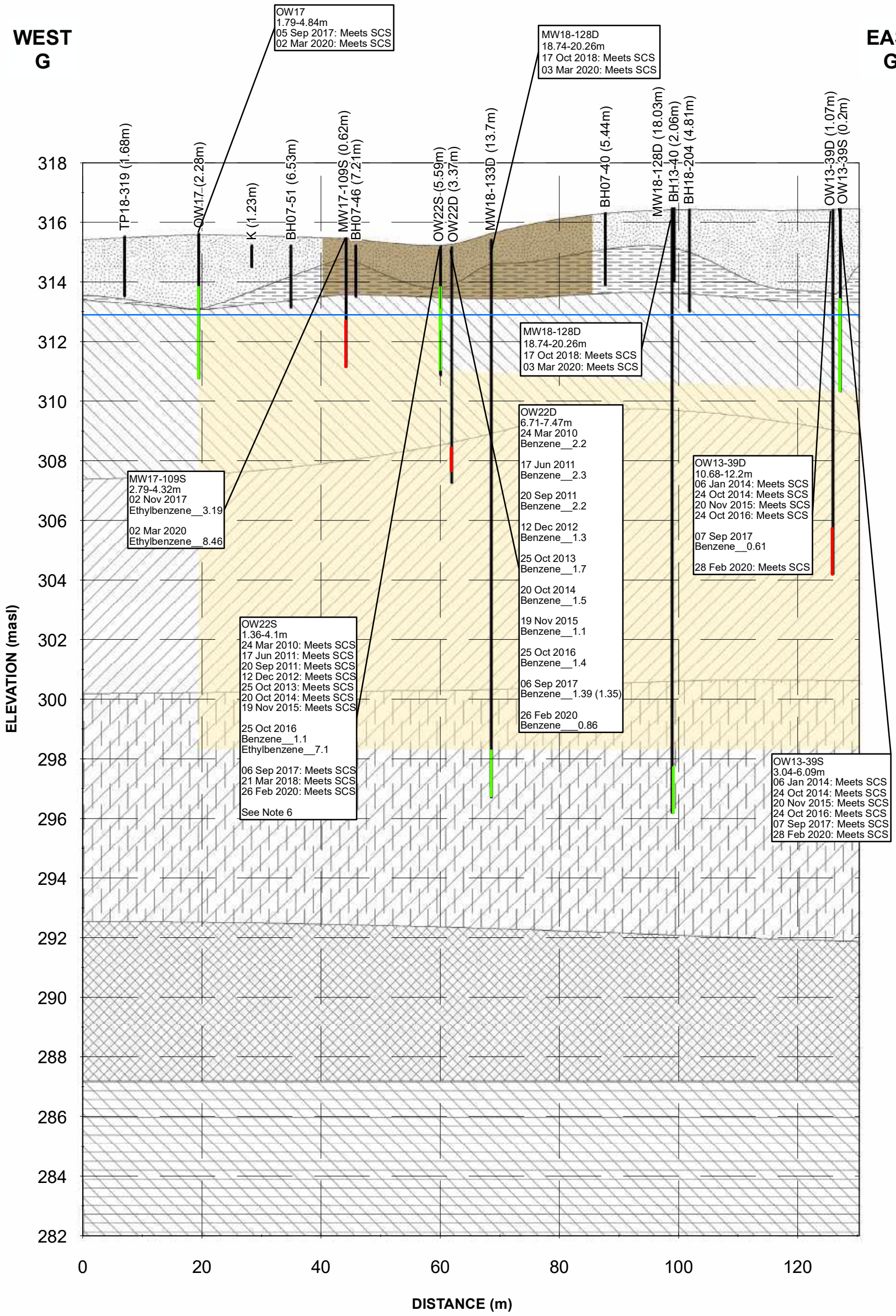
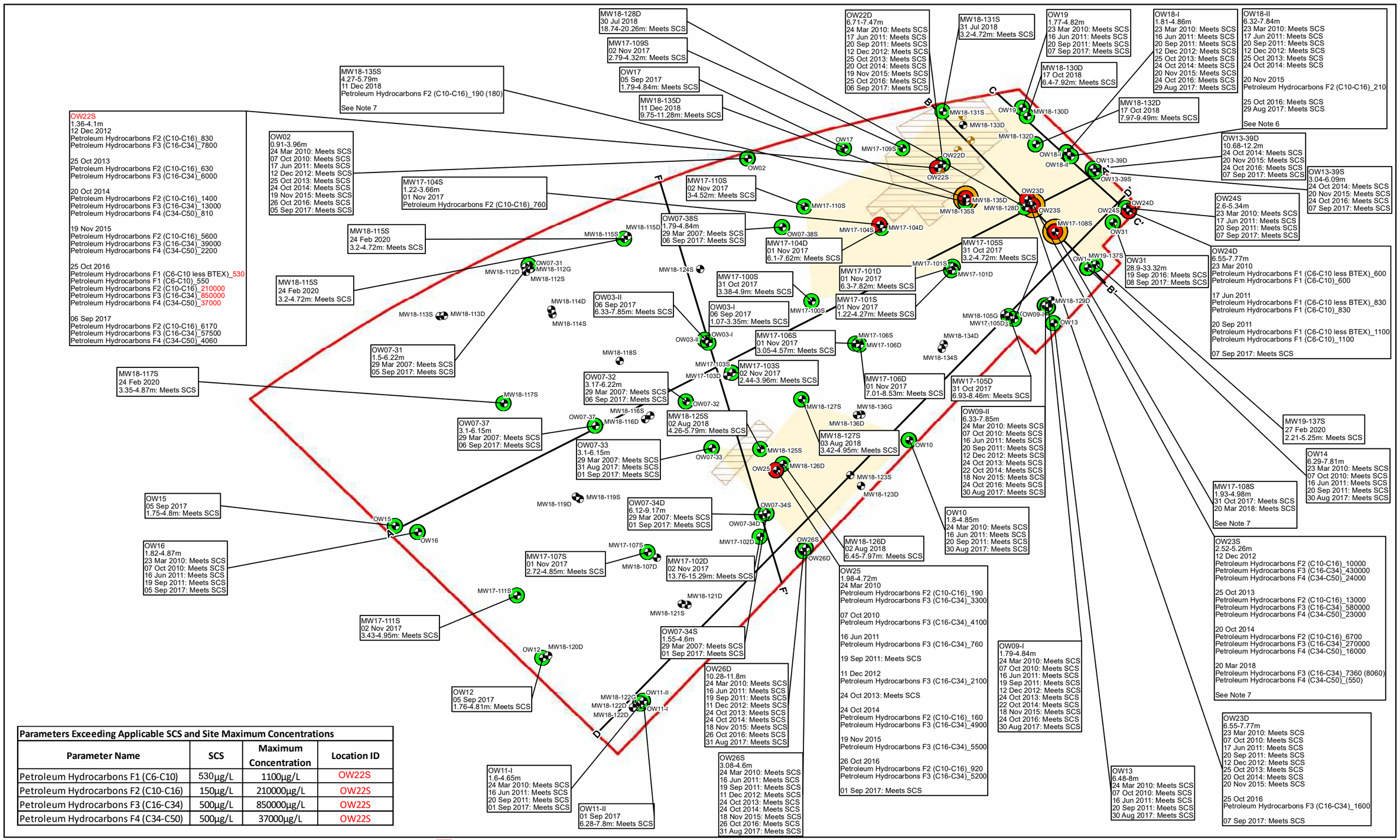


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-15d
Section G-G' - Groundwater Exceedances - BTEX
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
Petroleum Hydrocarbons F1 (C6-C10)	530µg/L	1100µg/L	OW22S
Petroleum Hydrocarbons F2 (C10-C16)	150µg/L	210000µg/L	OW22S
Petroleum Hydrocarbons F3 (C16-C34)	500µg/L	850000µg/L	OW22S
Petroleum Hydrocarbons F4 (C34-C50)	500µg/L	37000µg/L	OW22S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

Exceedance
No Exceedance
Location with measurable NAPL
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1.Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.
7. 2017 and 2018 results shown at the noted locations are from groundwater samples collected at a depth below the measured NAPL, within the screened interval. Results were collected for vertical delineation purposes to show dissolved concentrations immediately below the NAPL; the monitoring well location is not considered to meet the SCS.

Figure 6-16
Groundwater Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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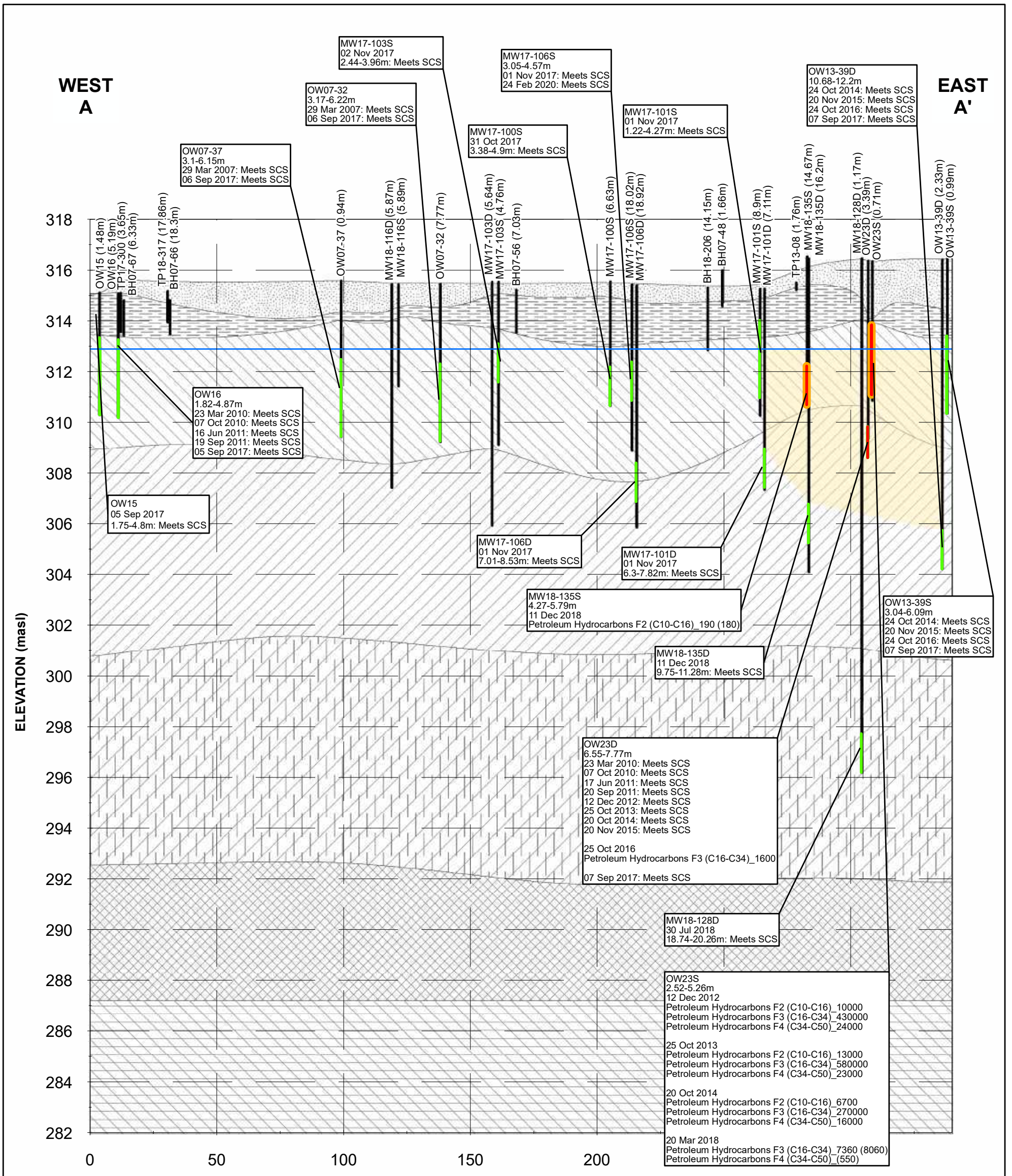


Approximate Groundwater Elevation
Exceedance
No Exceedance
Location with measurable non-aqueous phase liquid
Vertical Delineation
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. 2017 and 2018 results shown at the noted locations are from groundwater samples collected at a depth below the measured NAPL, within the screened interval. Results were collected for vertical delineation purposes to show dissolved concentrations immediately below the NAPL; the monitoring well location is not considered to meet the SCS.

Figure 6-16a
Section A-A' - Groundwater Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

NORTH
B

SOUTH
B'

MW18-131S (1.68m)
MW18-133D (3.21m)
OW22S (16.51m)
OW22D (13.69m)
MW18-135D (17.32m)
MW18-135S (18.43m)
BH07-40 (0.71m)
OW23D (0.9m)
MW18-128D (1.91m)
OW23S (0.94m)
TP18-309 (1.77m)
MW17-108S (0.41m)
TP18-310 (0.52m)
BH07-53 (4.32m)
OW14 (0.74m)
MW19-137S (2.61m)

OW22D
6.71-7.47m
24 Mar 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
19 Nov 2015: Meets SCS
25 Oct 2016: Meets SCS
06 Sep 2017: Meets SCS

MW18-135S
4.27-5.79m
11 Dec 2018
Petroleum Hydrocarbons F2 (C10-C16)_190 (180)

See Note 6

MW18-131S
31 Jul 2018
3.2-4.72m: Meets SCS

MW19-137S
2.21-5.25
27 Feb 2020: Meets SCS

OW14
6.29-7.81m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
16 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
30 Aug 2017: Meets SCS

MW17-108S
1.93-4.98m
31 Oct 2017: Meets SCS
20 Mar 2018: Meets SCS

See Note 6

MW18-135D
11 Dec 2018
9.75-11.28m: Meets SCS

OW23S
2.52-5.26m
12 Dec 2012
Petroleum Hydrocarbons F2 (C10-C16)_10000
Petroleum Hydrocarbons F3 (C16-C34)_430000
Petroleum Hydrocarbons F4 (C34-C50)_24000

25 Oct 2013
Petroleum Hydrocarbons F2 (C10-C16)_13000
Petroleum Hydrocarbons F3 (C16-C34)_580000
Petroleum Hydrocarbons F4 (C34-C50)_23000

20 Oct 2014
Petroleum Hydrocarbons F2 (C10-C16)_6700
Petroleum Hydrocarbons F3 (C16-C34)_270000
Petroleum Hydrocarbons F4 (C34-C50)_16000

20 Mar 2018
Petroleum Hydrocarbons F3 (C16-C34)_7360 (8060)
Petroleum Hydrocarbons F4 (C34-C50)_(550)

See Note 6

OW23D
6.55-7.77m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2016
Petroleum Hydrocarbons F3 (C16-C34)_1600

07 Sep 2017: Meets SCS

MW18-128D
30 Jul 2018
18.74-20.26m: Meets SCS

OW22S
1.36-4.1m
12 Dec 2012
Petroleum Hydrocarbons F2 (C10-C16)_830
Petroleum Hydrocarbons F3 (C16-C34)_7800

25 Oct 2013
Petroleum Hydrocarbons F2 (C10-C16)_630
Petroleum Hydrocarbons F3 (C16-C34)_6000

20 Oct 2014
Petroleum Hydrocarbons F2 (C10-C16)_1400
Petroleum Hydrocarbons F3 (C16-C34)_13000
Petroleum Hydrocarbons F4 (C34-C50)_810

19 Nov 2015
Petroleum Hydrocarbons F2 (C10-C16)_5600
Petroleum Hydrocarbons F3 (C16-C34)_39000
Petroleum Hydrocarbons F4 (C34-C50)_2200

25 Oct 2016
Petroleum Hydrocarbons F1 (C6-C10 less BTEX)_530
Petroleum Hydrocarbons F1 (C6-C10)_550
Petroleum Hydrocarbons F2 (C10-C16)_210000
Petroleum Hydrocarbons F3 (C16-C34)_850000
Petroleum Hydrocarbons F4 (C34-C50)_37000

06 Sep 2017
Petroleum Hydrocarbons F2 (C10-C16)_6170
Petroleum Hydrocarbons F3 (C16-C34)_57500
Petroleum Hydrocarbons F4 (C34-C50)_4060

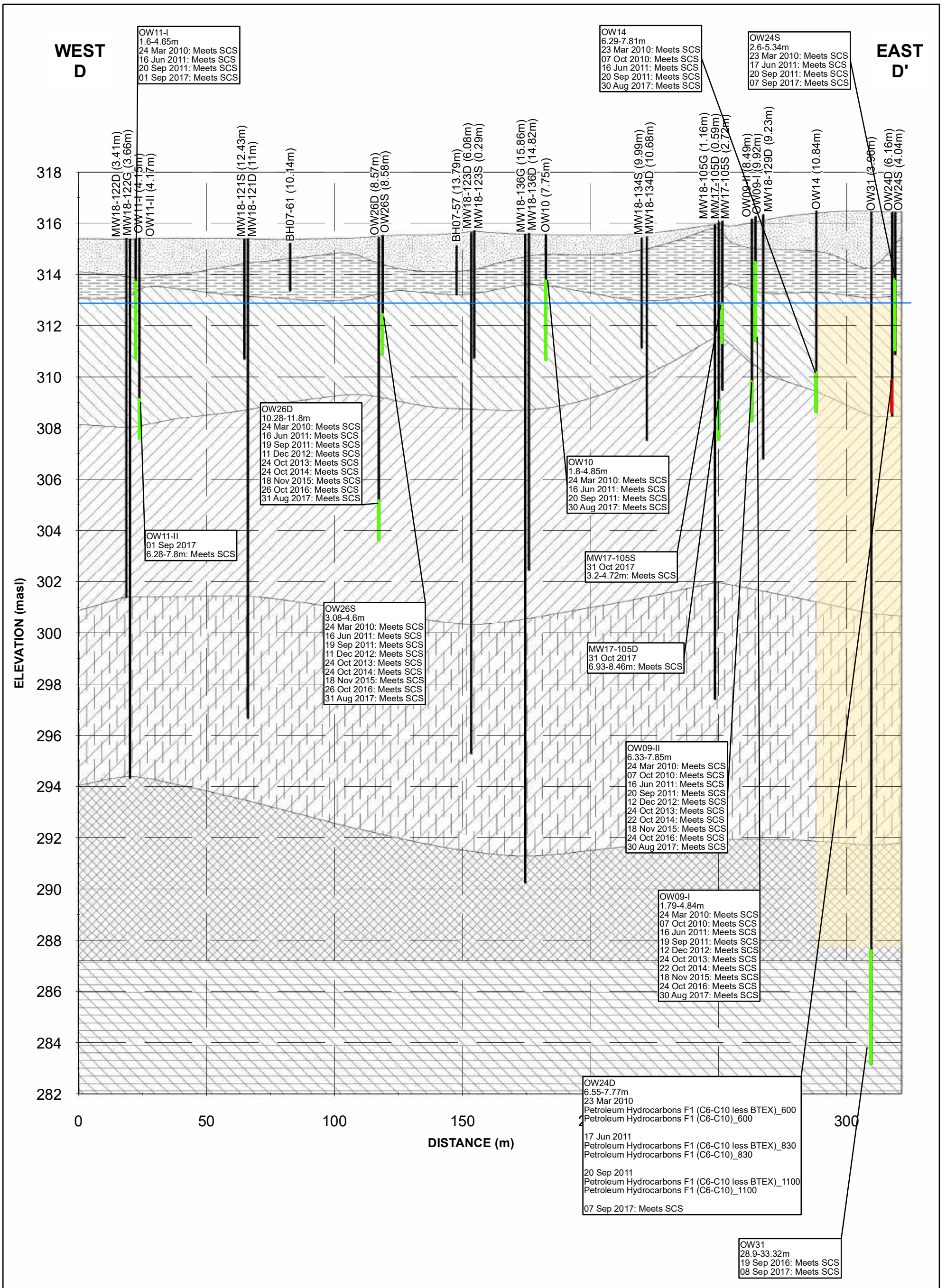
ELEVATION (masl)

DISTANCE (m)

- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Location with measurable non-aqueous phase liquid
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.
6. 2017 and 2018 results shown at the noted locations are from groundwater samples collected at a depth below the measured NAPL, within the screened interval. Results were collected for vertical delineation purposes to show dissolved concentrations immediately below the NAPL; the monitoring well location is not

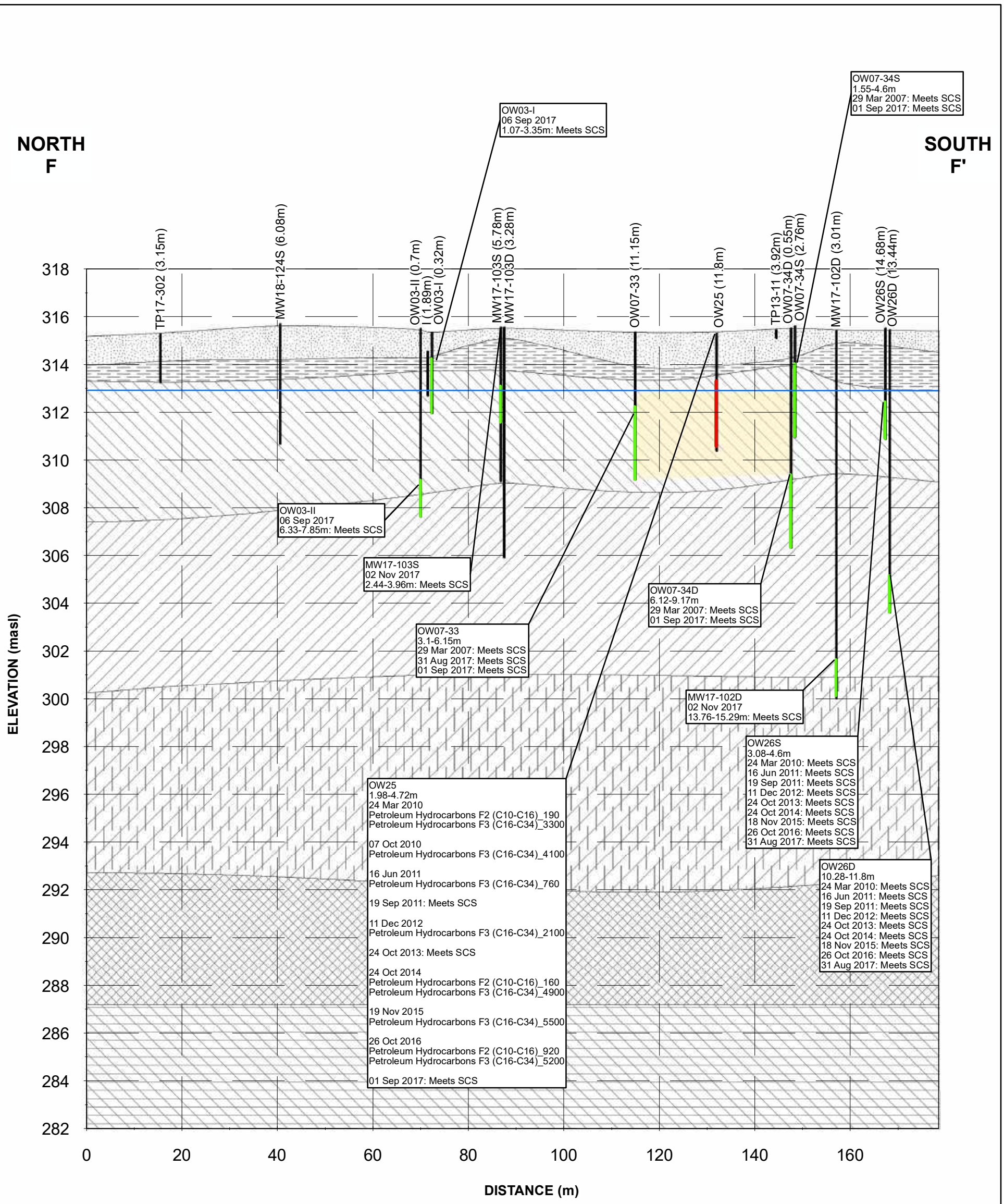
Figure 6-16b
Section B-B' - Groundwater Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

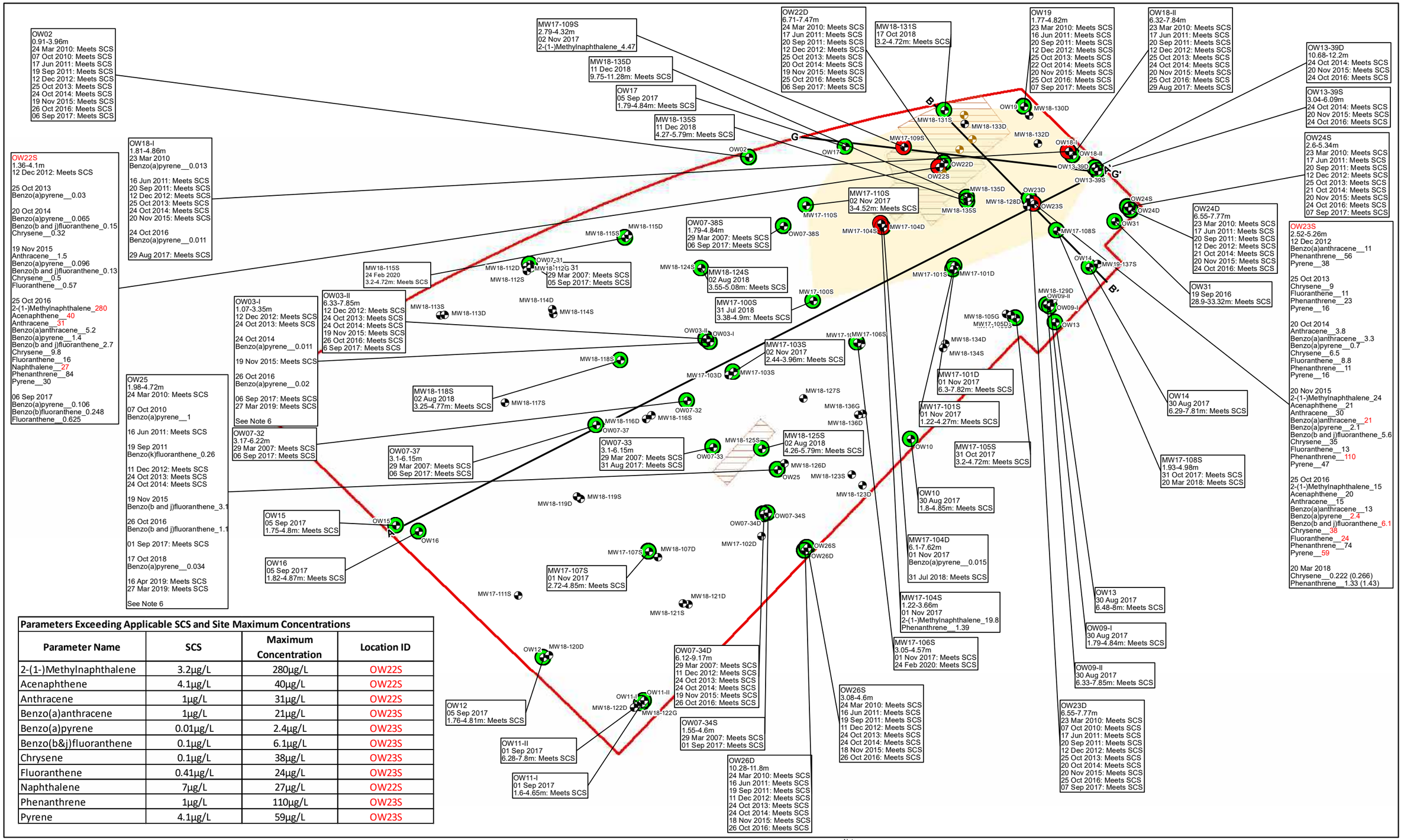
Figure 6-16c
Section D-D' - Groundwater Exceedances - PHCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silt (Native)
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offsite distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-16d
Section F-F' - Groundwater Exceedances - PHC
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Parameters Exceeding Applicable SCS and Site Maximum Concentrations

Parameter Name	SCS	Maximum Concentration	Location ID
2-(1-)Methylnaphthalene	3.2µg/L	280µg/L	OW22S
Acenaphthene	4.1µg/L	40µg/L	OW22S
Anthracene	1µg/L	31µg/L	OW22S
Benzo(a)anthracene	1µg/L	21µg/L	OW23S
Benzo(a)pyrene	0.01µg/L	2.4µg/L	OW23S
Benzo(b&j)fluoranthene	0.1µg/L	6.1µg/L	OW23S
Chrysene	0.1µg/L	38µg/L	OW23S
Fluoranthene	0.41µg/L	24µg/L	OW23S
Naphthalene	7µg/L	27µg/L	OW22S
Phenanthrene	1µg/L	110µg/L	OW23S
Pyrene	4.1µg/L	59µg/L	OW23S

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-17
Groundwater Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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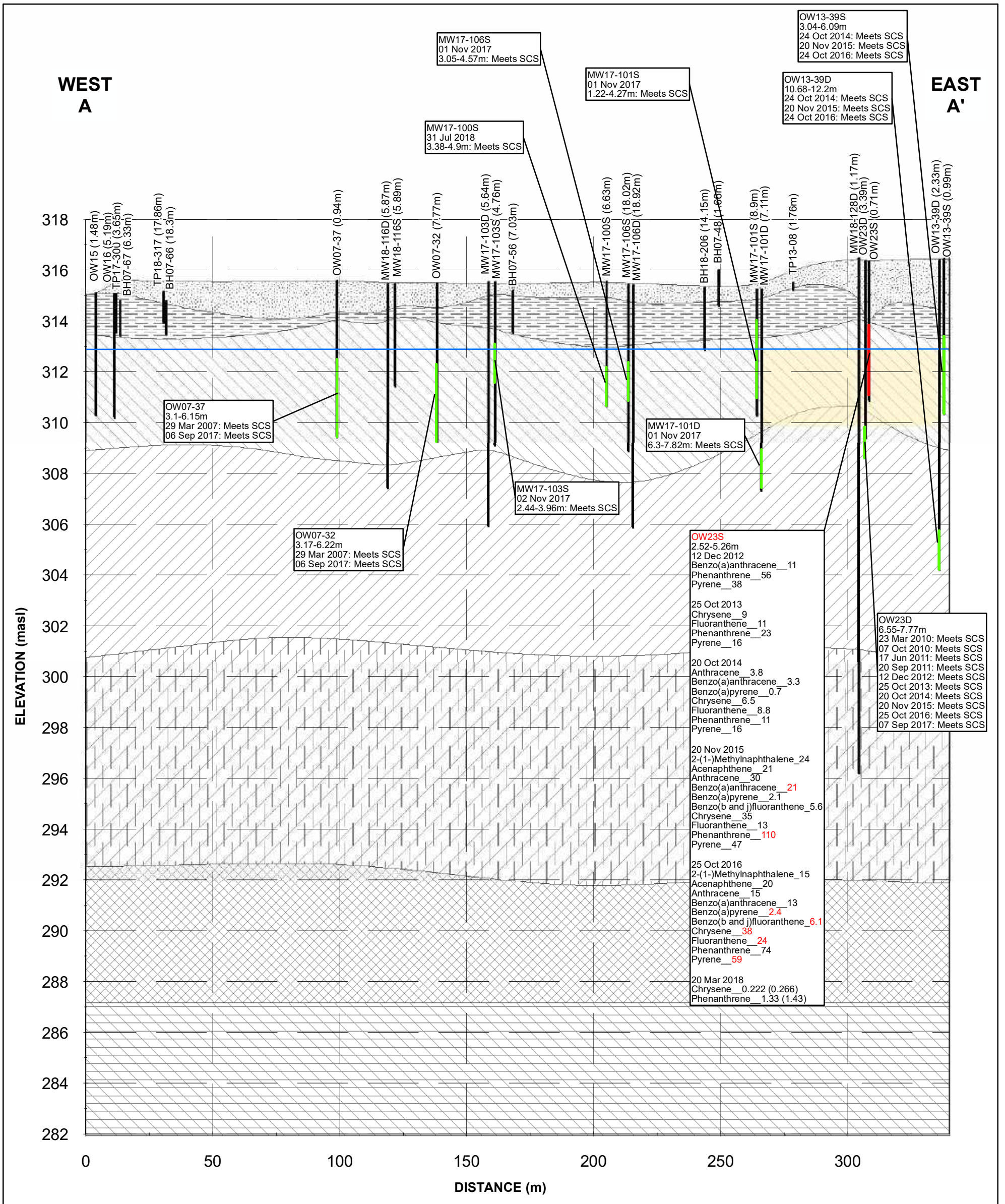

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17a
Section A-A' - Groundwater Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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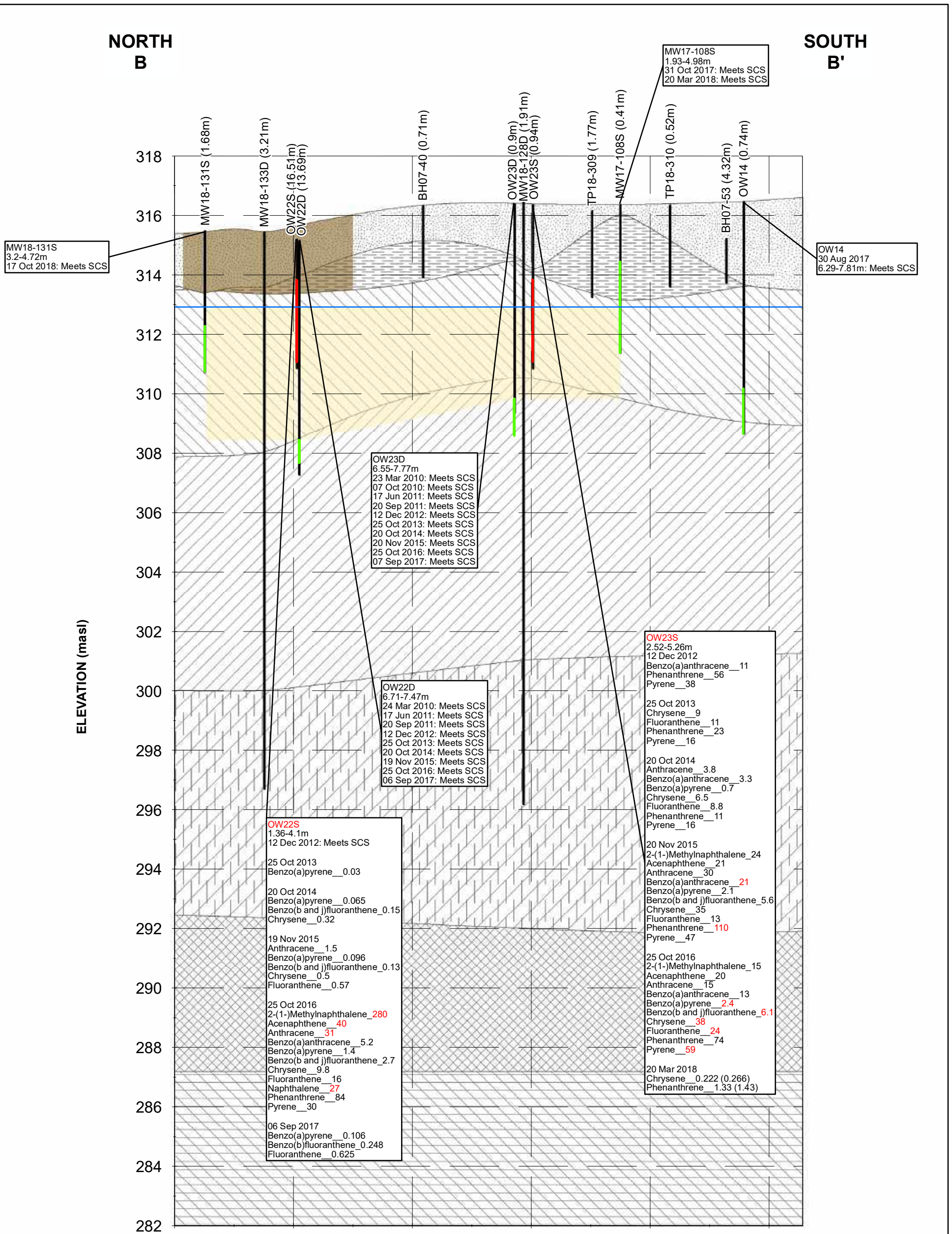
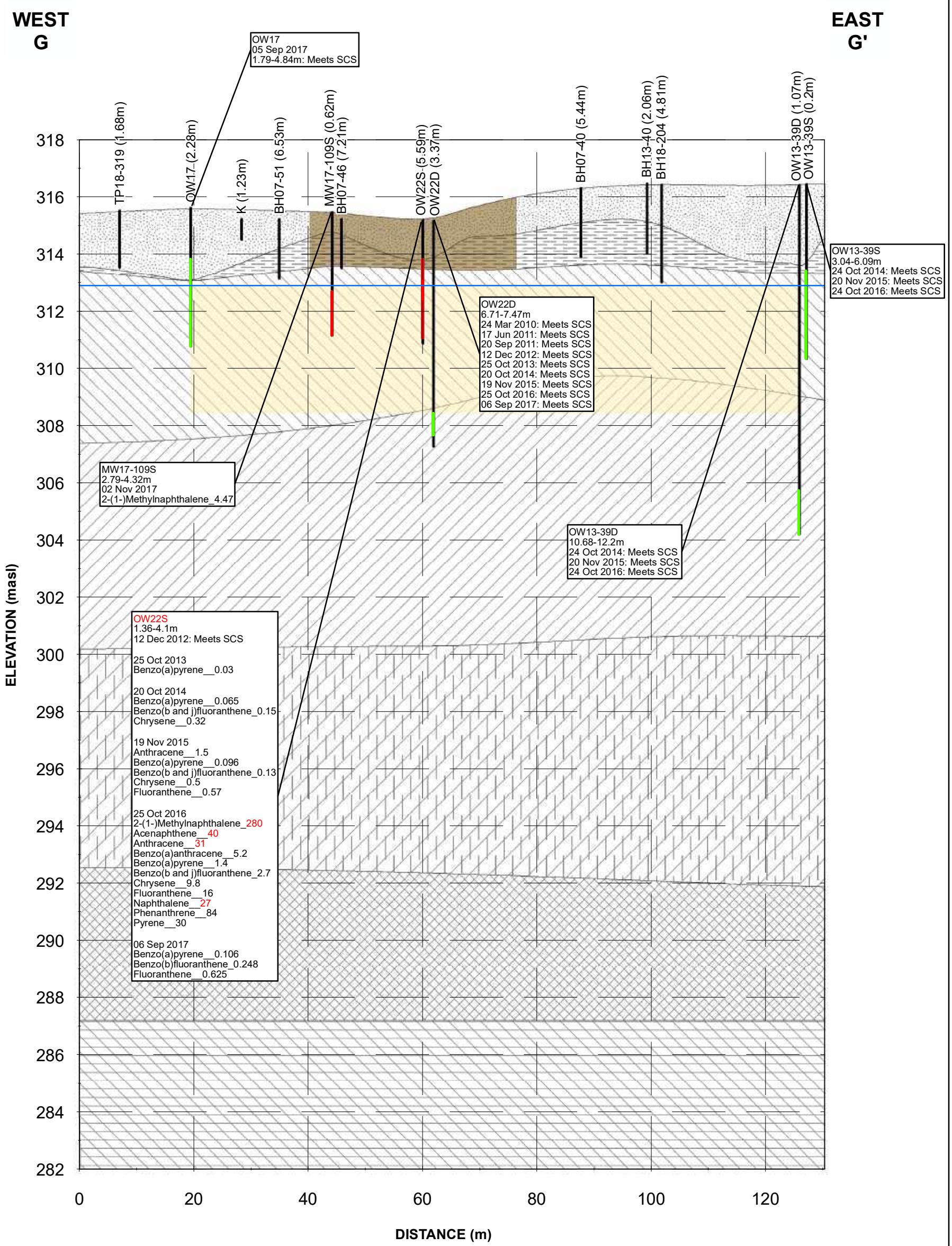


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17b
Section B-B' - Groundwater Exceedances - PAHs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-17c
Section G-G' - Soil Exceedances - PAH
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
1,1,1-Trichloroethane	23µg/L	37.1µg/L	OW11-II
1,1-Dichloroethane	5µg/L	29.5µg/L	OW11-II
1,1-Dichloroethene	0.5µg/L	64µg/L	OW24D
cis-1,2-Dichloroethene	1.6µg/L	960µg/L	OW24D
n-Hexane	5µg/L	7.46µg/L	MW17-105S
Tetrachloroethene	0.5µg/L	1.14µg/L	OW19
trans-1,2-Dichloroethene	1.6µg/L	81µg/L	OW24D
Trichloroethylene	0.5µg/L	7900µg/L	OW24D
Vinyl Chloride	0.5µg/L	86µg/L	OW24D

N

0 10 20 30

Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation
TCA/DCA Plume

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Horizontal delineation extends across the entire Site as almost deep wells (>10 mbgs) have cis-1,2-DCE above SCS.

Figure 6-18 (Part 1)
Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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Parameters Exceeding Applicable SCS and Site Maximum Concentrations			
Parameter Name	**SCS**	**Maximum Concentration**	**Location ID**
1,1,1-Trichloroethane	23µg/L	37.1µg/L	OW11-II
1,1-Dichloroethane	5µg/L	29.5µg/L	OW11-II
1,1-Dichloroethene	0.5µg/L	64µg/L	OW24D
cis-1,2-Dichloroethene	1.6µg/L	960µg/L	OW24D
n-Hexane	5µg/L	7.46µg/L	MW17-105S
Tetrachloroethene	0.5µg/L	1.14µg/L	OW19
trans-1,2-Dichloroethene	1.6µg/L	81µg/L	OW24D
Trichloroethylene	0.5µg/L	7900µg/L	OW24D
Vinyl Chloride	0.5µg/L	86µg/L	OW24D

N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance
Exceedance
Cross Section Location

Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999
Horizontal Delineation
TCA/DCA Plume

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. The estimated extent of impacts was inferred to extend from sampling locations that exceeded the Standards to the next available sampling location that did not exceed the Standards and extrapolated to the property boundary, where applicable.
6. Horizontal delineation extends across the entire Site as almost deep wells (>10 mbgs) have cis-1,2-DCE above SCS.

Figure 6-18 (Part 2)
Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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WEST
A

EAST
A'

MW18-116S
03 Aug 2018
2.51-4.03m: Meets SCS
26 Feb 2020: Meets SCS

MW17-106S
3.05-4.57m
01 Nov 2017: Meets SCS
24 Feb 2020: Meets SCS

MW17-100S
3.38-4.9m
31 Oct 2017: Meets SCS
24 Feb 2020: Meets SCS

MW17-101S
1.22-4.27m
01 Nov 2017
Trichloroethylene__0.6

28 Feb 2020: Meets SCS

OW23S
2.52-5.26m
23 Mar 2010: Meets SCS
07 Oct 2010: Meets SCS
17 Jun 2011: Meets SCS
20 Sep 2011: Meets SCS
12 Dec 2012: Meets SCS
25 Oct 2013: Meets SCS
20 Oct 2014: Meets SCS
20 Nov 2015: Meets SCS

25 Oct 2016
cis-1,2-Dichloroethene_4
Trichloroethylene__1.4
Vinyl Chloride__0.85

20 Mar 2018: Meets SCS

OW15 (1.48m)
OW16 (5.19m)
TP17-300 (3.65m)
BH07-67 (6.33m)
TP18-317 (17.86m)
BH07-66 (18.3m)
MW18-119D (22.17m)
MW18-119S (23.76m)
OW07-37 (0.94m)
MW18-116D (5.87m)
MW18-116S (5.89m)
OW07-32 (7.77m)
MW17-103D (5.64m)
MW17-103S (4.76m)
BH07-56 (7.03m)
MW17-100S (6.63m)
MW17-106S (18.02m)
MW17-106D (18.92m)
BH18-206 (14.15m)
BH07-48 (1.66m)
MW17-101S (8.9m)
MW17-101D (7.11m)
TP13-08 (1.76m)
MW18-128D (1.17m)
OW23D (3.39m)
OW23S (0.71m)
OW13-39D (2.33m)
OW13-39S (0.99m)

MW18-119S
3.45-4.97m
03 Aug 2018
1,1-Dichloroethane__16.1
1,1-Dichloroethene__0.77

25 Feb 2020
1,1-Dichloroethane__5.83J

MW17-103S
2.44-3.96m
02 Nov 2017: Meets SCS
03 Mar 2020: Meets SCS

MW17-106D
7.01-8.53m
01 Nov 2017: Meets SCS
24 Feb 2020: Meets SCS

MW17-101D
6.3-7.82m
01 Nov 2017
Vinyl Chloride__0.91

28 Feb 2020
cis-1,2-Dichloroethene_1.8
Vinyl Chloride_____1.24

OW16
1.82-4.87m
05 Sep 2017: Meets SCS
25 Feb 2020: Meets SCS

OW15
1.75-4.8m
05 Sep 2017: Meets SCS
25 Feb 2020: Meets SCS

MW18-119D
16.89-18.42m
10 Dec 2018
cis-1,2-Dichloroethene_1.67

25 Feb 2020: Meets SCS

MW18-116D
6.5-8.02m
03 Aug 2018
Trichloroethylene__0.85

26 Feb 2020
Trichloroethylene___0.57

OW07-37
3.1-6.15m
29 Mar 2007: Meets SCS
06 Sep 2017: Meets SCS
03 Mar 2020: Meets SCS

OW07-32
3.17-6.22m
29 Mar 2007
Trichloroethylene__1

06 Sep 2017
Trichloroethylene__0.92

03 Mar 2020: Meets SCS

MW17-103D
02 Nov 2017
7.32-8.84m: Meets SCS

03 Mar 2020: Meets SCS

OW23D
6.55-7.77m
23 Mar 2010
cis-1,2-Dichloroethene_23
Trichloroethylene__2
Vinyl Chloride__4.3

7 Oct 2010
cis-1,2-Dichloroethene_29
Trichloroethylene__1.9
Vinyl Chloride__10

17 Jun 2011
cis-1,2-Dichloroethene_23
Trichloroethylene__1.6
Vinyl Chloride__3.4

20 Sep 2011
cis-1,2-Dichloroethene_23
Trichloroethylene__1.4
Vinyl Chloride__6.4

12 Dec 2012
cis-1,2-Dichloroethene_26
Trichloroethylene__1.8
Vinyl Chloride__7

25 Oct 2013
cis-1,2-Dichloroethene_27
Trichloroethylene__1.7
Vinyl Chloride__9.6

20 Oct 2014
cis-1,2-Dichloroethene_28
Trichloroethylene__1.9
Vinyl Chloride__8.6

20 Nov 2015
cis-1,2-Dichloroethene_25
Trichloroethylene__1.4
Vinyl Chloride__10

25 Oct 2016
cis-1,2-Dichloroethene_27
Trichloroethylene__2.9
Vinyl Chloride__5.9

07 Sep 2017
cis-1,2-Dichloroethene_25.4
Trichloroethylene__2.23
Vinyl Chloride__7.26

03 Mar 2020
cis-1,2-Dichloroethene_23.7 (21.7)
Trichloroethylene___5.04
Vinyl Chloride_____2.4(2.37)

MW18-128D
18.74-20.26m
17 Oct 2018
cis-1,2-Dichloroethene_3.8
Trichloroethylene__0.85

03 Mar 2020
cis-1,2-Dichloroethene_3.53
Trichloroethylene___0.63

OW13-39D
10.68-12.2m
24 Oct 2014
1,1-Dichloroethene__11
cis-1,2-Dichloroethene_280
trans-1,2-Dichloroethene_15
Trichloroethylene__860
Vinyl Chloride__46

06 Jan 2014
1,1-Dichloroethene__4.4
cis-1,2-Dichloroethene_180
trans-1,2-Dichloroethene_9.3
Trichloroethylene__560
Vinyl Chloride__28

20 Nov 2015
1,1-Dichloroethene__8
cis-1,2-Dichloroethene_180
trans-1,2-Dichloroethene_11
Trichloroethylene__770
Vinyl Chloride__26

24 Oct 2016
1,1-Dichloroethene__5.2
cis-1,2-Dichloroethene_110
trans-1,2-Dichloroethene_8.4
Trichloroethylene__580
Vinyl Chloride__15

07 Sep 2017
1,1-Dichloroethene__15.2
cis-1,2-Dichloroethene_192
trans-1,2-Dichloroethene_22.2
Trichloroethylene__1290
Vinyl Chloride__45.2

28 Feb 2020
1,1-Dichloroethene__4.94(5.02)
cis-1,2-Dichloroethene_69.9(68.4)
trans-1,2-Dichloroethene_7.83(7.56)
Trichloroethylene___562(577)
Vinyl Chloride_____10.5(10.2)

OW13-39S
3.04-6.09m
24 Oct 2014
1,1-Dichloroethene__2.5
cis-1,2-Dichloroethene_60
trans-1,2-Dichloroethene_4.1
Trichloroethylene__91
Vinyl Chloride__12

06 Jan 2014
1,1-Dichloroethene__2.1
cis-1,2-Dichloroethene_100
trans-1,2-Dichloroethene_9.1
Trichloroethylene__130
Vinyl Chloride__12

20 Nov 2015
1,1-Dichloroethene__2.4
cis-1,2-Dichloroethene_69
trans-1,2-Dichloroethene_2.8
Trichloroethylene__71
Vinyl Chloride__17

24 Oct 2016
1,1-Dichloroethene__0.79
cis-1,2-Dichloroethene_57
trans-1,2-Dichloroethene_4
Trichloroethylene__120
Vinyl Chloride__4

07 Sep 2017
1,1-Dichloroethene__1
cis-1,2-Dichloroethene_51.2
trans-1,2-Dichloroethene_4.72
Trichloroethylene__184
Vinyl Chloride__2.76

28 Feb 2020
1,1-Dichloroethene__0.55
cis-1,2-Dichloroethene_25.5
trans-1,2-Dichloroethene_1.62
Trichloroethylene___66.8
Vinyl Chloride_____3.65

ELEVATION (masl)

318
316
314
312
310
308
306
304
302
300
298
296
294
292
290
288
286
284
282

0
50
100
150
300

DISTANCE (m)

Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Vertical Delineation Inferred Extent
Fill

Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-18a
Section A-A' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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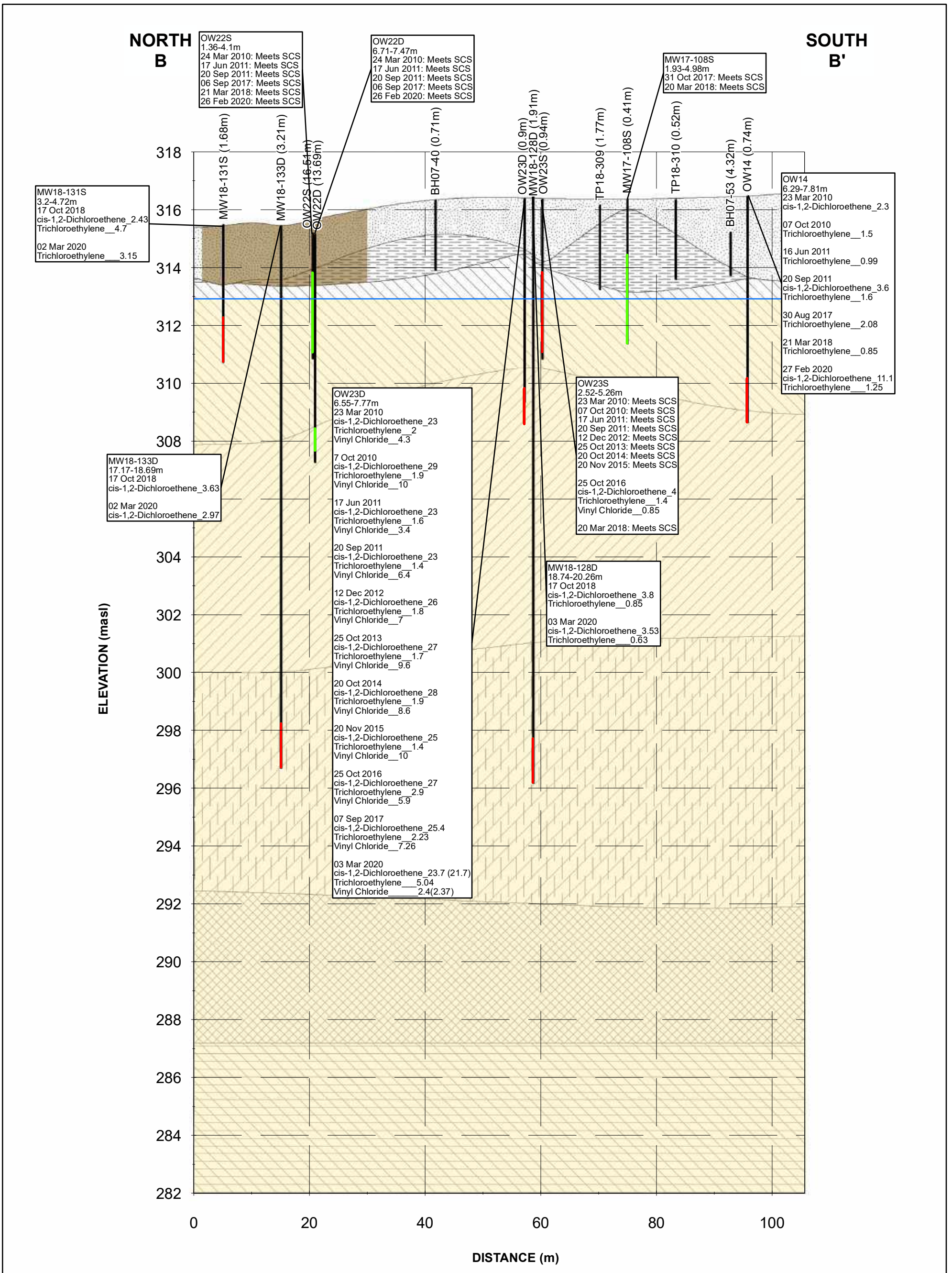
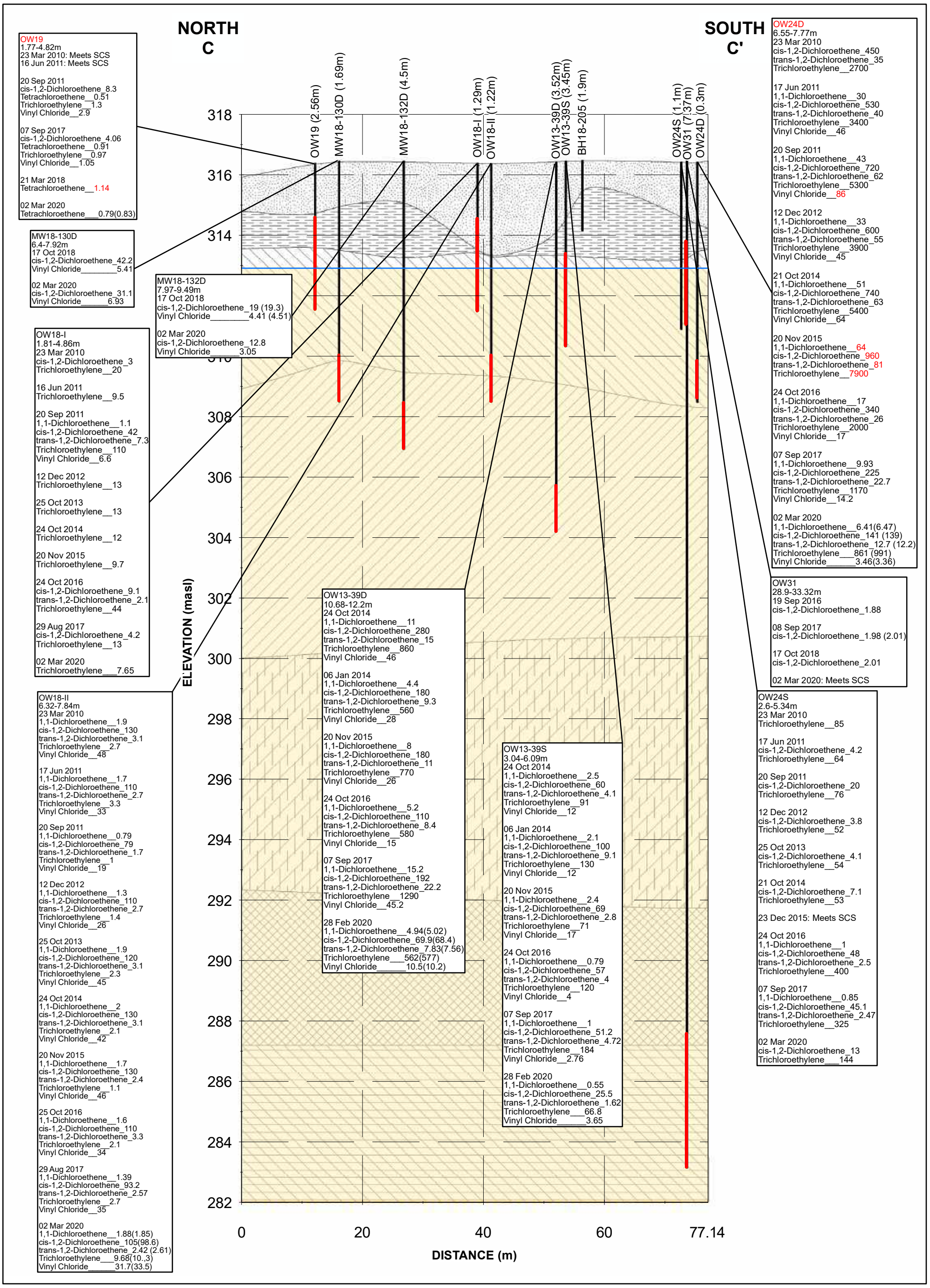


- Approximate Groundwater Elevation
- Exceedance
- No Exceedance
- Vertical Delineation
- Excavation Area
- Fill
- Silty Fine Sand
- Stone Road Member (Eramosa Formation)
- Reformatory Quarry Member (Eramosa Formation)
- Vinemount Member (Eramosa Formation)
- Ancaster Member (Goat Island Formation)
- Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

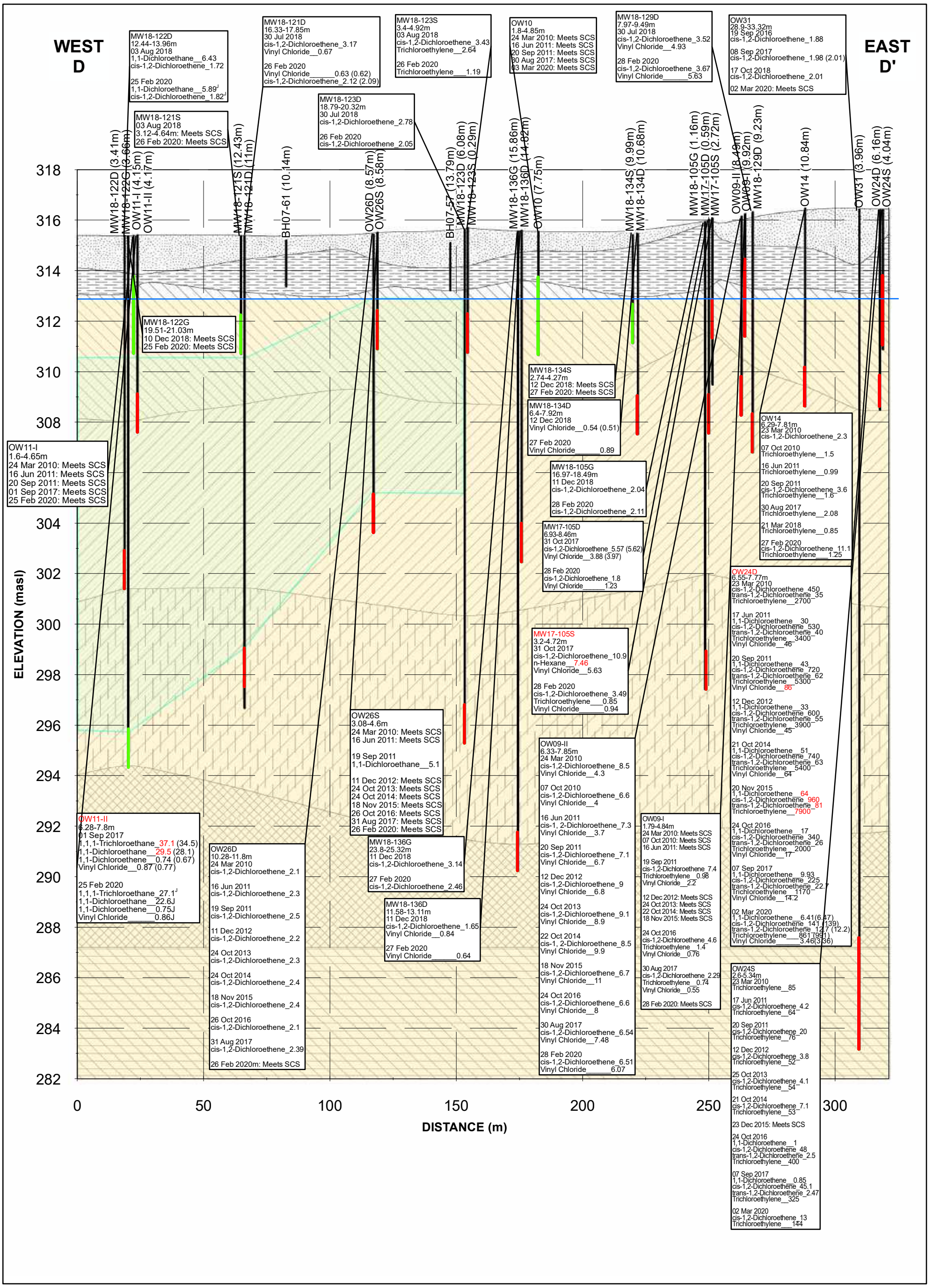
Figure 6-18b
Section B-B' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario



Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
Vertical Delineation Inferred Extent
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-18c
Section C-C' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

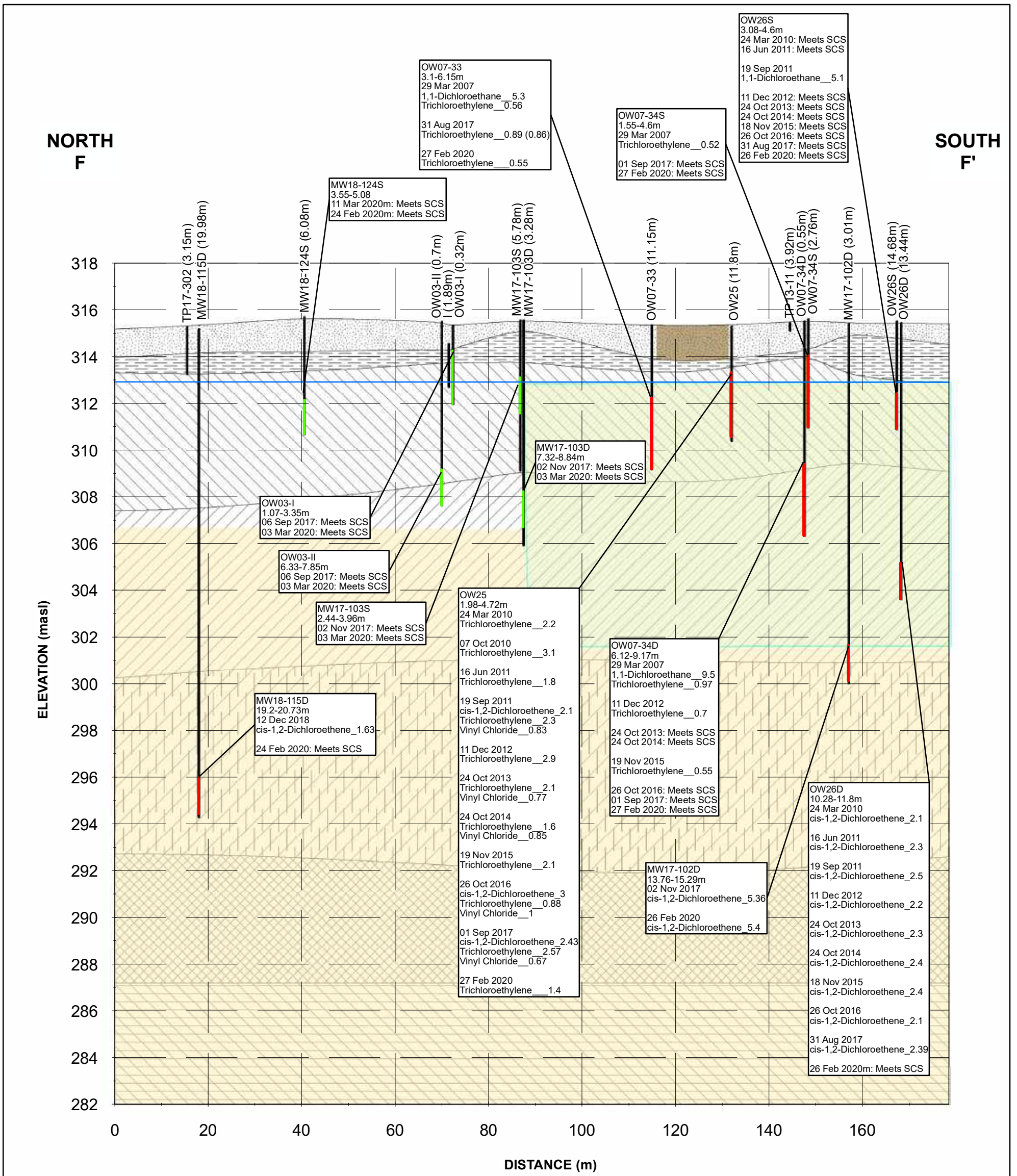


Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
TCA/DCA Plume
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-18d
Section D-D' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs



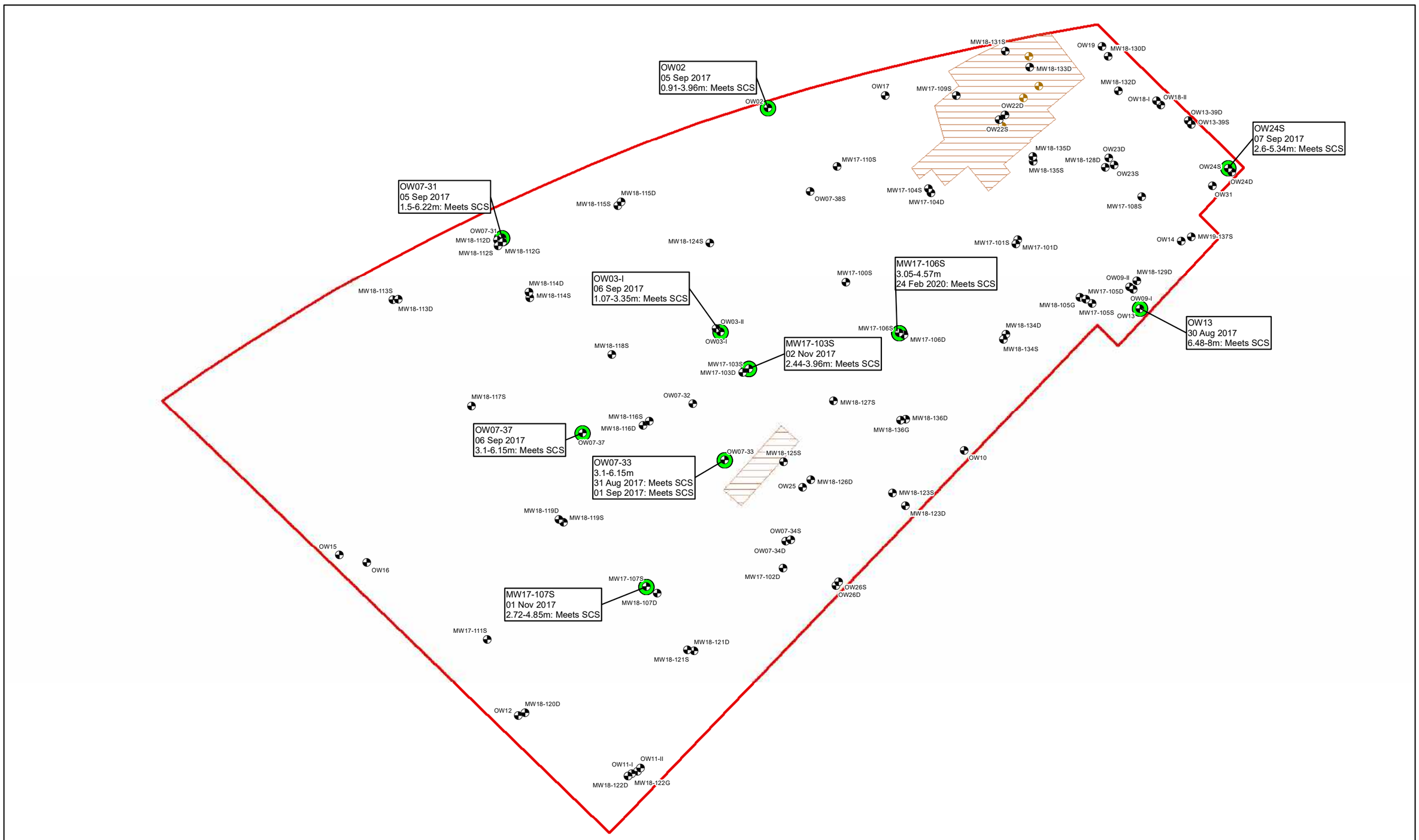
Approximate Groundwater Elevation
Exceedance
No Exceedance
Vertical Delineation
TCA/DCA Plume
Excavation Area
Fill
Silty Fine Sand
Stone Road Member (Eramosa Formation)
Reformatory Quarry Member (Eramosa Formation)
Vinemount Member (Eramosa Formation)
Ancaster Member (Goat Island Formation)
Niagara Falls Member Grainstone (Goat Island Formation)

Notes:
1. Ground surface elevations at borehole locations may be different than current grade as some locations are projected onto the cross-section line and ground surface elevations may have changed since the time of drilling for historical locations.
2. The offset distance from the cross-section line are shown in brackets following the location ID.
3. masl = metres above sea level
4. Stratigraphic units presented on the cross-sections are based on Jacobs' interpretation of the Site's geology and may differ from those noted on logs from investigations by others.
5. The average water table elevation of 312.9 masl for monitoring events between December 2017 and August 2018 is presented. Groundwater elevations at the Site ranged between 312.5 and 313.7 masl during this period.

Figure 6-18e
Section F-F' - Groundwater Exceedances - VOCs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\CROSSSECTIONF_GW_VOC.MXD KA077569 5/11/2020 2:52:41 PM



N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

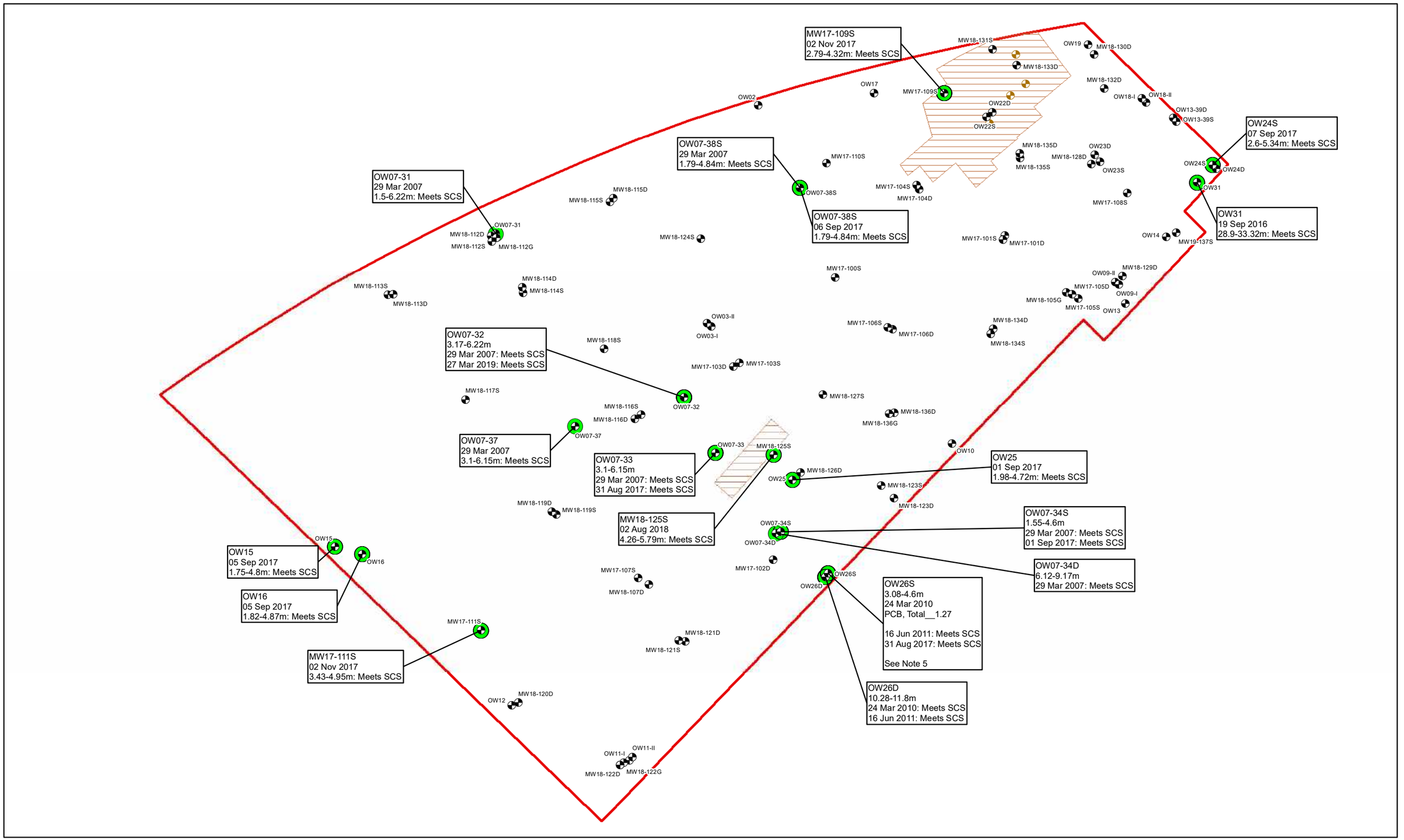
Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-19
Groundwater Exceedances - CPs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\GW_CPS.MXD MJOZWIAK 5/4/2020 10:44:04 PM



N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

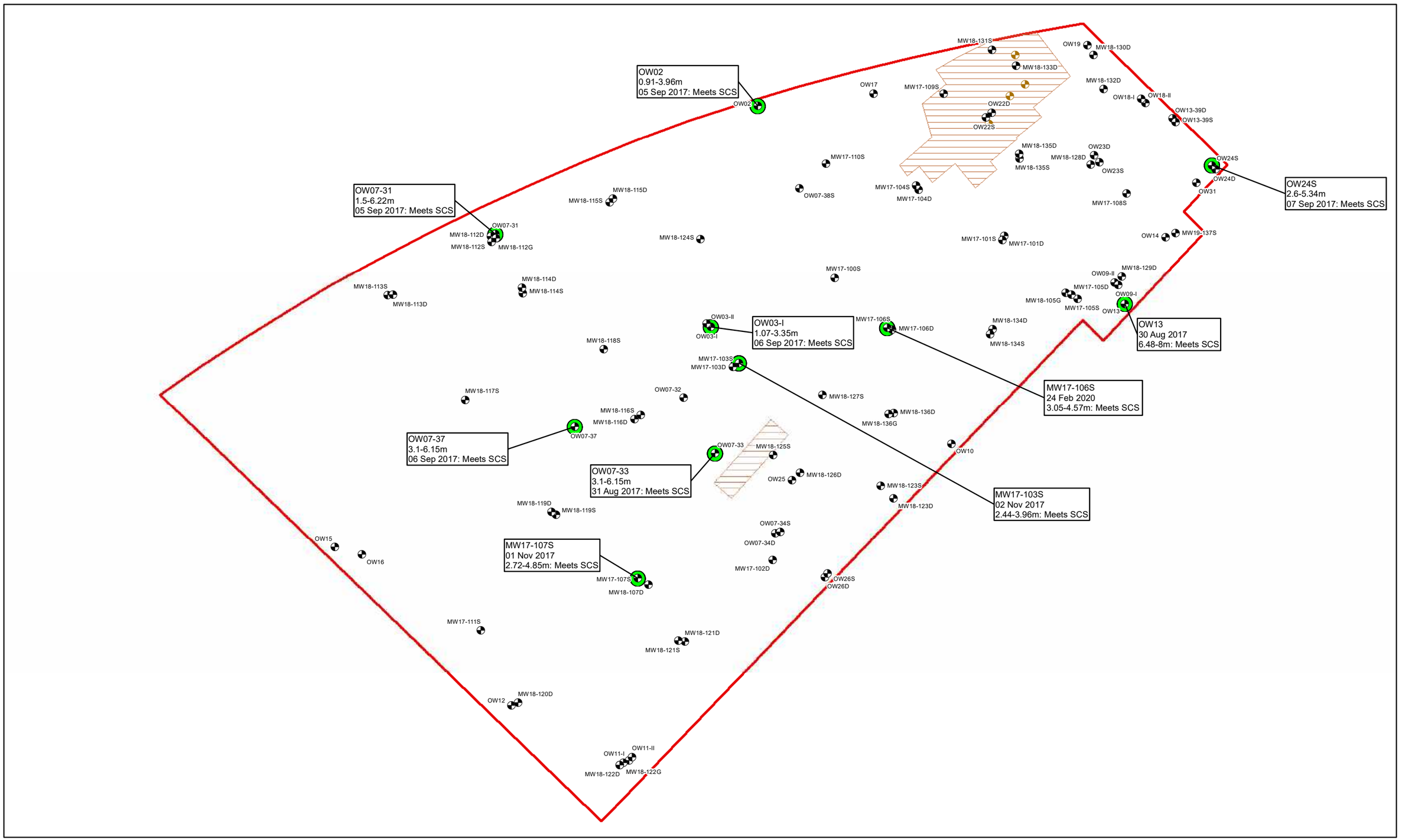
Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.
5. Parameter(s) previously exceeding are considered to meet the SCS based on two clean subsequent samples. See Table 6-10c for additional details.

Figure 6-20
Groundwater Exceedances - PCBs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\GW_PCBS.MXD MJOZWIAK 5/4/2020 10:43:38 PM



N

0 10 20 30
Metres

Sample Locations
Monitoring Well
Excavated Locations
Monitoring Well

No Exceedance

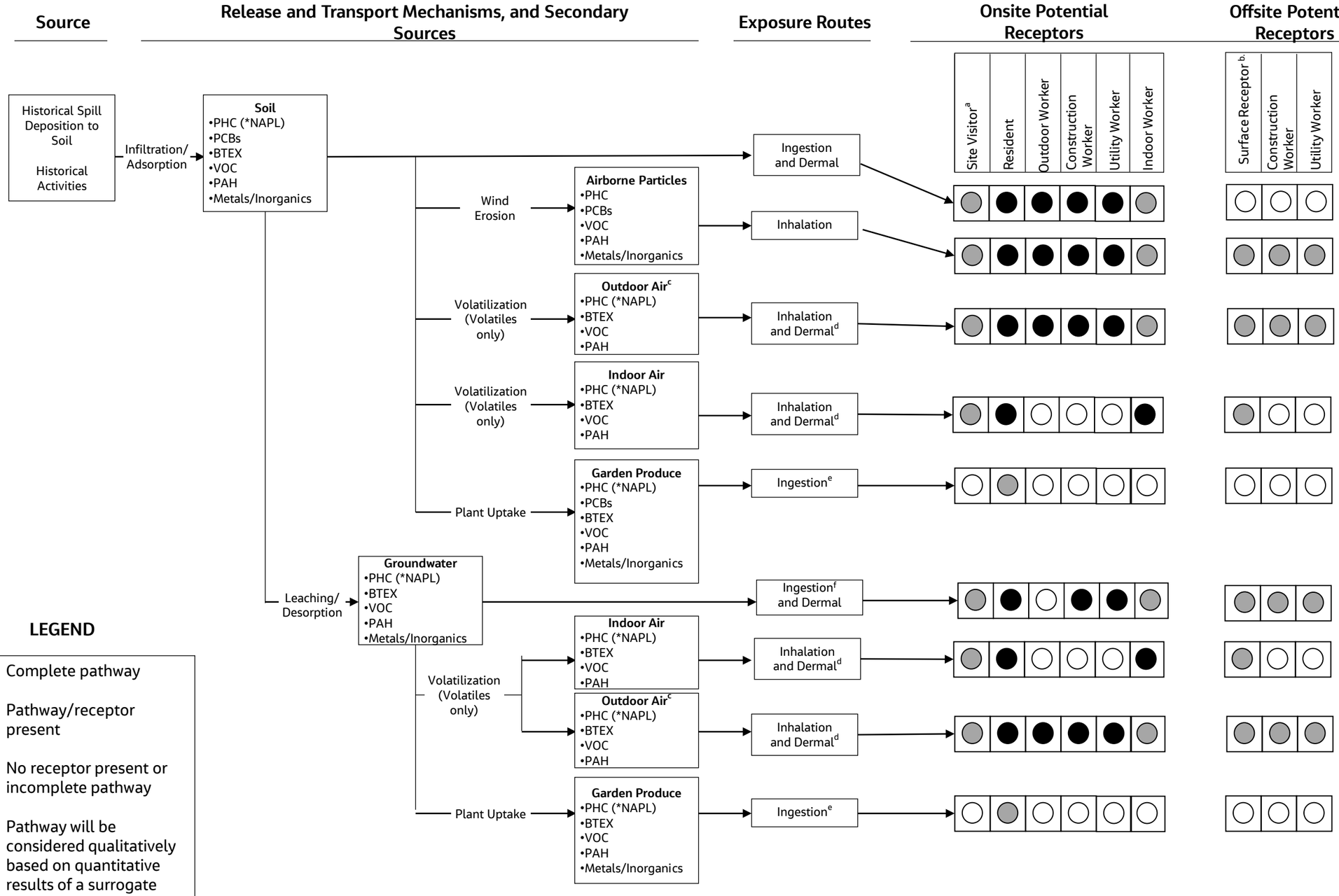
Former IMICO Property Boundary
Historical Excavation area, EarthTech, 1999

Notes:
1. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
2. Results in ( ) indicate field duplicates.
3. "J" indicates associated value is estimated.
4. Red text indicates the location of the Site maximum concentration of the analyte.

Figure 6-21
Groundwater Exceedances - ABNs
Site Characterization and Conceptual Site Model
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

\\DC1VS01\GISPROJ\G\GUELPHCITYOF\IMICO\MAPFILES\IMICO\PHASETWO\DRAFTII\GW_ABNS.MXD MJOZWIAK 5/4/2020 10:44:24 PM



LEGEND

- Complete pathway
- Pathway/receptor present
- No receptor present or incomplete pathway
- Pathway will be considered qualitatively based on quantitative results of a surrogate receptor

BTEX = benzene, toluene, ethylbenzene, xylenes

COC = contaminant of concern

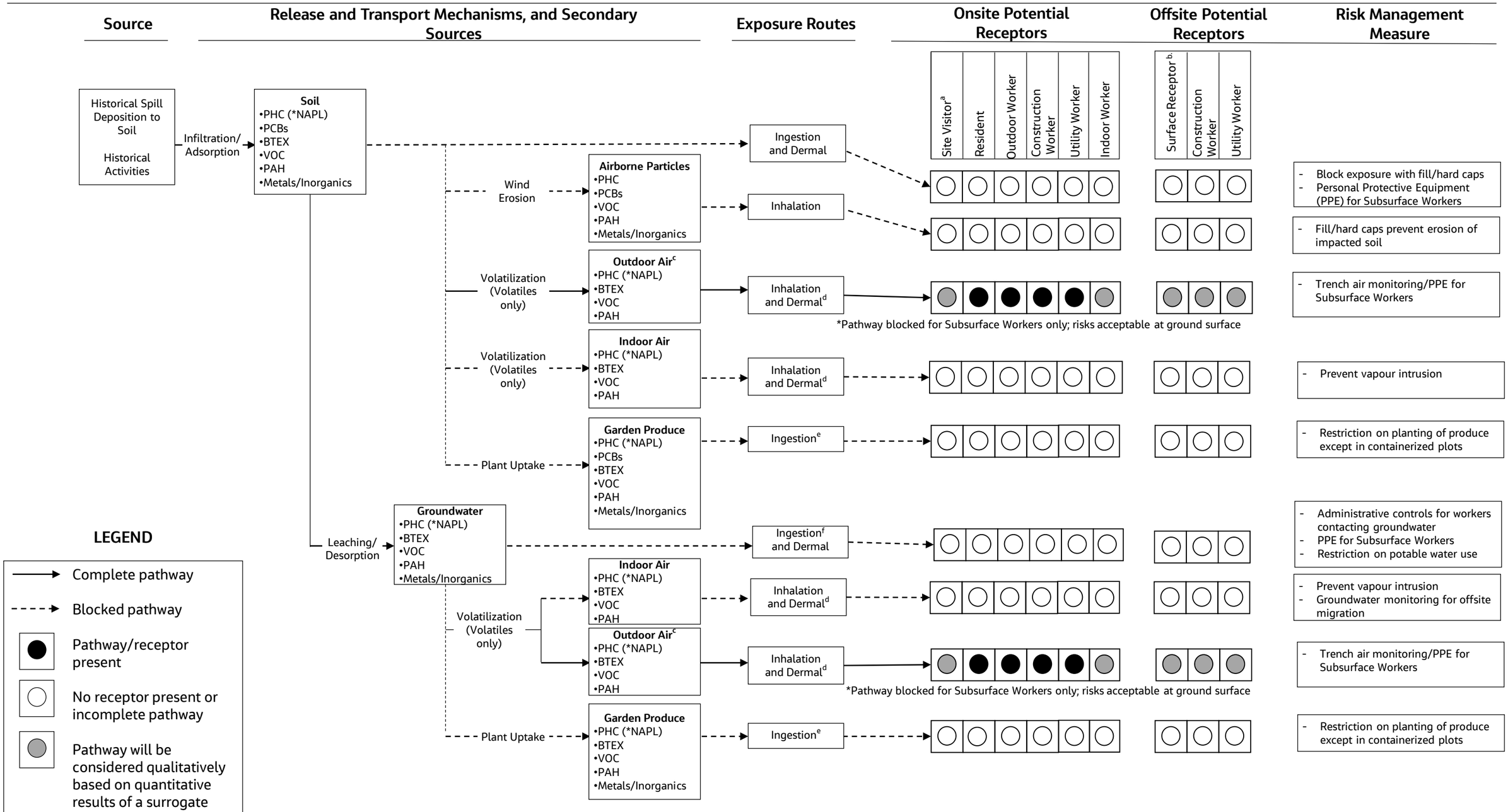
NAPL = nonaqueous phase liquid
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
RMM = risk management measure
VOC = volatile organic compound

Notes:
* As part of the Phase Two ESA investigation, measurable NAPL (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.

a. Site Visitors from all age categories would be anticipated to frequent the Site.
b. Surface Receptor incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as indoor workers, residents, visitors, outdoor workers, or patrons of nearby properties that may be exposed to dust (soil particulates) or groundwater migrating offsite during the redevelopment of the property in the absence of RMMs.
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore this pathway will not be considered quantitatively.
f. As groundwater at the Site is potable, the ingestion of groundwater pathway includes both incidental ingestion (as a result of subsurface activities) and ingestion of water from the municipal water supply

Figure 6-22. Human Health Conceptual Site Model
200 Beverley Street, Guelph, Ontario)

Jacobs



LEGEND

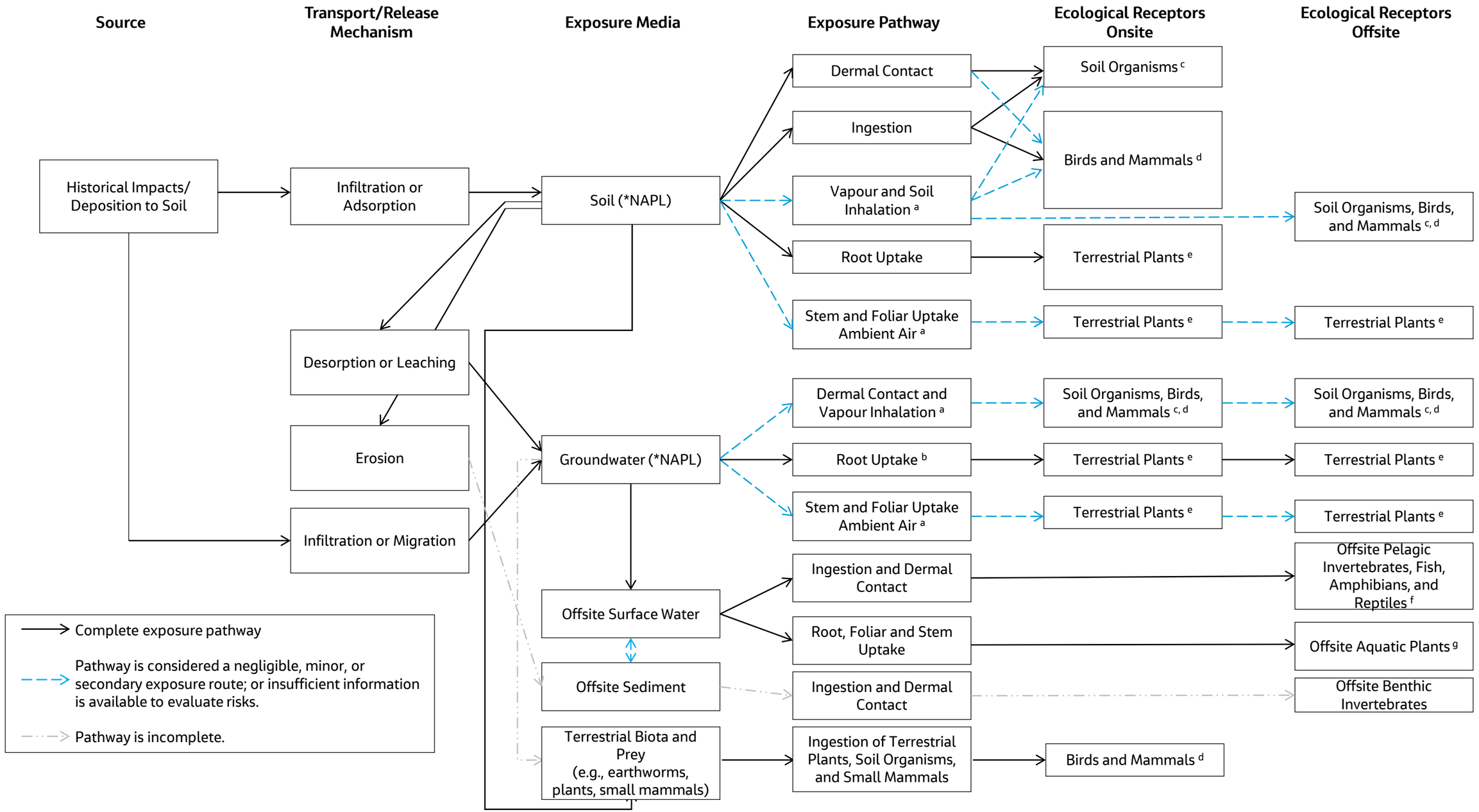
- Complete pathway
- Blocked pathway
- Pathway/receptor present
- No receptor present or incomplete pathway
- Pathway will be considered qualitatively based on quantitative results of a surrogate receptor

COC = contaminant of concern
PAH = polycyclic aromatic hydrocarbon
PCB = polychlorinated biphenyl
PHC = petroleum hydrocarbon
RMM = risk management measure
BTEX = benzene, toluene, ethylbenzene, xylenes
VOC = volatile organic compound

Notes:
* As part of the Phase Two ESA investigation, measurable NAPL (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Site Visitors from all age categories would be anticipated to frequent the Site.
b. Surface Receptor incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as indoor workers, visitors, residents, outdoor workers, or patrons of nearby properties that may be exposed to dust (soil particulates) or groundwater migrating offsite during the redevelopment of the property in the absence of RMMs.
c. Outdoor air inhalation includes both ambient and trench air inhalation, as appropriate.
d. Dermal exposure to vapours is a negligible pathway and will not be considered quantitatively.
e. There is high uncertainty associated with assessing the potential exposure to site COCs through ingestion of garden produce; therefore this pathway will not be considered quantitatively.
f. As groundwater at the Site is potable, the ingestion of groundwater pathway includes both incidental ingestion (as a result of subsurface activities) and ingestion of water from the municipal water supply

Figure 6-23. Human Health Conceptual Site Model with Risk Management Measures 200 Beverley Street, Guelph, Ontario)

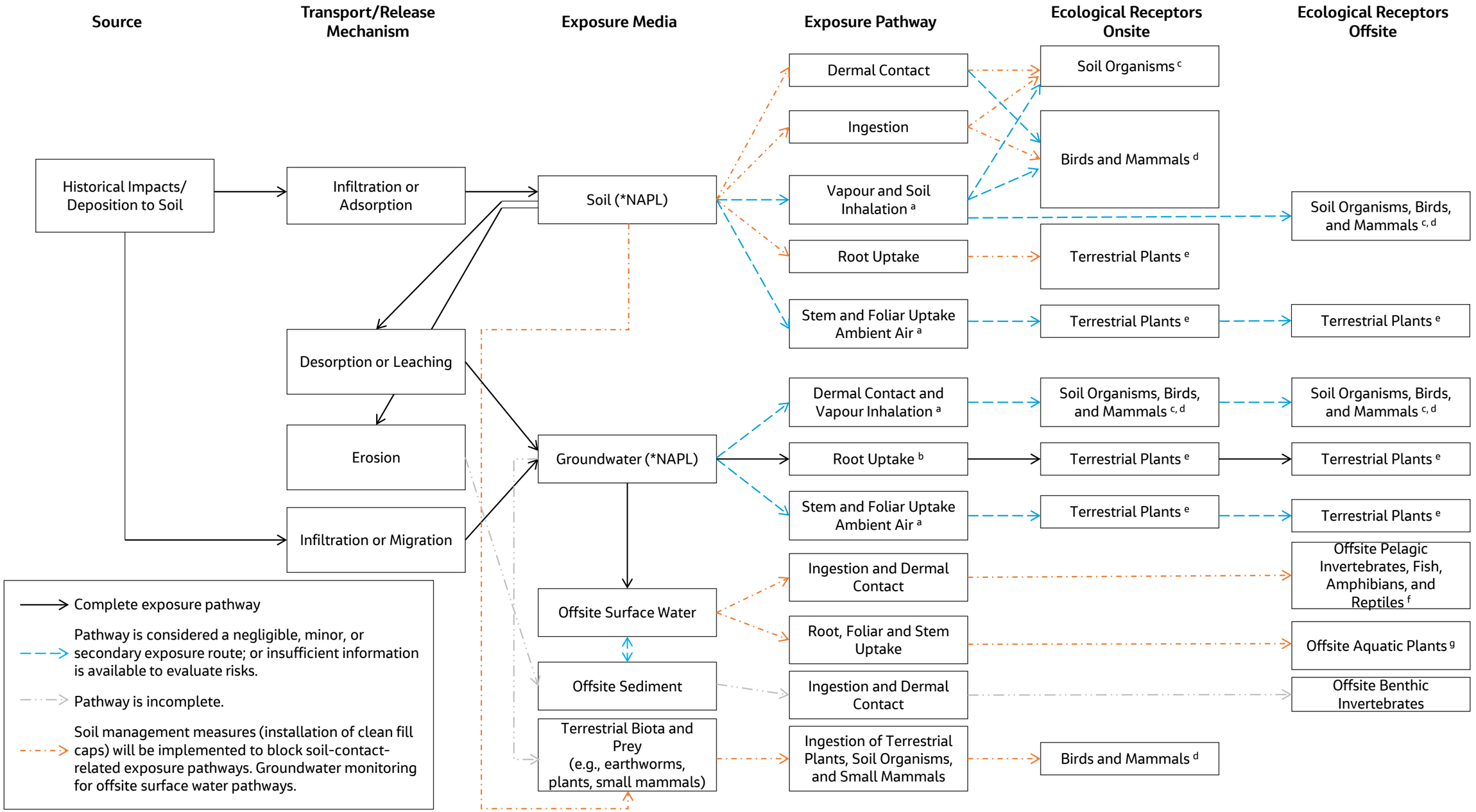
Jacobs



Notes:
* As part of the Phase Two ESA investigation, measurable nonaquous phase liquid (NAPL) (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Minimum depth to groundwater is less than 1.5 metres below ground surface.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Common Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure 6-24. Ecological Conceptual Site Model
200 Beverley Street, Guelph, Ontario

Jacobs



Notes:
* As part of the Phase Two ESA investigation, measurable nonaqueous phase liquid (NAPL) (associated with PHCs) was present in three monitoring wells in the eastern portion of the Site.
a. Vapour and soil inhalation, and uptake of ambient air are secondary routes of exposure; limited toxicological information is available to evaluate these pathways.
b. Minimum depth to groundwater is less than 1.5 metres below ground surface.
c. Selected VECs: Earthworms for soil organisms.
d. Selected VECs: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk for birds; Meadow Vole, Red Fox, and Short-tailed Shrew for mammals.
e. Selected VECs: Grasses and Manitoba Maple for terrestrial plants.
f. Selected VECs: Daphnia for pelagic invertebrates; Common Shiner and Northern Pike for fish; Green Frog for amphibians; and Midland Painted Turtle for reptiles.
g. Selected VECs: *Carex spp.* for aquatic plants.

Figure 6-25. Ecological Conceptual Site Model with Risk Management Measures
200 Beverley Street, Guelph, Ontario

Jacobs

Appendix D4
Borehole and Monitoring Well Logs and Laboratory Certificates of Approval

Borehole and Monitoring Well Logs

BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: BH7 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 8 May 1998
GEOLOGIST BJS
ELEVATION 315.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SILTY SAND Dark brown to black silty sand, trace gravel, moist. -Switching to medium brown silty sand with trace plastic and trace clayey silt fill from 0.30 to 0.61 m. Cobbles found from 0.30 m. No odours.		1		SS	24		80		Photovac 0 ppm. Sample taken from 0.0 m to 0.15 m (BH7-SS1).
1				2		SS	19/0.18m		90		Photovac 0 ppm. Sample taken from 1.0 m to 1.15 m (BH7-SS2).
1.5		Borehole terminated at 1.52 m on limestone bedrock.									

Printed: 8 JUN 98

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: BH22 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**									
		FILL Dark brown silty fine sand (foundry sand) fill, some gravel and brick, iron slag, moist, compact to dense. -Observed some clayey silt fill, wet, cobbles at 0.76 m		1		SS	10		85		Microtip = 0 ppm.
1				2		SS	28		80		Microtip = 0 ppm.
		-More frequent cobbles at 1.52 m.		3		SS	40		75		Microtip = 0 ppm.
2											
2.6				4		SS	15/ 0.075 m		0		
		Borehole terminated at 2.56 m on presumed bedrock surface.									

Printed: 6 OCT 98

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: BH23 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**		1		SS	23		90		Microtip = 0 ppm.
		FILL									
		Dark brown silty fine sand (probably foundry sand) fill, some brick, iron slag, nails, moist, compact to dense.		2		SS	25/0.125 m		60		Microtip = 0 ppm.
1		-Fuel odour detected at 1.04 m									
		-Cobbles more frequent and fuel odour at 1.52 m.		3		SS	45/0.125 m				
1.8		Borehole terminated at 1.80 m due to auger refusal.									

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: BH24 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**									Microtip = 0 ppm.
		FILL Dark brown and black silty fine sand (probably foundry sand) fill, some iron slag, moist, compact.		1		SS	12		70		
1		-Becoming a red/brown/grey clayey silt fill, WTPL at 1.1 m, compact.		2		SS	27		50		Microtip = 0 ppm.
				3		SS	27		0		
2		-Large cobble at 2.29 m.		4		SS	34/ 0.23 m		50		
2.6		Borehole terminated at 2.62 m on presumed bedrock surface.									

Printed: 21 OCT 98

Gartner Lee Limited

Project: CITY of GUELPH Contract No: 49520-I

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-40

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		CONCRETE SLAB - 150mm thick											
	0.15	**SAND and GRAVEL (FILL)** - dark brown, damp, medium to coarse, some coal and clinker				SS-1			57		N	⊕	
	0.30	**TOPSOIL (NATIVE)** - black, wet, trace hydrocarbon odour				SS-1A					T	⊕	Inorganics, Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
1													
	1.22	**SAND and LIMESTONE GRAVEL** - brown, damp, fine to medium, some silt				SS-2			100		N	⊕	
2													
	2.13	**SAND** - grey, damp to moist, fine, some silt, trace chemical odour				SS-2A					T	⊕	Metals, VOC's, F2-F4 and PCB's Analyses
	2.39	**END of BOREHOLE @ 2.39m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-41

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Stratigraphy: Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV (ppm) 100 200 300 400 / Headspace TOV (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND, COAL and CLINKER (FILL/REWORKED NATIVE) - black, damp, medium				SS-1 / SS-1A			63		N / N	⊕	Inorganics, Metals, PAH, F2-F4 and PCB's Analyses DUP #4 Metals Analyses
	0.61	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium to coarse											
1						SS-2			24		N	⊕	Metals, VOC's and F2-F4 Analyses
2													
	2.29	**END of BOREHOLE @ 2.29m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Borehole: BH07-42

Boring date: 22/02/2007 Supervised by: G.C.Yule

Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Sheet 1 of 1

Scale (m)	Stratigraphy: Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SILTY SAND and COAL (FILL/REWORKED NATIVE) - black, damp, medium				SS-1			67		N	⊕	Inorganics, Metals, VOC's, BTEX/F1, F2-F4, TOC and PCB's Analyses
	0.61	**SILTY SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium				SS-1A					N	⊕	
1						SS-2			100		N	⊕	Metals and VOC's Analyses DUP # 14 Metals Analyses
	1.68	**END of BOREHOLE @ 1.68m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-1** Borehole: **BH07-45**

Boring date: **08/02/2007** Supervised by: **G.C.Yule**

Monitoring Well: **n/a**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd.**

Sheet 1 of 1

Drilling Method: **Power Probe 9700 w/ Double Tube**

Scale (m)	Stratigraphy: Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Samples: Symbol	Well Details	Water Level	Sample Type and Number	Condition Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND (FILL)** - greyish brown, damp, medium to fine, some gravel, trace silt				SS-1		83		N	⊕	Metals and F2-F4 Analyses
						SS-1A				N		VOC's Analyses
						SS-2		100		N	⊕	Metals, PAH and PCB's Analyses DUP # 2 PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
	1.78	**END of BOREHOLE @ 1.78m** Refusal on inferred bedrock.										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: **G.C.Yule**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-I** Borehole: **BH07-46**

Boring date: **08/02/2007** Supervised by: **G.C.Yule** Monitoring Well: **n/a**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd.** **Sheet 1 of 1**

Drilling Method: **Power Probe 9700 w/ Double Tube**

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊖ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND and GRAVEL (FILL)** - brown, damp, medium to coarse				SS-1 SS-1A			83		N N		Metals and PCB's Analyses
	1.22	**SAND and GRAVEL (NATIVE)** - greyish brown, moist, medium to coarse, trace hydrocarbon odour				SS-2			100		T		Metals, PAH, VOC's, F2-F4 and PCB's Analyses
	1.68	**END of BOREHOLE @ 1.68m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **G.C.Yule**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-47

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊖ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		CONCRETE SLAB - 150mm thick											
	0.15	**SAND and GRAVEL (NATIVE)** - brown, damp, medium to coarse				SS-1			100		N	⊕	Metals Analyses
1						SS-2			100		N	⊕	Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
		- becoming moist @ 1.68m											
	1.80	**END of BOREHOLE @ 1.8m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-48

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details / Water Level	Sample Type and Number	Condition	Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		CONCRETE SLAB - 100mm thick										
	0.10	**SILTY SAND and GRAVEL (FILL/REWORKED)** - brown, damp, fine to medium			SS-1			100		N	⊕	Metals, PAH, BTEX/F1, F2-F4 and PCB's Analyses
1												
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, moist to damp, medium			SS-2			100		N	⊕	Metals, BTEX/F1 and F2-F4 Analyses
	1.42	**END of BOREHOLE @ 1.42m**										
		Refusal on inferred bedrock										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Borehole: BH07-49

Boring date: 09/02/2007 Supervised by: G.C.Yule

Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation, m											
		CONCRETE SLAB - 150mm thick											
	0.15	**TOPSOIL (NATIVE)** - dark brown, moist, silty, some fine sand				SS-1			79		N	⊕	Metals Analyses
	0.30	**SAND and LIMESTONE GRAVEL** - brown, damp, medium				SS-1A					N	⊕	
1						SS-2			100		N	⊕	Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
	1.83	**END of BOREHOLE @ 1.83m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: BH07-50

Boring date: 08/02/2007 Supervised by: G.C.Yule Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. **Sheet 1 of 1**

Drilling Method: Power Probe 9700 w/ Double Tube

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: m										
	0.05	**CONCRETE SLAB** - 50mm thick										
		SAND (FILL/REWORKED NATIVE) - dark brown, damp, fine to medium, some silt				SS-1		75		N	⊕	Inorganics, Metals, F2-F4 and PCB's Analyses
1	1.07	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium				SS-1A				N	⊕	
						SS-2		100		N	⊕	Metals and PCB's Analyses
	1.67	**END of BOREHOLE @ 1.67m**										
		Refusal on inferred bedrock.										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-51

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND (FILL/REWORKED NATIVE) - dark brown to black, damp, fine, some gravel and fine coat, trace red brick				SS-1 SS-1A			73		N N	⊕	Metals, F2-F4, TOC and PCB's Analyses
1													
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp to moist, fine to medium, some silt				SS-2			88		N	⊕	Metals, PAH, VOC's, BTEX/F1 and F2-F4 Analyses
2													
	2.06	**END of BOREHOLE @ 2.06m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-52

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SILTY SAND (FILL/REWORKED NATIVE)** - dark brown, damp, fine to medium, some humus and gravel, trace tin foil and fine coal				SS-1			75		N	⊕	Metals, PAH, BTEX/F1, F2-F4, TOC and PCB's Analyses DUP # 3 PCB's Analyses
	1.22	**SAND and GRAVEL (NATIVE)** - dark brown, damp, medium to coarse, some silt				SS-2			90		N	⊕	
2	1.83	**SAND** - brown, moist, medium, some silt, trace to some limestone gravel				SS-2A					N	⊕	Metals, BTEX/F1 and F2-F4 Analyses
	2.01	**END of BOREHOLE @ 2.01m** Refusal on inferred bedrock											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-53

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊖ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND and GRAVEL (FILL/REWORKED NATIVE)** - dark brown, damp, fine to medium, silty				SS-1 SS-1A			83		N N		Inorganics, Metals, PAH, VOC's and F2-F4 Analyses
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium				SS-2			100		N		Metals, VOC's, BTEX/F1 and F2-F4 Analyses DUP #1 Inorganics, Metals, PAH, VOC's and F2-F4 Analyses
	1.47	**END of BOREHOLE @ 1.47m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-54

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SILTY SAND (FILL/REWORKED NATIVE) - dark brown, damp, fine, some gravel, trace fine coal and clinker				SS-1			77		N	⊕	Metals, BTEX/F1 and F2-F4 Analyses
						SS-1A					N		
	0.61	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium to coarse, trace silt				SS-1B					N	⊕	
1													
						SS-2			100		N	⊕	Inorganics, Metals, PAH, BTEX/F1 and F2-F4 Analyses
2													
	2.39	**END of BOREHOLE @ 2.39m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No. 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-55

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND (FILL/REWORKED NATIVE) - dark brown, damp, fine to medium, some silt, trace slag				SS-1			75		N	⊕	
						SS-1A					N		
1	0.9	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace silt				SS-1B					N	⊕	Metals, PAH, VOC's, BTEX/F1 and F2-F4 Analyses
						SS-2			100		N	⊕	
	1.80	**END of BOREHOLE @ 1.8m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

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DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-S6

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Stratigraphy: Description (Ground Surface Elevation, m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black and brown, damp, medium to coarse, some coal and clinker, trace humus				SS-1 SS-1A		83		N N	⊕	Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
1	0.91	**SAND (NATIVE)** - brown, moist, fine to medium, some silt and gravel				SS-1B				N	⊕	
	1.22	**SAND and LIMESTONE GRAVEL** - brown, moist to damp, medium, trace silt				SS-2				N	⊕	Metals and VOC's Analyses
	1.67	**END of BOREHOLE @ 1.67m** Refusal on inferred bedrock.										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Borehole: BH07-57

Boring date: 08/02/2007 Supervised by: G.C.Yule

Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ◻ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1	0.05	**SILTY TOPSOIL (FILL)** - dark brown, damp, trace red brick and coal				SS-1			67		N	⊕	Inorganics, Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses DUP #5 Metals Analyses
		SILTY SAND (FILL/REWORKED NATIVE) - dark brown, damp, fine to medium, some gravel, trace to some fine coal and red brick				SS-1A					N		
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium, some to trace silt				SS-2			100		N	⊕	Metals Analyses
	1.88	**END of BOREHOLE @ 1.88m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-58

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND and GRAVEL (FILL/REWORKED NATIVE)** - dark brown, damp, medium to coarse, some coal and clinker				SS-1			88		N	⊕	
						SS-1A					N		Metals, PAH, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
	0.61	**SAND (FILL/REWORKED NATIVE)** - black, damp, medium, some fine coal, trace gravel				SS-1B					N	⊕	
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace silt				SS-2			88		N	⊕	Metals Analyses
	1.63	**END of BOREHOLE @ 1.63m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Borehole: BH07-59

Boring date: 09/02/2007 Supervised by: G.C.Yule

Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Sheet 1 of 1

Drilling Method: Power Probe 9700 w/ Double Tube

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SILTY TOPSOIL (FILL/REWORKED NATIVE) black, moist to damp, trace fine sand and gravel, trace coal				SS-1 SS-1A			100		N N	⊕	Metals, PAH, VOCs, BTEX/F1 and PCB's Analyses Metals Analyses
	0.30	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace silt				SS-1B					N	⊕	
	0.69	**END of BOREHOLE @ 0.69m** Refusal on inferred bedrock											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-60

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Stratigraphy: Elev. (m) / Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⓘ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black, damp, medium to coarse, some coal and clinker				SS-1			89		N	ⓘ	Inorganics, Metals, PAH, VOC's, BTEX/F1 and F2-F4 Analyses
						SS-1A					N	ⓘ	
	0.76	**SAND (NATIVE)** - brown, damp, medium, some limestone gravel, trace silt				SS-1B					N	ⓘ	Metals Analyses
1	1.19	**END of BOREHOLE @ 1.19m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-61

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1	0.05	**SANDY TOPSOIL (FILL/REWORKED NATIVE)** - dark brown, damp, medium, some to trace fine coal				SS-1			75		N		Metals, PAH, VOC's, BTEX/F1, F2-F4, TOC and PCB's Analyses
		SAND (FILL/REWORKED NATIVE) - dark brown to brown, damp, medium, trace silt and fine coal				SS-1A					N		
	1.22	**SILTY TOPSOIL (NATIVE)** - dark brown, damp				SS-2			100		N		Metals Analyses
	1.37	**SAND and LIMESTONE GRAVEL** - brown, damp, medium, trace to some silt				SS-2A					N		
	1.83	**END of BOREHOLE @ 1.83m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-62

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	0.05	**SAND and HUMUS (FILL)** - dark brown, damp, medium				SS-1 SS-1A			75		N N		Inorganics and Metals Analyses
	0.61	**SAND (FILL/REWORKED NATIVE)** - brown, damp, medium, some limestone gravel				SS-1B					N	⊕	Inorganics, Metals, PAH, VOCs, F2-F4 and PCB's Analyses DUP #6 Metals Analyses
1													
	1.22	**SAND (FILL/REWORKED NATIVE)** - dark brown, damp, medium, some silt and fine coal				SS-2			100		N	⊕	
2		**END of BOREHOLE @ 2.03m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-63

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Stratigraphy: Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**COAL and CLINKER (FILL)** - black, damp, some sand				SS-1 SS-1A			63		N N	⊕ ⊕	Metals and VOC's Analyses
	1.22	**SILTY SAND (NATIVE)** - brown, damp, fine to medium, some limestone gravel				SS-2			85		N	⊕	Inorganics, Metals, VOC's, BTEX/F1, F2-F4 and TOC Analyses
	1.88	**END of BOREHOLE @ 1.88m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 08/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-64

Monitoring Well: n/a

Sheet 1 of 1

Ground Surface Elevation: m

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	0.05	**TOPSOIL (FILL)** - black, damp, some medium sand, trace roots				SS-1			67		N	⊕	Inorganics, Metals, PAH, VOCs, BTEX/F1 and F2-F4 Analyses
		SAND (FILL/REWORKED NATIVE) - dark brown, damp, medium, trace to some silt and coal, trace glass				SS-1A					N		
1													
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium, some silt				SS-2			71		N	⊕	Metals Analyses
2													
	2.29	**END of BOREHOLE @ 2.29m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: BH07-65

Boring date: 09/02/2007 Supervised by: G.C.Yule Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. **Sheet 1 of 1**

Drilling Method: Power Probe 9700 w/ Double Tube

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SILTY TOPSOIL (FILL/REWORKED NATIVE) black, damp, some fine sand and coal, trace gravel				SS-1			63		N	⊕	
						SS-1A					N		Metals, PAH, BTEX/F1, F2-F4 and PCB's Analyses
	0.61	**SILTY SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine				SS-1B					N	⊕	
1													
						SS-2			94		N	⊕	Metals, VOC's and PCB's Analyses
2	2.03	**END of BOREHOLE @ 2.03m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-1**

Boring date: **09/02/2007** Supervised by: **G.C.Yule**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd.**

Drilling Method: **Power Probe 9700 w/ Double Tube**

Borehole: **BH07-66**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND (FILL/REWORKED NATIVE)** - black, damp, medium to coarse, some gravel and coal				SS-1 SS-1A			100		N N	⊕	Metals, PAH, BTEX/F1, F2-F4 and PCB's Analyses
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium				SS-2			100		N	⊕	Metals, F2-F4 and PCB's Analyses
	1.32	**END of BOREHOLE @ 1.32m** Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: **G.C.Yule**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-1**

Boring date: **09/02/2007** Supervised by: **G.C.Yule**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd.**

Drilling Method: **Power Probe 9700 w/ Double Tube**

Borehole: **BH07-67**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	0.05	**SAND and GRAVEL (FILL)** - brown, damp				SS-1			83		N	⊕	
		SILTY COAL and CLINKER (FILL/REWORKED NATIVE) - black, damp, some fine to medium sand, trace to some humus, trace hydrocarbon odour				SS-1A					N		Metals, VOC's, F2-F4 and PCB's Analyses
1	0.91	**SAND and LIMESTONE GRAVEL (NATIVE)** - greyish brown, damp, fine to medium				SS-1B					N	⊕	
						SS-2			100		N	⊕	Metals, VOC's, and PCB's Analyses
	1.37	**END of BOREHOLE @ 1.37m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **G.C.Yule**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-1**

Boring date: **09/02/2007** Supervised by: **G.C.Yule**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd.**

Drilling Method: **Power Probe 9700 w/ Double Tube**

Borehole: **BH07-68**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation, m											
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black, damp, medium to coarse, some coal and clinker, trace humus				SS-1			83		N	⊕	Metals, F2-F4 and PCB's Analyses
						SS-1A					N	⊕	Metals, F2-F4 and PCB's Analyses
	0.61	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace silt				SS-1B					N	⊕	
1													
						SS-2			100		N	⊕	
	1.32	**END of BOREHOLE @ 1.32m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **G.C.Yule**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-69

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev (m) Depth (m)	Stratigraphy: Description (Ground Surface Elevation: m)	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	0.08	**SAND and GRAVEL (FILL)** - brown, damp, medium to coarse				SS-1			83		N	⊕	Inorganics, Metals, PAH, VOC's and F2-F4 Analyses
		SAND (FILL/REWORKED NATIVE) - black and dark brown, damp, medium, some coal and clinker, trace to some gravel				SS-1A					N		
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace silt				SS-2			100		N	⊕	Metals Analyses
	1.42	**END of BOREHOLE @ 1.42m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 09/02/2007 Supervised by: G.C.Yule

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd.

Drilling Method: Power Probe 9700 w/ Double Tube

Borehole: BH07-70

Monitoring Well: n/a

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1	0.05	**SAND and GRAVEL (FILL)** - brown, damp, medium				SS-1			63		N	⊕	Inorganics, Metals, PAH, BTEX/F1, F2-F4 and PCB's Analyses
						SS-1A					N		
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black and brown, damp, medium, some silt and coal & clinker											
	1.22	**SAND (FILL/REWORKED NATIVE)** - black, damp, medium, trace gravel				SS-2			75		N	⊕	Metals and F2-F4 Analyses
	1.73	**END of BOREHOLE @ 1.73m**											
		Refusal on inferred bedrock.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: BH07-71

Boring date: 09/02/2007 Supervised by: G.C.Yule Monitoring Well: n/a

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. **Sheet 1 of 1**

Drilling Method: Power Probe 9700 w/ Double Tube

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1	0.05	**SAND and GRAVEL (FILL)** - brown, damp, medium to coarse				SS-1 SS-1A		63		N N	⊕	Inorganics, Metals, PAH, VOC's and F2-F4 Analyses
		SAND, COAL and CLINKER (FILL/REWORKED NATIVE) - black, damp, medium to fine, some red brick										
	1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium to fine				SS-2		100		N	⊕	Metals Analyses
	1.32	**END of BOREHOLE @ 1.32m**										
		Refusal on inferred bedrock.										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Boring date: **12/12/2013** Supervised by: **M. McCormick**

Borehole Location: **200 Beverly Street, Guelph, Ontario**

Driller: **Aardvark Drilling**

Drilling Method: **CME 55T w/ HSA**

Borehole: **BH13-40**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation:316.47m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	316.37	**CONCRETE** - 100 mm thick				GS-1					N		
	0.10	**GRAVEL (FILL)** , crushed limestone											
	316.27	**SAND and GRAVEL (NATIVE)** , brown, medium											
	0.20	to coarse, some cobbles											
						GS-2					N		
1													
						GS-3					N		
						SS-1					N		VOCs, PAHs, BTEX/ PHC (F1-F4), Metals and Inorganics Analyses.
2													
	314.03												
	2.44	**END of BOREHOLE @ 2.44m**											
		Refusal on inferred bedrock.											
3													
4													
5													
6													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S.Prior**

Date: **11/02/14**

DECOMMISSIONING CONSULTING SERVICES

COREHOLE LOGS
Former IMICO Property
Guelph, Ontario

Corehole	Depth (m)	Stratigraphy	PID (ppm)	Samples (mbg)
C1	0.00 - 0.19	Concrete	2.5	
	0.19 - 0.61	Medium to dark brown silty sand - **FILL**		C1-2
	0.61 - 1.07	Reddish brown clayey **SILT**		C1-3
C2	0.00 - 0.17	Concrete	2	
	0.17 - 0.61	Black silty sand - **FILL**, foundry sand odour		C2-1
	0.61 - 1.07	Black silty sand - **FILL**, light foundry sand odour		C2-2
C3	0.00 - 0.15	Concrete		
	0.15	Refusal		
		Note: C3 located approximately 1.2 m below floor grade		
C4	0.00 - 0.33	Concrete	0	
	0.33 - 0.61	Inferred to be clayey silt with cobbles and boulders		
	0.61	Refusal		
		Note: C4 located approximately 1.2 m below floor grade		
C5	0.00 - 0.08	Interlocking bricks		
	0.08 - 0.23	Concrete		
	0.23	Refusal		
C6	0.00 - 0.17	Concrete	0.5	
	0.17 - 0.61	Dark brown to black silty sand **FILL**, perhaps foundry sand		C6-1
	0.61 - 0.76	Dark brown to black silty sand **FILL**, less foundry sand than above, petroleum oil-like odour		C6-2
	0.76	Refusal		
C7	0.00 - 0.23	Concrete	110	
	0.23 - 1.22	Dark brown to black silty sand **FILL**, slight solvent-like odour		C7-1 (0.23-0.61) C7-2 (0.61-1.22)
C8	0.00 - 0.14	Concrete	13	
	0.14 - 0.76	Dark brown to black silty sand **FILL**, slight solvent-like odour		C8-1
	0.76 - 1.22	Dark brown to black silty sand **FILL**, occaisional gravel beginning at 0.91m, slight solvent-like odour		C8-2
C9	0.00 - 0.13	Concrete	0	
	0.13	Refusal		

COREHOLE LOGS
Former IMICO Property

Corehole	Depth (m)	Stratigraphy	PID (ppm)	Samples (mbg)
C10	0.00 - 0.13	Concrete	0	
	0.13 - 0.61	Brown SAND and GRAVEL, trace silt		C10-1
	0.61 - 1.22	No sample recovered Note: C10 located in a pit approximately 1 metre below floor grade		
C11	0.00 - 0.16	Concrete	0.5	
	0.16 - 0.34	Concrete- second layer		
	0.34 - 0.40	Light brown mixed SAND and gravel		C11-1
C12	0.00 - 0.13	Concrete	5	
	0.13 - 0.30	Brown to grey coarse sand and gravel, slight ammonia-like odour -**FILL**		C12-1
	0.30	Refusal		
C13	0.00 - 0.14	Concrete	4	
	0.14 - 0.91	Dark brown to black medium sand, trace silt, trace gravel - **FILL**, including cinders and foundry sand, slight ammonia-like odour		C13-1
	0.91 - 1.20	Dark brown to black medium sand, trace silt with gravel - **FILL**		C13-2
	1.20 - 1.22	Brown **SILTY SAND** Note: C13 located in a pit approximately 1 m below floor grade		
C14	0.00 - 0.12	Concrete	0	
	0.12 - 1.22	Dark brown to black sand, trace silt, some gravel - **FILL** including cinders and foundry sand		C14-1 (0.12-0.61) C14-2 (0.61-1.22)
C15	0.00 - 0.13	Concrete	0	
	0.13 - 0.91	Brown to grey coarse sand and gravel - **FILL**		
	0.91	Refusal		

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London

BOREHOLE 1

Sheet 1 Of 1

Client: BANK OF MONTREAL E.O. No.: 90K26
Project Location: FORMER IMICO PROPERTY-GUELPH
Borehole Location: SEE FIGURE 6
Drilling Contractor: ATCOST Date: APRIL 25/91
Monitoring Well Data – Pipe: 5.1cm PVC
– Screen: 5.1cm PVC #10 SLOT
Other Monitors: 1.6cm HDPE SOIL GAS PROBE

Elevation:
– Datum: GEODETIC
– Ground surface: 315.75
–Measuring Pt.: 316.46 (TOC)

Logged By: E.T. Checked By: D.K.
Drawn By: W.J.G. Scale: 1:40

Depth Scale (ft.)	Depth Scale (m)	Boring Method	Soil Profile: Description	Strat. Plot	Elev. (m) Depth (m)	Sample: Number	Sample: Interval	Sample: Type	Sample: "N" Value	PID: 100 200 300	Monitoring Well Details
					315.75						Lockable Protective Casing
0	0.0	Power Auger Hollow Stem	Silty fine to medium sand, trace clay, dark brn. to blk, moist, light weathered hydrocarbon odour, fill.		0.00	AU-1		AU			CEMENT; BENTONITE SEAL
3	1.0		Silty sand, with cobbles and boulders, dark brn. to blk., moist, weathered hydrocarbon odour, fill.								SOIL GAS PROBE
5	1.5		Clayeysilt, trace to some mixed sandy, reddish brn., moist(tip wet), strange weathered hyrdocarbon odour, fill.		313.87	SS-1		SS	48		SANDPACK
6	2.0	Rotary Core NQ			1.88						▽ 313.23 ON MAY 2/91
8	2.5		Limestone, very hard weathered, grey, fractured, occasional shaley partings, vuggy.			CORE-1		RX			WELLSCREEN
10	3.0		-Weathered hydrocarbon odour extending to approx. 3.35 mbg.		312.40						
11	3.5				3.35						
13	4.0		END OF BOREHOLE		311.79 3.96						
14	4.5										
16	5.0										
18	5.5										
19	6.0										
20											

Note: This borehole log was prepared for hydrogeological and/or environmental assessment purpose and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Proctor & Redfern personnel before use by others.

BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW1-II 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 11 May 1998
GEOLOGIST BJS
ELEVATION 315.6 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SANDY SILT Dark brown, medium to coarse sandy silt, some gravel, brick, moist to wet, some black ash fragments, no odours.		1		SS	6		40		Photovac 0 ppm
1		-Becoming wet with some odour from 0.76 to 1.37 m.		2		SS	5		40		Photovac 0 ppm, Sample taken from 0.76 to 1.37 m.
		-Cobble in tip of spoon, saturated with some odour from 1.52 to 2.13 m.		3		SS	7		40		Photovac 36.9 ppm
2											
2.5		-Oily sheen on soil sample with strong hydrocarbon odour from 2.13 to 2.29 m. -Spoon bouncing at 2.29 m - presumed bedrock surface. Benseal seal from 2.30 to 2.45 m.		4		HQ			100	9	Photovac 9.7 ppm, Sample taken from 2.13 to 2.29 m. (AS4-OW1-II)
3		**LIMESTONE** Grey limestone with occasional shale stringers, porous, vuggy, some crystalline structure, fractured. -Becoming highly fractured with occasional shale partings from 3.23 m and increasing with depth.		5		HQ			100	8	
4											W.L. @ 3.61m BGS on May 11/98.
				6		HQ			99	27	
5											
5.9											
6		**SHALEY LIMESTONE** Grey shaley limestone, more frequent shale partings, some crystalline structure. -Becoming vuggy with more frequent shale inclusions, fractures decreasing with depth.		7		HQ			100	48	
7											
7.8		Borehole terminated at 7.83 m in shaley limestone bedrock.									

Printed: 8 JUN 98

Gartner Lee Limited

Proctor & Redfern Limited
Consulting Engineers & Scientists
London

BOREHOLE 2

Sheet 1 Of 1

Client: BANK OF MONTREAL E.O. No.: 90K26
Project Location: FORMER IMICO PROPERTY-GUELPH
Borehole Location: SEE FIGURE 6
Drilling Contractor: ATCOST Date: APRIL 25/91
Monitoring Well Data – Pipe: 5.1cm PVC
– Screen: 5.1cm PVC #10 SLOT
Other Monitors:

Elevation:
– Datum: GEODETIC
– Ground surface: 315.23
–Measuring Pt.: 315.97 (TOC)

Logged By: E.T. Checked By: D.K.
Drawn By: W.J.G. Scale: 1:40

Depth Scale	Boring Method	Soil Profile: Description	Strat. Plot	Elev. Depth	Sample	PID (100 / 200 / 300)	Monitoring Well Details
0 – 0.0				315.23			Lockable Protective Casing
1 – 0.5	Power Auger Hollow Stem	Silty sand, trace clay, blk. staining, minor gravel, moist fill, evidence of foundry sands.		0.00	SS-1 SS 16		CEMENT
2 – 3 – 1.0					SS-2 SS 13		BENTONITE SEAL
4 – 1.5		Silty sand, light brn. moist		313.85/ 1.38			
5 – 6 – 2.0	Rotary Core NQ	Limestone, very weathered grey fractured, occasional shaley partings,		313.81/ 1.42	CORE-1 RX		▽ 313.70 ON MAY 2/91
7 – 8 – 2.5 – 9 – 10 – 3.0 – 11 – 3.5 – 12		Limestone becomes more competent					WELLSCREEN SANDPACK
13 – 4.0		END OF BOREHOLE		311.27 3.96			
14 – 15 – 4.5 – 16							
17 – 5.0 – 18 – 5.5 – 19							
20 – 6.0							

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BOREHOLE 3

Sheet 1 Of 1

Client: BANK OF MONTREAL E.O. No.: 90K26
Project Location: FORMER IMICO PROPERTY-GUELPH
Borehole Location: SEE FIGURE 6
Drilling Contractor: ATCOST Date: APRIL 25/91
Monitoring Well Data – Pipe: 5.1cm PVC
– Screen: 5.1cm PVC #10 SLOT
Other Monitors:

Elevation:
– Datum: GEODETIC
– Ground surface: 315.41
–Measuring Pt.: 316.11 (TOC)

Logged By: E.T. Checked By: D.K.
Drawn By: W.J.G. Scale: 1:40

Depth Scale (ft.)	Depth Scale (m)	Boring Method	Soil Profile: Description	Strat. Plot	Elev. (m) Depth (m)	Sample: Number	Sample: Interval	Sample: Type	Sample: "N" Value	PID: 100	PID: 200	PID: 300	Monitoring Well Details
					315.49								Lockable Protective Casing
0	0.0	Power Auger Hollow Stem	Mixed sands with brick and metal debris–fill.		0.00								CEMENT
2	0.5												BENTONITE SEAL
3	1.0				314.34								
4			Silty sand course, grey till, with cobbles and boulders.		1.07								
5	1.5				313.75								WELLSCREEN
6		Rotary Core NQ	Limestone, very weathered grey, fractured.		1.66	CORE-1		RX					▽ 313.18 ON MAY 2/91
7	2.0				312.97								
8			Zone of more porous and crystalline rock.		2.44								
9	2.5				312.67								SANDPACK
10	3.0				2.74								
11					312.06								
12	3.5		END OF BOREHOLE		3.35								
13	4.0												
14													
15	4.5												
16													
17	5.0												
18	5.5												
19													
20	6.0												

Note: This borehole log was prepared for hydrogeological and/or environmental assessment purpose and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Proctor & Redfern personnel before use by others.

BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW3-II 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 May 1998
GEOLOGIST BJS
ELEVATION 315.3 m ASL GE

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0		**SILT AND FINE SAND** Medium to dark brown silt and fine sand, some gravel, trace glass, moist. -Yellow to light brown powdery substance (likely old brick) from 0.3 to 0.4 m.		1		SS	25		70		Photovac 1.5 ppm
1		-Dark brown silty fine sand, with a trace of gravel and brick, saturated from 0.76 m to 1.25 m.		2		SS	12		60		
		-Becoming an olive brown and yellow (rust) brown fine sandy silt, saturated with no odour from 1.25 to 1.37 m.		3			30/ 0.15m		95		Photovac 0 ppm
1.8		-Becoming light brown to grey silty fine sand and weathered limestone pieces at 1.52 m.									Photovac 0 ppm
2		**LIMESTONE** Grey limestone with occasional shale partings, highly fractured and weathered, vuggy appearance, trace of fossil, some oxidation along fractures.		4		HQ			97	0	
3		-Some crystalline quartz detected in voids.		5		HQ			92	7	W.L. @ 2.94 m BGS on May 4/98.
4											
5				6		HQ			100	24	
6											
6.5		**SHALEY LIMESTONE** Dark grey to black shaley limestone.		7		HQ			84	16	
7.0		**LIMESTONE** Grey limestone with shale partings, vuggy, quartz crystals in voids, highly fractured.									
7											
7.9		Borehole terminated at 7.85 metres in limestone.									

Printed: 8 JUN 98

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Consulting Engineers & Scientists
London

BOREHOLE 4

Sheet 1 Of 1

Client: BANK OF MONTREAL E.O. No.: 90K26
Project Location: FORMER IMICO PROPERTY-GUELPH
Borehole Location: SEE FIGURE 6
Drilling Contractor: ATCOST Date: APRIL 26/91
Monitoring Well Data – Pipe: 5.1cm PVC
– Screen: 5.1cm PVC #10 SLOT
Other Monitors:

Elevation:
– Datum: GEODETIC
– Ground surface: 315.75
–Measuring Pt.: 316.55 (TOC)

Logged By: E.T. Checked By: D.K.
Drawn By: W.J.G. Scale: 1:40

Depth Scale (ft)	Depth Scale (m)	Boring Method	Soil Profile: Description	Soil Profile: Strat. Plot	Elev. (m) Depth (m)	Sample: Number	Sample: Interval	Sample: Type	Sample: 'N' Value	PID: 100 200 300	Monitoring Well Details
					315.75						Lockable Protective Casing
0	0.0	Power Auger Hollow Stem	Silty sand, some clay, blk. staining, minor organics, moist fill containing foundry sands, cinders & slag.		0.00	SS-1		SS	13		CEMENT
1					315.14						BENTONITE SEAL
2	0.5		Silty sand, with cobbles and boulders, moist.		0.61						
3	1.0					SS-2		SS	48		
4											
5	1.5					OW-3		SS			WELLSCREEN
6											
7	2.0				313.46						
8	2.5	Rotary Core NQ	Limestone, weathered, grey, very hard, porous, occasional shale partings, vuggy.		2.29	CORE-1		RX			SANDPACK
9											
10	3.0				312.65						▽ 312.87 ON MAY 2/91
11			END OF BOREHOLE		3.10						
12	3.5										
13	4.0										
14											
15	4.5										
16											
17	5.0										
18	5.5										
19											
20	6.0										

Note: This borehole log was prepared for hydrogeological and/or environmental assessment purpose and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Proctor & Redfern personnel before use by others.

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Consulting Engineers & Scientists
London

BOREHOLE 5

Sheet 1 Of 1

Client: BANK OF MONTREAL E.O. No.: 90K26
Project Location: FORMER IMICO PROPERTY--GUELPH
Borehole Location: SEE FIGURE 6
Drilling Contractor: ATCOST Date: April 26/91
Monitoring Well Data – Pipe: 5.1cm PVC
– Screen: 5.1cm PVC #10 SLOT
Other Monitors:

Elevation:
– Datum: GEODETIC
– Ground surface:
–Measuring Pt.: 315.83

Logged By: E.T. Checked By: D.K.
Drawn By: W.J.G. Scale: 1:40

Depth Scale (ft)	(m)	Boring Method	Soil Profile Description	Strat. Plot	Elev. (m) Depth (m)	Sample Number	Interval	Type	"N" Value	PID 100 200 300	Monitoring Well Details
					319.83						Lockable Protective Casing
0	0.0	Power Auger Hollow Stem	Silty sand topsoil some gravel, oily		0.00	SS-1		SS	7		CEMENT
1			Silty sand, blk. staining foundry sands, slag, moist.		315.09						
2	0.5										BENTONITE SEAL
3	1.0		Sand, med. to course with pebbles, gravel, light brn. to grey, moist.		0.74 314.81	SS-2		SS	46		
4			–Cobbles and boulders below 1.2m.		1.02	SS-3		SS	39		CAVE
5	1.5				314.23	SS-4		SS			
6		Rotary Core HQ	Limestone, weathered, grey, fractured, porous and vuggy.		1.60	CORE-1		RX			BENTONITE SEAL
7	2.0										SANDPACK
8	2.5										
9											WELLSCREEN
10	3.0										▽ 312.56 ON MAY 2/91
11											
12	3.5										
13	4.0										
14					311.49						
15	4.5		END OF BOREHOLE		4.34						
16											
17	5.0										
18	5.5										
19											
20	6.0										

Note: This borehole log was prepared for hydrogeological and/or environmental assessment purpose and does not necessarily contain information suitable for a geotechnical assessment of the subsurface conditions. Borehole data requires interpretation by Proctor & Redfern personnel before use by others.

BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW9-1 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 7 May 1998
GEOLOGIST BJS
ELEVATION 316.1 m ASL

316.1

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SILTY FINE SAND Dark brown silty fine sand to sandy silt, some clumps of silt, some coarse sand and trace gravel fill, moist, no staining or odours.		1		SS	12		40		Photovac 4.2 ppm
1		-Limestone cobbles observed from 0.76m.		2		SS	19		60		Photovac 0 ppm
314.2			314.2	3		SS	43/ 0.15m		75		
2		-Silty sand, gravel and limestone cobbles with some granite cobbles.		4		HQ			87	37	
313.3 2.8		**LIMESTONE** Grey limestone, porous, vuggy. -Iron staining and occasional shale partings, fractured with some sandy silt in fractures.									W.L. @ 2.93 m BGS on May 7/98.
3		-Some crystalline structure and some clayey silt observed in fractures from 3.39 m.		5		HQ			100	50	
4											
311.3 4.8		Borehole terminated at 4.84 metres in limestone bedrock.	311.3								

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BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW9-II 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 7 May 1998
GEOLOGIST BJS
ELEVATION 316.0 m ASL (E

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
316		**SILTY FINE SAND** Dark brown silty fine sand to sandy silt, some clumps of silt, some coarse sand and trace gravel fill, moist, no staining or odours. -Limestone cobbles observed from 0.76m.									Straight augered to bedrock. Soil stratigraphy inferred from BHOW9-1.
1											
2											
313.2 2.8		-Silty sand, gravel and limestone cobbles with some granite cobbles.									
3		**LIMESTONE** Grey limestone, porous, vuggy. -Becoming iron stained with occasional shale partings, fractured from 3.00 m. -Better quality rock, with some crystalline structure with increasing depth.		1		HQ			80	0	
				2		HQ			100	56	
4											W.L. @ 3.84 m BGS on May 7/98.
5		-Becoming highly fractured from 4.82 to 6.29 m.		3		HQ			100	28	
6		Sh. P. to 309.6									
309.6		-Becoming a grey limestone to shaley limestone, occasional shale partings, vuggy, some crystalline structure, better rock quality from 6.29 m.	309.6	4		HQ			100	45	
7											
308.1 7.9		Borehole terminated at 7.85 m in limestone bedrock.	308.1								

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BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW10-I 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 11 May 1998
GEOLOGIST BJS
ELEVATION 315.3 m ASL GE

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
316.3		**SANDY SILT** Dark brown fine sandy silt, trace gravel, trace asphalt, rootlets, wet.		1		SS	5		50		Photovac 0 ppm
		-Becoming moist at 0.76 m. -Cobbles from 0.91 m. -Spoon bouncing on a cobble at 0.95 m.		2		SS	3/ 0.19m		95		Photovac 0 ppm
313.5			313.5	3		SS	14/ 0.15m		80		
313.2		**LIMESTONE** Brownish grey limestone, occasional shale partings, vuggy, porous, fractured, some crystalline structure.		4		HQ			95	23	
		-Becoming grey and highly fractured at 3.45 m.		5		HQ			100	16	W.L. @ 3.08 m BGS on May 11/98.
310.9		Borehole terminated at 4.85 m in limestone bedrock.	310.4								

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BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW11-I 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 5 May 1998
GEOLOGIST BJS
ELEVATION 315.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
315.2		**SANDY SILT TOPSOIL**		1		SS	12		50		Photovac 1.9 ppm
		Dark brown fine sandy silt topsoil, some gravel, brick, grass, moist, no staining or odours.									
314.9 0.8		**SANDY SILT**		2		SS	15		60		Photovac 0 ppm
1		Dark brown fine sandy silt.									
		-Becoming a dark brown silty fine sand, moist at 1.0 m.									
316.6		-Piece of wood fragment found from 1.2 to 1.22 m.									
313.5 1.7		-Becoming a dark brown fine sandy silt, trace gravel, wet at 1.52 m. 313.6		3		SS	33		60		Photovac 0 ppm
		LIMESTONE									W.L. @ 1.71 m BGS on May 5/98.
2		Grey weathered limestone, some coarse sand, wet.		4		HQ			92	26	
		-Becoming vuggy, porous and fractured with occassional shale partings from 2.00 m.									
		-Dark grey shaley limestone or shale seam found from 2.15 to 2.30 m.									
3		-Piece of granite (biotite) found at 3.20 m. (Poor quality rock - breaking up during drilling).		5		HQ			95	0	
				6		HQ			98	37	
4											
310.5 4.7		Borehole terminated at 4.65 m in limestone bedrock.	310.5								

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BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW11-II 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 6 May 1998
GEOLOGIST BJS
ELEVATION 315.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
315.2		**SANDY SILT TOPSOIL**									Straight augered to bedrock. Soil stratigraphy inferred from BHOW11-II.
		Dark brown fine sandy silt topsoil, some gravel, brick, grass, moist, no staining or odours.									
314.4 0.8		**SANDY SILT**									
1		Dark brown fine sandy silt.									
		-Becoming a dark brown silty fine sand, moist at 1.0 m.									
313.5 1.7		-Becoming a dark brown fine sandy silt, trace of gravel, wet at 1.52 m.									
2		**LIMESTONE**									
		Grey weathered limestone, some coarse sand, wet.		1		HQ			87	15	
		-Becoming highly fractured, vuggy, porous with some crystalline deposits from 2.05 m.									W.L. @ 2.51 m BGS on May 6/98.
3		-Occasional shale partings found from 2.91 m.		2		HQ			92	26	
		-Fracturing found both horizontally and vertically from 3.29 m.		3		HQ			100	22	
4											
310.2 5		-Calcite crystals found at 4.79 m.		4		HQ			100	30	
		-Shale content in limestone increasing with depth.									
6											
308.9			308.9	5		HQ			100	56	
7											
7.8		Borehole terminated at 7.80 m in limestone bedrock.	307.4								

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BOREHOLE LOG

PROJECT: 98-224

BOREHOLE: OW12-I 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 6 May 1998
GEOLOGIST BJS
ELEVATION 315.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SILTY FINE SAND Dark brown to black silty fine sand, trace rootlets and grass, moist, no staining or odours.		1		SS	10		60		Photovac 0 ppm
		-Becoming cobbley from 0.61 m, moist with lots of rootlets from 0.76 m .		2		SS	56		10		Photovac 0 ppm
1											
		-Becoming a medium to dark brown cemented silty sand and gravel mixed with pieces of limestone from 1.52.		3		SS	41/ 0.15m		70		Photovac 0 ppm
				4		HQ			100		
2											
2.2		-Grey granite boulder found at 2.10 m.		5		HQ			50	0	W.L. @ 2.21 m BGS on May 6/98.
		LIMESTONE Grey limestone, occasional shale partings, porous, vuggy, fractured with some crystalline structure. -Becoming highly fractured from 2.52 m.		6		HQ			100	0	
3											
				7		HQ			100	0	
4											
4.8		Borehole terminated at 4.81 m in limestone bedrock.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW13-II 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST BIS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SILTY SAND AND GRAVEL									
		Brown silty sand and gravel, cobbles, moist, compact.									
1		-Limestone cobbles found at 0.91 m.		1		SS	19/ 0.15 m		60		Microtip = 0 ppm
				2		SS	30/ 0.10 m		0		
2				3		SS	30/ 0.10 m		60		Microtip = 0 ppm
3.1		**SHALEY LIMESTONE**									
3		Grey shaley limestone, occasional shale partings, highly fractured.		4		HQ			93	35	
		-Becoming brownish grey, porous, vuggy at 3.26 m.		5		HQ			100	49	
4		-Crystalline structure found below 3.43 m.									
		-Rust coloured oxidation observed from 3.60 to 3.73m.									
5		-Turning grey at 4.91 m.		6		HQ			99	54	
6											
				7		HQ			100	66	
7											
8.0											
8		Borehole terminated at 8.0 m in shaley limestone bedrock.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW14-II 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST BJS
ELEVATION 316.2 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
316.2		**FILL**		1		SS	36		50		Microtip = 0 ppm.
		Medium brown silty sand and gravel fill, moist, compact to dense.									
		-Trace of iron slag at 0.76 m.		2		SS	14		25		Microtip = 0 ppm.
1											
				3		SS	20/ 0.15 m		50		Microtip = 0 ppm.
2											
				4		SS					
313.4											
2.8		**SHALEY LIMESTONE**		5		HQ			80	0	
3		Grey shaley limestone, occasional shale partings, highly weathered to about 3.37 m, porous.		6		HQ			60	0	
		-Becoming vuggy with some crystalline structure at 3.37 m.		7		HQ			99	19	
		-Rust colouration from 3.70 to 3.96 m.									
4											
				8		HQ			100	71	
5											
309.9			307.9								
6				9		HQ			100	85	
7											
308.4											
7.8		Borehole terminated at 7.81 m in shaley limestone.	308.4								

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW15-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST BJS
ELEVATION 314.8 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		SILTY SAND AND GRAVEL		1		SS	20/0.15 m				Microtip= 0 ppm.
1		Medium brown silty sand and gravel, moist, compact to dense.		2		SS	29		25		Microtip= 0 ppm.
1.7				3		SS	45/		60	0	Microtip= 0 ppm.
		SHALEY LIMESTONE		4		HQ	0.23 m		100	7	
2		Grey shaley limestone, occasional shale partings, porous, vuggy, fractured. Some crystalline structure below 1.71 m.		5		HQ			100		
3				6		HQ			100	9	
4											
4.8		Borehole terminated at 4.80 m in shaley limestone.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW16-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST BJS
ELEVATION 314.9 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0		**SILTY SAND AND GRAVEL**		1		SS	42		25		Microtip= 0 ppm.
		Medium brown silty sand and gravel, moist.									
		-Black coal like material from 0.40 to 0.61 m.									
1				2		SS	40/ 0.23 m		60		Microtip= 0 ppm.
1.8				3		HQ			92	0	
		SHALEY LIMESTONE		4		HQ			100	0	
2		Grey shalely limestone, occasional shale partings, porous, vuggy, some fossils, fine crystalline structure, highly fractured to 3.30 m.									
3				5		HQ			100	28	
4											
4.9		Borehole terminated at 4.87 m in shaley limestone.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW17-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST BJS
ELEVATION 315.4 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
		FILL		1		SS	42		35		Microtip= 0 ppm.
		Medium brown silty sand and gravel fill, trace coal like material, moist, compact to dense.									
		-Cobbles found below 0.61 m.									
		-Becoming dark brown to black fine sand from 0.76 to 1.0 m.		2		SS	25		75		Microtip= 0 ppm.
1		-Becoming rust coloured from 1.0 to 1.21 m.									
		-Becoming dark brown to black below 1.52 m.		3		SS	13/ 0.15 m		80		Microtip= 0 ppm.
2											
2.6				4		SS	21/ 0.13 m				Microtip= 0 ppm.
		LIMESTONE		5		HQ			100	0	
		Brownish grey limestone, occasional shale partings, porous, vuggy, highly fractured.									
3		-Some crystalline structure at 3.28 m.		6		HQ			100	15	
4											
4.8		Borehole terminated at 4.84 m in limestone bedrock.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW18-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 3 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**									
		FILL Medium to dark brown fine sandy silt fill mixed with iron slag, trace coarse sand, compact to dense, moist.									
1		-Limestone pieces at 1.06 m.									
2											
3.0		**LIMESTONE**									
3		Grey limestone cobble layer from 3.0 to 3.21 m.		1		HQ					
		-Becoming a brown grey limestone with occasional shale partings, porous, vuggy, highly fractured, fine crystalline structure at 3.21 m. Rust colouring to 3.42 m.		2		HQ			100		
4											
4.9		Borehole terminated at 4.86 m in limestone bedrock.									

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BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW18-II 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 3 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		CONCRETE		1		SS	11		70		Microtip = 0 ppm.
		FILL Medium to dark brown fine sandy silt fill mixed with iron slag, trace coarse sand, compact to dense, moist.									
1		-Limestone pieces at 1.06 m.		2		SS	50/0.15 m		50		Microtip = 0 ppm.
				3		SS	50/0.15 m		50		
2				4		SS	30/0.15 m		0		
3		Grey limestone cobble layer from 3.0 to 3.21 m.		6		HQ	20/0.05 m		100	67	
3.2		LIMESTONE Brown grey limestone with occasional shale partings, porous, vuggy, highly fractured to about 4.8 m, fine crystalline structure from 3.21 m. Rust colouring to 3.42 m.		5		SS			94	6	
				7		HQ					
4											
5				8		HQ			100	66	
6											
				9		HQ			100	57	
7											
7.8		Borehole terminated at 7.84 m in limestone.									

Printed: 6 OCT 98

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW19-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 3 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**		1		SS	18		60		Microtip = 0 ppm.
		FILL Medium brown, rust brown, black fine sandy silt fill mixed with iron slag and coal like material, moist, compact.		2		SS	14		75		Microtip = 0 ppm.
1											
1.8				3		SS	18		75		Microtip = 0 ppm.
2		**SANDY SILT** Medium to dark red brown fine sandy silt with some cobbles, moist, compact to dense. -Limestone pieces at 2.29 m.		4		SS	67/ 0.23 m		70		
2.8		**LIMESTONE** Brown grey limestone with occasional shale partings, porous, vuggy, fractured, fine crystalline structure. -Becoming fossiliferous at 3.3 m.		5		HQ			98	36	
3				6		HQ			100	7	
4											
4.8		Borehole terminated at 4.82 m in limestone.									

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW20-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 September 1998
GEOLOGIST BJS
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**		1		SS	19/0.125 m		25		Microtip= 0 ppm.
		FILL Medium brown silty sand and gravel fill, moist, brick layer from 0.27 to 0.76 m. -Concrete and brick wall from 0.76 to 1.52 m.		2		SS			0		
1											
1.8				3		SS			0		
2		**SILTY SAND AND GRAVEL** Medium to dark brown silty sand and gravel.									Auger sample taken at about 1.8 m.
2.7				4		SS			0		
		LIMESTONE Grey limestone with occasional shale partings, vuggy, porous, some crystalline structure, highly fractured, some rust oxidation along fractures.		5		HQ			94	0	
3				6		HQ			100	9	
4											
5				7		HQ			100	14	
5.6		Borehole terminated at 5.58 m in limestone bedrock.									

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW21-I 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 4 September 1998
GEOLOGIST BJS
ELEVATION 315.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE**									
		FILL Red brown silt and sand fill, iron slag, cobbles, moist, compact.		1		SS	28/0.15 m		90		Microtip = 0 ppm.
1		-Becoming a black silt with some sand, cobbles, wet, odour at 1.22 m.		2		SS	18/0.20 m		0		
		-Auger sample taken from 1.68 to 1.98 m. Greyish black silt and sand, gravel, cobbles, heavy fuel odour, wet.		3		AS					Microtip = 572 ppm.
2.2		**LIMESTONE** Grey limestone, occasional shale partings, vuggy, porous, fine crystalline, highly fractured.		4		HQ			88	11	
3				5		HQ			100	14	
4											
5.1				6		HQ			100	43	
5		Borehole terminated at 5.07 m in limestone.									

Printed: 21 OCT 98

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW22S 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 12 July 1999
GEOLOGIST JSK
ELEVATION 315.0 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
1		**FILL** Light brown gravel and sand fill. -Light grey fill, moist, hydrocarbon odour.									
1.7		**LIMESTONE** Light grey crystalline limestone, weathered, fractured with black staining, vuggy, calcite crystals in vugs, crumbly zones, occasional shale partings, strong hydrocarbon odour, irridescent sheen on core.		1		RC			90	4	
2											
3											
4											
4.3		Borehole terminated at 4.27 m in limestone.									

Printed: 13 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW22D 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 12 July 1999
GEOLOGIST JSK
ELEVATION 315.0 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0		**FILL** Light brown mixed gravel, sand, silt fill. -Becoming grey, moist, strong hydrocarbon odour (fuel oil/diesel type odour) from auger cuttings at 0.31 m.									
1		-Becoming a grey sandy gravel (limestone/dolostone) fill, compact to dense, moist, trace hydrocarbon odour at 1.22 m.		1		SS			100		
1.7		-Becoming saturated at 1.52 m.		2		SS			100	19	
2		**LIMESTONE** Light grey limestone, crystalline, fractured, some fractures with calcite crystals, appears massive, numerous 1-5 mm vugs, medium hard, porous. Fracture with black staining at 1.78 m, 1.82 m, 1.85 m, 1.96 m, 2.08 m, 2.16 m, 2.34 m. Fracture with black staining and hydrocarbon odour (fuel oil/diesel type odour) at 2.62 m, 2.79 m, 2.84 m and 3.66 m to 4.11 m.		3		SS			100	10	
3											
4				4		SS			100	28	
5											
5.3		**SHALEY LIMESTONE** Light grey to dark grey shaley limestone, appears less fractured than above limestone, no hydrocarbon odour, limestone zones porous, vuggy, crystalline, some black staining on fractures.									
6		-Weathered shale parting at 5.84 m. -Becoming medium hard at 5.95 m. -Weathered shale parting at 6.53 m. -Weathered shale parting at 6.68 m.		5		SS			78	58	
7		-Becoming vuggy at 6.86 m to 6.91 m.									
		-Weathered shale parting at 7.29 m. -Weathered shale parting at 7.44 m.									
7.9		-Trace hydrocarbon odour from fracture at 7.72 m. Borehole terminated at 7.87 m in shaley limestone.									

Printed: 26 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW23S 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 13 July 1999
GEOLOGIST JSK
ELEVATION 316.3 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE SLAB** Concrete floor slab									
		FILL Light brown, gravelly fine to coarse sand, silty fill, like Granular "A", hydrocarbon odour to 0.76 m. -Becoming moist and very dense at 0.76 m. -Hydrocarbon odour at 1.22 m.		1		SS			33		
1				2		SS			50		
2											
2.5		-Crushed limestone pieces (weathered) with sand and gravel from 2.29 m to 2.52 m.		3		SS			100		
		LIMESTONE Buff brown weathered crystalline limestone, crumbly.									
3		-Becoming brown-grey, fractured with black staining, low quality, porous, vuggy, trace hydrocarbon odour.		4		RC			52	0	
		-Becoming light grey, poor quality, medium hard at 3.63 m. Fuel oil/diesel type odour.		5		RC			100	24	
4											
5											
5.5		Borehole terminated at 5.54 m in limestone.									

Printed: 13 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW23D 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 13 July 1999
GEOLOGIST JSK
ELEVATION ~~8.0~~ 316.32 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.2		**CONCRETE** Concrete floor slab									
		FILL Light brown gravelly fine to coarse sand, some silt fill, moist, like Granular "A", hydrocarbon odour.									
1											
1.9											
2		**LIMESTONE** Light grey crystalline limestone, massive, porous, vuggy, medium hard, vertical and horizontal fractures with black staining, some light brown staining, strong fuel oil type odour.									
3				1		RC			100	0	
		-Becoming fossiliferous, weathered, occasional shale partings, strong diesel/fuel oil type odour, some sulphur odour at 3.35 m. Light brown fluid on core with diesel/fuel oil type odour, sulphurous from 3.38 m to 3.40 m.		2		RC			100	0	
4											
		-Vugs containing calcite crystals, black and light brown staining on porous zone, trace hydrocarbon odour at 4.72 m.		3		RC			56	0	
5											
				4		RC			100	54	
6											
6.5		**SHALEY LIMESTONE**									
7.0		Light to medium grey shaley limestone, hard, massively layered, no odour, occasional crystalline lined vugs.									
		Borehole terminated at 7.95 m in shaley limestone.									

Printed: 13 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW24S 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 14 July 1999
GEOLOGIST JSK
ELEVATION 316.3 m ASL

316.3

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.1		**CONCRETE** Concrete floor slab									
1		**SANDY SILT** Light brown gravelly sandy silt, dense, trace hydrocarbon odour.									
2											
		313.7									
3											
313 3.3		**LIMESTONE** Buff brown to grey brown limestone, crystalline with fossilferous zones throughout, vuggy, some vugs containing white crystals, occasional shale partings. -Rust coloured staining on fractures from 3.61 m to 3.91 m.		1		RC			93	23	
4											
5											
5.5		Borehole terminated at 5.54 m in limestone.									

Printed: 13 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW24D 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 14 July 1999
GEOLOGIST JSK
ELEVATION 316.3 m ASL

316.3

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.1		**CONCRETE** Concrete floor slab.									
		SAND Light brown gravelly fine to coarse sand, some silt, moist, trace hydrocarbon odour.									
1											
		-Becoming a gravelly sandy silt below 1.52 m.									
2											
2.9											
3		**LIMESTONE** Light brown to light grey limestone, vuggy, porous, crystalline with fossils noted, slight odour of hydrocarbon (fuel oil type odour) in top 8 cm of rock.		1		RC			45	0	
		-Occasional shale partings and vugs lined with clear/white crystals at 3.56 m.		2		RC			88	13	
4		-Fracture with orange-brown staining at 3.68 m, 3.78 m, 3.89 m, 3.91 m, 3.96 m, 4.01 m, 4.09 m, 4.14 m, 4.19 m, 4.26 m.		3		RC			100	25	
		-Becoming light brown, massive to massively layered, good quality, breaks only subhorizontally along shale partings at 4.83 m.		4		RC			100	63	
5											
6											
7											
		-Becoming buff brown, less porous/vuggy, occasional fossilferrous zones at 7.37 m.		5		RC			75	0	
7.9		Borehole terminated at 7.90 m in limestone.									

Printed: 26 AUG 99

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 98-393

BOREHOLE: OW25 1 of 1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 15 July 1999
GEOLOGIST JSK 315-13
ELEVATION ~~316.1~~ m ASL 46

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
0.1		**CONCRETE** Concrete floor slab									
		SANDY SILT Mottled light brown to dark brown sandy silt, moist, trace hydrocarbon odour. -Becoming a gravelly sandy silt, compact to dense at 0.91 m.		1		SS			33		
2.0		-Becoming very dense with a faint hydrocarbon odour at 1.52 m.		2		SS			0		
		LIMESTONE Light brown limestone, crystalline, some fossils, vuggy with calcite crystals, porous, massively layered, occasional shale partings, no odour, rust coloured staining to 2.29 m.		3		RC			100	19	
4.9		Borehole terminated at 4.88 m in limestone.		4		RC			100	100	

Printed: 13 AUG 99

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 22-393	BOREHOLE: OW26S 1 of 1
FORMER IMICO SITE GUELPH, ONTARIO FOR: CITY OF GUELPH		DATE: 13 August 2002 GEOLOGIST PJAM/DJG ELEVATION 315.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
315.5		**SANDY SILT (FILL)** Dark brown sandy silt fill, trace gravel, trace asphalt, occasional rootlet, dry, loose.		1		CS			17		**PID READINGS**
1											
1.2		**SANDY SILT (NATIVE)** Orange brown silt with fine and coarse sand, some medium subangular gravel, occasional cobble, moist, loose to compact, layer of orangey brown silty clay to clayey silt, approximately 0.05 m thick, APL to WTPL, firm to stiff. -Becoming greyish brown silt with fine and medium sand, occasional rounded gravel, moist, loose to compact below 1.4 m depth.		2		CS			75		-0 ppm at 1.2 m depth -84 ppm at 1.4 m depth -22.1 ppm at 1.5 m depth
2				3		CS			100		-0 ppm at 2.0 m depth
2.4		**LIMESTONE** Light brown to greyish brown limestone, vuggey, occasional shale parting, aphanitic to fine crystalline, massively bedded, very broken, fractures weathered with calcite crystals on fracture faces, medium hard.		4		HQ			10	0	-Oil in pores of rock core.
312.1											
3				5		HQ			100	0	
4											
4.6		-Becoming light grey with slight increase in shale content below 4.5 m depth. Borehole terminated at 4.6 m depth in limestone.									
310.7											

Printed: 9 Dec 02

Gartner Lee Limited

BOREHOLE LOG

PROJECT: 22-393

BOREHOLE: OW26D 1 of 1

FORMER IMICO SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 14 August 2002
GEOLOGIST PJAM/DJG
ELEVATION 315.5 m ASL

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	COMMENTS
315.5											
314.3 1.2		**SANDY SILT (FILL)** Dark brown sandy silt fill, trace gravel, trace asphalt, occasional rootlet, dry, loose.		1		CS			17		**PID READINGS**
		SANDY SILT (NATIVE) Orange brown silt with fine and coarse sand, some medium subangular gravel, occasional cobble, moist, loose to compact.		2		CS			75		-0 ppm at 1.2 m depth -84 ppm at 1.4 m depth -22.1 ppm at 1.5 m depth
				3		CS			100		
312.9 2.6		-Layer of orangey brown silty clay to clayey silt, approximately 0.05 m thick, API. to WTPL, firm to stiff at 1.4 m depth. -Becoming greyish brown silt with fine and medium sand, occasional rounded gravel, moist, loose to compact below 1.4 m depth.		4		PQ			100	0	-Oil in pores of rock core.
		LIMESTONE Light brown to greyish brown limestone, vuggey, aphanitic to fine crystalline, heavily bedded, very broken, occasional fossil, occasional shale parting, fractures weathered with calcite crystals on fracture faces, medium hard. -Fracture infilled with fine to medium sand at 3.1 m depth. -Becoming light grey, higher shale content below 4.5 m depth.		5		PQ			100	9	
				6		HQ			100	0	
				7		HQ			100	21	
		-Becoming thinly bedded below 6.3 m depth.		8		HQ			100	71	
		-Open fractures with rust coloured staining on fracture faces, occasional fossiliferous zones below 7.9 m depth.		9		HQ			93	23	
				10		HQ			100	77	-Contact between "Guelph" and "Eramosa" formations appears gradational.
305.1											
304.9		-Becoming grey shaley limestone, thinly laminated to thinly bedded, occasional shale parting, occasional vug with calcite deposit on fracture face, some fossil deposits, open fractures with rust colored staining in fracture faces, occasional fossiliferous zones below 10.9 m depth.		11		HQ			100	85	
303.7 11.8		Borehole terminated at 11.8 m depth in shaley limestone.									

Printed: 8 Dec 02

Gartner Lee Limited

Project: CITY of GUELPH Contract No: 49520-1 Borehole: OW07-31

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald Monitoring Well: Installed

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling **Sheet 1 of 1**

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ◑ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.93m											
1		**SAND and COAL (FILL/REWORKED NATIVE)** - black, damp, medium, trace gravel				SS-1			63		N		Inorganics, Metals, VOC's, BTEX/F1 and F2-F4 Analyses DUP 48 VOC's, BTEX/F1 and F2 to F4 Analyses
	314.71 1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, trace to some silt				SS-2			86		N		
2	314.28 1.65	**LIMESTONE (BEDROCK)**-grey/brown, fine grain crystalline vesicular, some organic mud/ shaley laminations, calcite mineralization as amygdular nodules, pitting, banding, highly fractured.				Run1			62	0			
3						Run2			100	0			
4		Heavily fractured 4.27-4.6m, weathered, residual carbonate rich sands, shaley partings											
5						Run3			100	30			
6	309.71 6.22	**MARLED LIMESTONE high mud content** -dark grey/brown, fine grain, increased mud and organic content, shale laminations 1-3mm, amygdular calcite nodules. **END OF BORE HOLE @ 6.22m**											

Note: original sampling found infered bedrock (refusal) @ 1.58m

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: OW07-32

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald Monitoring Well: Installed

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling Sheet 1 of 1

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: 315.56m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black, damp, medium, some coal				SS-1			63		N	⊕	Inorganics, Metals, PAH, BTEX/F1, F2-F4, VOC's and PCB's Analyses
1	314.49												
	1.07	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, medium, some silt				SS-2			100		N	⊕	VOC's, BTEX/F1, F2-F4 and PCB's Analyses
	313.91												
	1.65	**LIMESTONE (BEDROCK)**Grey, fine grain vesicular, some calcite banding, heavily fractured, shaley partings				Run1			100	9			
2													
		Highly Fractured 2.74m-3.0m, shaley partings, crystaline calcite mineralization											
3						Run2			100	26			
		Highly Fractured 3.48m-4.6m, shaley partings, white crystalline calcite fill											
4													
						Run3			100	40			
5													
		Highly Fractured 3.48m-4.6m, shaley partings, some calcite remineralization											
6													
	309.34												
	6.22	**END of BOREHOLE** @6.22m											
		Note: original sampling found infered bedrock (refusal) @ 2.5m											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **CITY of GUELPH** Contract No: **49520-1**

Borehole: **OW07-33**

Boring date: **22/02/2007** Supervised by: **G.C.Yule, C. Archibald**

Monitoring Well: **Installed**

Borehole Location: **200 Beverley Street, Guelph**

Driller: **Profile Drilling Ltd. + Lantech Drilling**

Drilling Method: **Power Probe 9700 w/ Double Tube + CME 75 Power Auger**

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: 315.36m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND and LIMESTONE GRAVEL (FILL)** - brown, damp, medium to coarse				SS-1			64		N		Inorganics, Metals, VOC's, BTEX/F1, F2-F4 and PCB's Analyses
2	313.73 1.63	**LIMESTONE (BEDROCK)**- Light grey/brown, fine grain crystalline, vesicular 0.5-5mm, mud/ silt/ organicmaterial at fractures				Run1			100	44			
	312.92 2.44	Highly fractured 2.4-2.6m, silt and organic rich											
3		**MARLED LIMESTONE high mud content** -dark grey/brown, fine grain crystalline, increased mud, content, shaley partings and trace residual sand at fractures, Pitted with large crystalline calcite lined vesicles 2-30mm Fractured from 3.1-3.3m, vertical to sub-vertical				Run2			100	46			
4		Intermittent shaley partings 1-3mm and increased calcite lined vesicles 3.76m-4.22m											
5						Run3			100	64			
6		Shaley partings 1-3mm, crystalline calcite lined vesicles 1-5cm, 5.18-6.15m.											
	309.21 6.15	**END OF BOREHOLE@6.15m** Note: original sampling found infered bedrock (refusal) @ 1.19m											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: **G.C.Yule, C. Archibald**

Checked by: **S.Prior**

Date: **06/03/07**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 12/03/2007 Supervised by: C.W.Archibald

Borehole Location: 200 Beverley Street, Guelph

Driller: Lantech Drilling

Drilling Method: CME 75 Power Auger

Borehole: OWO7-34S

Monitoring Well: Installed

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.50m											
1		**SAND and LIMESTONE GRAVEL (FILL/ REWORKED NATIVE)** - brown, damp, fine to medium											
	313.93 1.57	**LIMESTONE (BEDROCK)** -Lt. Grey-Brn , fine grain crystalline vesicular 1-5mm, some calcite nodules 1mm-10cm, residual carbonate sands, shaley partings, black organic shale at fractures, highly fractured 1.68-4.0m				Run1			100	0			
2													
3						Run2			100	18			
4		Minor red-Brn Iron staining											
	310.90 4.60	**END OF BOREHOLE@ 4.6m**											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: C.W.Archibald

Checked by: _____

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: OW07-34D

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald Monitoring Well: Installed

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Sheet 1 of 2

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: 315.62m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV ☐ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SILTY SAND (FILL/REWORKED NATIVE)** - black, damp to moist, fine to medium, some gravel and coal				SS-1			50		N		Inorganics, Metals, PAH, VOC's, BTEX/F1, F2-F4, TOC and PCB's Analyses DUP #1 PCB's Analyses
	314.40 1.22	**SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium				SS-2			100		N		PCB's Analyses
	314.05 1.57	**LIMESTONE (BEDROCK)**Lt. Grey-Brn., fine grain crystalline, some calcite banding, heavily fractured, shaley partings				Run1			100	0			
2		Highly fractured, weathered, residual carbonate sands, crystalline calcite 1.57-3.05m											
3		Fractured, weathered, residual carbonate sands, 3.15-3.25m				Run2			100	25			
		Fractured, increased mud/organic content, shaley partings, crystalline calcite 3.35-3.66m											
4		Weathered residual carbonate sand 4.0-4.09m											
	311.05 4.57	**MARLED LIMESTONE high mud content** -dark grey/brown, fine grain crystalline, increased mud, content, shaley partings and trace residual sand at fractures, Pitted with large crystalline calcite lined vesicles 0.5-20mm				Run3			100	48			
5		Carbonate sand bed, 10cm thickness, black shale deposit at contacts											
6						Run4			100	73			

Continued

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Borehole: OW07-34D

Monitoring Well: Installed

Scale (m)	Stratigraphy: Elev. (m) / Depth (m)	Description	Symbol	Samples: Well Details	Water Level	Sample Type and Number	Condition Blows/150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
8		Highly weathered, Red-Brn. Iron staining, crystalline calcite to 3mm, residual carbonate sands 6.9-7.47m				Run5		98	44			
9	306.45 9.17	**END of BOREHOLE @ 9.17m** Note: original sampling found inferred bedrock (refusal) @ 8.27m										

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1 Borehole: OW07-37

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald Monitoring Well: Installed

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description (Ground Surface Elevation: 316.52m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		SAND and GRAVEL (FILL/REWORKED NATIVE) - black, damp, medium to coarse, some coal				SS-1			75		N	⊕	Metals, PAH, VOC's and F2-F4 Analyses
	315.91 / 0.61	**SAND (FILL/REWORKED NATIVE)** - brown, damp, medium, some gravel				SS-1A					N	⊕	Metals, PAH, VOC's and F2-F4 Analyses
1	315.30 / 1.22	**SILTY SAND and LIMESTONE GRAVEL (NATIVE)** - brown, damp, fine to medium				SS-2			100		N	⊕	
	314.95 / 1.57	**LIMESTONE (BEDROCK)**- Light grey/brown, fine grain crystalline, vesicular, calcite nodules 0.25- 2cm, highly fractured, mud/ silt/ organic material at fractures				Run1			77	0			
2		Heavily Fractured, 2.44m-2.74m											
3		Heavily Fractured, 3.15m-3.60m				Run2			100	23			
	312.92 / 3.60												
	312.86 / 3.66	**MARLED LIMESTONE high mud content** -dark grey/brown, fine grain crystalline, increased mud, content, calsite mineralization,some shalcy partings, trace residual sand at fractures, minor iron staining											
4													
						Run3			100	48			
5		Iron staining in vertical fracture											
6	310.37 / 6.15	Iron staining in vertical fracture **END of BOREHOLE @ 6.15m**											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: CITY of GUELPH Contract No: 49520-1

Borehole: OW07-38

Boring date: 22/02/2007 Supervised by: G.C.Yule, C. Archibald

Monitoring Well: Installed

Borehole Location: 200 Beverley Street, Guelph

Driller: Profile Drilling Ltd. + Lantech Drilling

Drilling Method: Power Probe 9700 w/ Double Tube + CME 75 Power Auger

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description (Ground Surface Elevation: 316.60m)	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 150mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
1		**SAND and COAL (FILL/REWORKED NATIVE)** - black, damp, medium, trace gravel				SS-1			69		N	⊕	Metals, VOC's and F2-F4 Analyses
	315.38 1.22	**SILTY SAND (NATIVE)** - brown, damp, some limestone gravel				SS-2			100		N	⊕	VOC's Analyses
2	314.80 1.80	**LIMESTONE (BEDROCK)** Grey, fine grain vesicular, some calcite nodules/banding, heavily fractured, shaley partings and residual carbonate sands				Run1			90	24			
3						Run2			100	32			
4	311.76 4.84	Weathered sandstone band **END of BOREHOLE @ 4.84m**											

Note: original sampling found infered bedrock (refusal) @ 1.68m

ODOUR.
N - None
T - Trace
M - Moderate
S - Strong
VS - Very Strong

Prepared by: G.C.Yule, C. Archibald

Checked by: S.Prior

Date: 06/03/07

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Boring date: **12/12/2013** Supervised by: **M. McCormick**

Borehole Location: **200 Beverly Street, Guelph, Ontario**

Driller: **Aardvark Drilling**

Drilling Method: **CME 55T w/ HSA**

Borehole: **OW13-39(S)**

Monitoring Well: **Installed**

Sheet 1 of 1

Ground Surface Elevation:316.50m

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
	316.40	**TOPSOIL (FILL)** , black, damp, some medium sand, trace roots				SS-1		10 12 17	60		N		
	0.10	**SAND and GRAVEL (NATIVE)** , brown, medium to coarse, some cobbles, trace silt											
1						SS-2		41 19 22	75		N		
						SS-3		29 33/150	75		N		
2													
						SS-4		42 50/75	50		N		VOCs, Metals and Inorganics Analyses
3	313.35												
	3.15	**LIMESTONE BEDROCK** , light brown, vuggy with some calcite crystals			▽	RC-1			100	62			
4													
						RC-2			93	75			
5													
6	310.41												
	6.09	**END of BOREHOLE @ 6.09m**											Groundwater analyzed for VOCs.
		Water level at 3.53mbgs (el 312.97) on 6 January 2014.											

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S.Prior**

Date: **11/02/14**

DCS
DECOMMISSIONING CONSULTING SERVICES

Project: **IMICO - Guelph** Contract No: **701996**

Boring date: **11/12/2013** Supervised by: **M. McCormick**

Borehole Location: **200 Beverly Street, Guelph, Ontario**

Driller: **Aardvark Drilling**

Drilling Method: **CME 55T w/ HSA**

Borehole: **OW13-39(D)**

Monitoring Well: **Installed**

Sheet 1 of 2

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation:316.50m											
	316.40 0.10	**TOPSOIL (FILL)** , black, damp, some medium sand, trace roots				SS-1		3 3 36			N		
		SAND and GRAVEL (NATIVE) , brown, medium to coarse, some cobbles, trace silt											
1						SS-2		35 35 8	0		N		
						SS-3		35 35/75	0		N		
2						SS-4		35/75	0		N		
		- becomes wet @ 2.74m			▽								
3	313.35 3.15	**LIMESTONE BEDROCK** , light brown, vuggy with some calcite crystals				RC-1			100	62			
4													
5						RC-2			98	64			
6													
						RC-3			97	70			

Continued

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S.Prior**

Date: **11/02/14**

DCS
DECOMMISSIONING CONSULTING SERVICES

Project: **IMICO - Guelph** Contract No: **701996**

Boring date: **11/12/2013** Supervised by: **M. McCormick**

Borehole Location: **200 Beverly Street, Guelph, Ontario**

Driller: **Aardvark Drilling**

Drilling Method: **CME 55T w/ HSA**

Borehole: **OW13-39(D)**

Monitoring Well: **Installed**

Sheet 2 of 2

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/ 300mm	% Recovery	RQD	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
8						RC-4			93	80			
9													
10						RC-5			96	83			
11													
12						RC-6			100	96			
	304.30 12.20	**END of BOREHOLE @ 12.20m** Water level at 3.03mbgs (el 313.47) on 6 January 2014.											Groundwater analyzed for VOCs.
13													

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S.Prior**

Date: **11/02/14**

DCS
DECOMMISSIONING CONSULTING SERVICES

BOREHOLE NO. OW31

PROJECT NAME: IMICO TCE VERTICAL DELINEATION STUDY
PROJECT NO.: 161-09287-00 / 3316442

CLIENT: CITY OF GUELPH
DATE COMPLETED: Sep 13, 2016

BOREHOLE TYPE: CONTINUOUS CORE
SUPERVISOR: SH/BH

GROUND ELEVATION: 316.46 mASL
REVIEWER: PH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (Telescoped Borehole)	SAMPLE TYPE	SAMPLE TCE	SAMPLE cis-1,2 DCE	SAMPLE trans-1,2 DCE	SAMPLE VC	CORE PHOTOGRAPH
0.0									
0.2	**CONCRETE**								
	FILL - Brown - Medium/coarse grained sand - Some gravel; stones - No staining, no odours - Damp			GS1	0.0				No core recovered (0 to 4 m)
1.0									
				GS2	0.0				
2.0									
				GS3	0.0				
3.0									
3.1	**SAND AND GRAVEL (SW)** - Grey / brown - Coarse sand and gravel - Some silt - Strong hydrocarbon odours, no visible staining - Wet			GS4	29.9				
3.4									
4.0									
	DOLOSTONE (Guelph Formation) - Brown to tan colour - Fossiliferous - Magnesium/iron staining along fractures - No odours			GS5	45.7	39.8			
	- Very vuggy; highly porous - Calcification at 5.9 mbgs - Minor hydrocarbon staining								Core Box 1 of 11 (4 to 6.7 m)
5.0									
	- Large vugs at 5.3, 5.4, 5.7, 6.6, 7.5, 8.4, 8.9 mbgs			GS6	79.0	34.9			
6.0									
				GS7	114.0	57.5	2.3	22.7	
7.0									
									Core Box 2 of 11 (6.7 to 9.8 m)
8.0									
	- Heavy staining at 8.1 mbgs - Abundant horizontal fractures			GS8	369.2	168.3	13.0	28.7	
9.0									
9.2	**DOLOMUDSTONE (Eramosa Formation)** - Grey - light grey - Some fossil debris - Large vugs (less common) - Thickly bedded - Fractues common at mud streaks			GS9	324.7	89.7	17.8	21.4	
10.0									

TCE (ug/L): 150 300 450

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 562387
Northing: 4822400

REMARKS

Drilling and Casing Details
-Hollow stem auger from surface to 4.0 m.
-8 5/8" casing installed and sealed with concrete from surface to 4 mbgs (over-drilled into bedrock from 3.3 to 4.0 m)
-HQ coring using air rotary from 4.0 to 12.20 m
-6 5/8" casing installed and sealed from surface to12.20 m
-HQ coring using air rotary from 12.20 to 28.9 m
-4" casing installed and sealed from surface to 28.9
-HQ coring using air rotary from 28.9 to 33.3 m
-Open hole from 28.9 to 33.3 m

Sample Notes
-All units are in ug/L
cis-1,2-DCE = cis-1,2-Dichloroethylene
trans-1,2-DCE = trans-1,2-Dichloroethylene
TCE = Trichloroethylene
VC = Vinyl Chloride

Groundwater sample collected at 4.6 mbgs for comprehensive analysis of Metals & Inorganics, PAHs, PHCs, VOCs

BOREHOLE NO. OW31

PROJECT NAME: IMICO TCE VERTICAL DELINEATION STUDY
PROJECT NO.: 161-09287-00 / 3316442

CLIENT: CITY OF GUELPH
DATE COMPLETED: Sep 13, 2016

BOREHOLE TYPE: CONTINUOUS CORE
SUPERVISOR: SH/BH

GROUND ELEVATION: 316.46 mASL
REVIEWER: PH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (Telescoped Borehole)	SAMPLE TYPE	TCE	cis-1,2 DCE	trans-1,2 DCE	VC	CORE PHOTOGRAPH	TCE (ug/L) 150 300 450	REMARKS
10.0	- Iron/Manganese staining in fractures - Yellow-orange (sphalerite) and dolomite lined vugs										
	- Occasional carbonate mud clasts; few laminaions (~mm scale) appear banded										No water between 10.6 - 11.5 mbgs
11.0				GS10					Core Box 3 of 11 (9.8 to 12.5 m)		
	- Light/dark grey - Rare vugs - Muddy / fossil rich clasts at 11.7 mbgs - Slight petroleum hydrocarbon odour (natural) upon break			GS11	446.5	153.6	18.6	37.0			
12.0											No water between 12.2 - 12.9 mbgs
	- Occasional fossils - Dark banding (grey-black) - Stylolitic seams - Small (<1cm) rare vugs			GS12							
13.0				GS13	57.7	46.3		30.2	Core Box 4 of 11 (12.5 to 15.4 m)		
	- Rare fossiliferous content; some ostracod rich beds - Rare stylolitic seams - Hydrocarbon odour from fractures - Natural breaks / partings at muddy seams										
14.0				GS14	134.0	127.1		17.8			
15.0											
	- Light/dark grey - Rare fossil content - Hydrocarbon odour upon break										
16.0				GS15	130.0	146.5	28.6	16.4	Core Box 5 of 11 (15.4 to 18.3 m)		
17.0											
				GS16	96.8	103.6	15.4	39.7			
18.0	18.0 - Vinemount member of the Eramosa Formation										No water between 18.3 - 19.6 mbgs
	- Dark grey - black - Massive in appearance; thickly bedded - Compentent - Occassional fossil debris - Strong hydrocarbonn odour			GS17					Core Box 6 of 11 (18.3 to 21.1 m)		
19.0											
	- Very competent - Low permeability			GS18	26.4	34.3		67.4			
20.0											

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 562387
Northing: 4822400

WSP GEOLOGIC (METRIC) WITH UTM WSP_ENV_V1.GPJ WSP_ENV_V1.GDT 10/4/16

BOREHOLE NO. OW31

PROJECT NAME: IMICO TCE VERTICAL DELINEATION STUDY
PROJECT NO.: 161-09287-00 / 3316442

CLIENT: CITY OF GUELPH
DATE COMPLETED: Sep 13, 2016

BOREHOLE TYPE: CONTINUOUS CORE
SUPERVISOR: SH/BH

GROUND ELEVATION: 316.46 mASL
REVIEWER: PH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (Telescoped Borehole)	SAMPLE TYPE	SAMPLE TCE	SAMPLE cis-1,2 DCE	SAMPLE trans-1,2 DCE	SAMPLE VC	CORE PHOTOGRAPH	TCE (ug/L) 150 300 450	UTM CO-ORDINATES / REMARKS
20.0											UTM Zone: 17 NAD: 83 Easting: 562387 Northing: 4822400
	- Thin to thickly bedded - No fossil content - Strong hydrocarbon odour - Large vug (~3cm) at 20 mbgs - Infilled with pyrite and dolostone - Thin to thickly bedded - Minor fossil debris - Verticle fracture from 21.0 to 21.6 mbgs - Strong hydrocarbon odours										
21.0											
				GS19	36.8	45.6		17.0			
22.0											
	- Reduced hydrocarbon odours - Large verticle fractures from 23.4 to 23.6 mbgs - Calcite and pyrite nodules (<0.5 to 1.5 cm)								Core Box 7 of 11 (21.1 to 24.2 m)		
23.0				GS20	25.1	16.1		49.8			
24.0											
	- Large vug at 25.47 mbgs, no pyrite - Stylolitic seams with fossil debris - Low hydrocarbon odours										
24.8	**DOLOMUDSTONE (Goat Island Formation - Ancaster Member)** - Large fracture at 24.8 mbgs - Heavily bioturbated - Low hydrocarbon odour - Cherty dolomudstone from 28.9 - 30.4 mbgs			GS21	17.1	39.8		49.9	Core Box 8 of 11 (24.2 to 26.7 m)		
25.0											
26.0				GS23	11.6	36.4					
				GS22	21.0	68.6		20.4			
27.0											
28.0				GS24	68.0	111.7		33.7	Core Box 9 of 11 (26.7 to 29.7 m)		
29.0											No water between 29 - 30.5 mbgs
				GS25							
30.0											

BOREHOLE NO. OW31

PROJECT NAME: IMICO TCE VERTICAL DELINEATION STUDY
PROJECT NO.: 161-09287-00 / 3316442

CLIENT: CITY OF GUELPH
DATE COMPLETED: Sep 13, 2016

BOREHOLE TYPE: CONTINUOUS CORE
SUPERVISOR: SH/BH

GROUND ELEVATION: 316.46 mASL
REVIEWER: PH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (Telescoped Borehole)	SAMPLE TYPE	SAMPLE TCE	SAMPLE cis-1,2 DCE	SAMPLE trans-1,2 DCE	SAMPLE VC	CORE PHOTOGRAPH	TCE (ug/L) 150 300 450	REMARKS
30.0											**UTM CO-ORDINATES** UTM Zone: 17 NAD: 83 Easting: 562387 Northing: 4822400
30.4	- Niagara Falls Member (?) of Goat Island formation - Light grey - blue - Porous - Massive in appearance with abundant stylolite - No fossil content								Core Box 10 of 11 (29.7 to 31.7 m)		
31.0											
32.0				GS26	0.0	0.0		0.0	Core Box 11 of 11 (31.7 to 33.3 m)		Groundwater sample collected at end of hole for comprehensive analysis of Metals & Inorganics, PAHs, PHCs, VOCs
33.0				GS27	0.0	0.0		0.0			
33.3	BOREHOLE TERMINATED AT 33.32										Above surface casing completed with 4" monument riser extending 1.14 m above ground surface. No PVC monitoring well installed. Lockable cap on well with temporary lock installed.
34.0											
35.0											
36.0											
37.0											
38.0											
39.0											
40.0											

LOG OF TEST PIT A

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 317.90 m

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
317.90	0.00	0.00	Asphalt	Frozen
317.80	0.10	0.33	Fill – Mixed sands and gravel	Construction Material
317.70	0.20	0.66		
317.60	0.30	0.98		Sample A–1 composite
317.50	0.40	1.31		from 03–1.0 m
317.40	0.50	1.64		
317.30	0.60	1.97		
317.20	0.70	2.30		
317.10	0.80	2.62	Course sand fill and	
317.00	0.90	2.95	cobbles and boulders	
316.90	1.00	3.28		Sample A–2 composite
316.80	1.10	3.61		from 1–2 m
316.70	1.20	3.94		
316.60	1.30	4.26		
316.50	1.40	4.59		
316.40	1.50	4.92		
316.30	1.60	5.25		
316.20	1.70	5.58		
316.10	1.80	5.90		
316.00	1.90	6.23		
315.90	2.00	6.56		
315.80	2.10	6.89		Sample A3
315.70	2.20	7.22		
315.60	2.30	7.54		
315.50	2.40	7.87		
315.40	2.50	8.20		
315.30	2.60	8.53		
315.20	2.70	8.86		
315.10	2.80	9.18		
315.00	2.90	9.51		
314.90	3.00	9.84		
314.80	3.10	10.17		
314.70	3.20	10.50	Bedrock	End of test pit - 3.2 m
314.60	3.30	10.82		
314.50	3.40	11.15		
314.40	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT ASW14

EO:	90K26	Date:	January 23, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	317.58 m

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
317.58	0.00	0.00	Asphalt	Sample ASW14-1
317.48	0.10	0.33		
317.38	0.20	0.66		
317.28	0.30	0.98	Medium sand	Sample ASW14-2, composite
317.18	0.40	1.31		0.3–0.6m
317.08	0.50	1.64		
316.98	0.60	1.97		End of test pit – 0.6 m
316.88	0.70	2.30		
316.78	0.80	2.62		
316.68	0.90	2.95		
316.58	1.00	3.28		
316.48	1.10	3.61		
316.38	1.20	3.94		
316.28	1.30	4.26		
316.18	1.40	4.59		
316.08	1.50	4.92		
315.98	1.60	5.25		
315.88	1.70	5.58		
315.78	1.80	5.90		
315.68	1.90	6.23		
315.58	2.00	6.56		
315.48	2.10	6.89		
315.38	2.20	7.22		
315.28	2.30	7.54		
315.18	2.40	7.87		
315.08	2.50	8.20		
314.98	2.60	8.53		
314.88	2.70	8.86		
314.78	2.80	9.18		
314.68	2.90	9.51		
314.58	3.00	9.84		
314.48	3.10	10.17		
314.38	3.20	10.50		
314.28	3.30	10.82		
314.18	3.40	11.15		
314.08	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 24, 1991

LOG OF TEST PIT AN21

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.68

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.68	0.00	0.00	Sandy topsoil	Sample AN21-1, composite of 0 -0.9 m
316.58	0.10	0.33		
316.48	0.20	0.66		
316.38	0.30	0.98	Gravel backfill	
316.28	0.40	1.31		
316.18	0.50	1.64		
316.08	0.60	1.97		
315.98	0.70	2.30		
315.88	0.80	2.62		
315.78	0.90	2.95	Fill - medium sand yellow, some gravel	Sample AN21-2, composite of 0.9 to 1.70 m. Metal pipe at 0.9 m possible catchbasin tile, discharging very low flow of hydrocarbon contaminated water (sheen on water)
315.68	1.00	3.28		
315.58	1.10	3.61		
315.48	1.20	3.94		
315.38	1.30	4.26		
315.28	1.40	4.59		
315.18	1.50	4.92		
315.08	1.60	5.25		
314.98	1.70	5.58		Sample AN21-3 at 1.70 m
314.88	1.80	5.90		
314.78	1.90	6.23		
314.68	2.00	6.56	Concrete/cast metal pipe Possible water supply	End of test pit -2.0m
314.58	2.10	6.89		
314.48	2.20	7.22		
314.38	2.30	7.54		
314.28	2.40	7.87		
314.18	2.50	8.20		
314.08	2.60	8.53		
313.98	2.70	8.86		
313.88	2.80	9.18		
313.78	2.90	9.51		
313.68	3.00	9.84		
313.58	3.10	10.17		
313.48	3.20	10.50		
313.38	3.30	10.82		
313.28	3.40	11.15		
313.18	3.50	11.48		

Comments: Test pit containing water from possible catchbasin tile, otherwise appears to be dry
Test pit backfilled January 22, 1991

LOG OF TEST PIT B

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.36 m

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.36	0.00	0.00	Asphalt and gravel	Frozen, sample B-1
316.26	0.10	0.33		
316.16	0.20	0.66		
316.06	0.30	0.98	Sand, red with cobbles	Sample B-2, composite of
315.96	0.40	1.31	and rootlets	0.3-1 m
315.86	0.50	1.64		
315.76	0.60	1.97		
315.66	0.70	2.30		
315.56	0.80	2.62		
315.46	0.90	2.95		
315.36	1.00	3.28	Coarse sand, brown to grey	Sample B-3, composite
315.26	1.10	3.61	with gravel	of 1-1.4 m
315.16	1.20	3.94		
315.06	1.30	4.26		
314.96	1.40	4.59		End of test pit -1.4 m
314.86	1.50	4.92		
314.76	1.60	5.25		
314.66	1.70	5.58		
314.56	1.80	5.90		
314.46	1.90	6.23		
314.36	2.00	6.56		
314.26	2.10	6.89		
314.16	2.20	7.22		
314.06	2.30	7.54		
313.96	2.40	7.87		
313.86	2.50	8.20		
313.76	2.60	8.53		
313.66	2.70	8.86		
313.56	2.80	9.18		
313.46	2.90	9.51		
313.36	3.00	9.84		
313.26	3.10	10.17		
313.16	3.20	10.50		
313.06	3.30	10.82		
312.96	3.40	11.15		
312.86	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT BW11

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 23, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.78

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.78	0.00	0.00	Concrete	
316.68	0.10	0.33		
316.58	0.20	0.66	Granular material	
316.48	0.30	0.98		Sample BW11-1 at 0.4 m
316.38	0.40	1.31		
316.28	0.50	1.64		
316.18	0.60	1.97		
316.08	0.70	2.30		Sample BW11-2 at 0.8 m
315.98	0.80	2.62		End of test pit 0.8 m
315.88	0.90	2.95		
315.78	1.00	3.28		
315.68	1.10	3.61		
315.58	1.20	3.94		
315.48	1.30	4.26		
315.38	1.40	4.59		
315.28	1.50	4.92		
315.18	1.60	5.25		
315.08	1.70	5.58		
314.98	1.80	5.90		
314.88	1.90	6.23		
314.78	2.00	6.56		
314.68	2.10	6.89		
314.58	2.20	7.22		
314.48	2.30	7.54		
314.38	2.40	7.87		
314.28	2.50	8.20		
314.18	2.60	8.53		
314.08	2.70	8.86		
313.98	2.80	9.18		
313.88	2.90	9.51		
313.78	3.00	9.84		
313.68	3.10	10.17		
313.58	3.20	10.50		
313.48	3.30	10.82		
313.38	3.40	11.15		
313.28	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 24, 1991

LOG OF TEST PIT C

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.57

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.57	0.00	0.00	Fill – silt, black sooty stained	Sample C–1, composite
314.47	0.10	0.33		of 0–02.m
314.37	0.20	0.66	Fill – medium sand red stained,	Sample C–2, composite
314.27	0.30	0.98	with thin metal rods and	of 0.3–0.8 m
314.17	0.40	1.31	wood chips	
314.07	0.50	1.64		
313.97	0.60	1.97		
313.87	0.70	2.30		
313.77	0.80	2.62	Fill – silt, dark stained	Sample C–3, grab at 0.8 m
313.67	0.90	2.95	Till – sand medium to fine, brown	Sample C–4, composite of
313.57	1.00	3.28	with pebbles, cobbles and boulders	0.9–1.3 m
313.47	1.10	3.61		
313.37	1.20	3.94		
313.27	1.30	4.26		
313.17	1.40	4.59	Till – sand, course, grey with boulders	
313.07	1.50	4.92		End of test pit –1.5 m
312.97	1.60	5.25		
312.87	1.70	5.58		
312.77	1.80	5.90		
312.67	1.90	6.23		
312.57	2.00	6.56		
312.47	2.10	6.89		
312.37	2.20	7.22		
312.27	2.30	7.54		
312.17	2.40	7.87		
312.07	2.50	8.20		
311.97	2.60	8.53		
311.87	2.70	8.86		
311.77	2.80	9.18		
311.67	2.90	9.51		
311.57	3.00	9.84		
311.47	3.10	10.17		
311.37	3.20	10.50		
311.27	3.30	10.82		
311.17	3.40	11.15		
311.07	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT CW10

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.17

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.17	0.00	0.00	Gravel	Frozen
315.07	0.10	0.33		
314.97	0.20	0.66	Fill sand	Sample CW10-1
314.87	0.30	0.98		
314.77	0.40	1.31		
314.67	0.50	1.64		
314.57	0.60	1.97	Fill – silty, black sooty	Sample CW10-2
314.47	0.70	2.30		
314.37	0.80	2.62		
314.27	0.90	2.95		End of test pit – 0.9 m
314.17	1.00	3.28		
314.07	1.10	3.61		
313.97	1.20	3.94		
313.87	1.30	4.26		
313.77	1.40	4.59		
313.67	1.50	4.92		
313.57	1.60	5.25		
313.47	1.70	5.58		
313.37	1.80	5.90		
313.27	1.90	6.23		
313.17	2.00	6.56		
313.07	2.10	6.89		
312.97	2.20	7.22		
312.87	2.30	7.54		
312.77	2.40	7.87		
312.67	2.50	8.20		
312.57	2.60	8.53		
312.47	2.70	8.86		
312.37	2.80	9.18		
312.27	2.90	9.51		
312.17	3.00	9.84		
312.07	3.10	10.17		
311.97	3.20	10.50		
311.87	3.30	10.82		
311.77	3.40	11.15		
311.67	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT CE10

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	314.37

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.37	0.00	0.00	Asphalt	
314.27	0.10	0.33	Fill	Sample CE10-1
314.17	0.20	0.66		
314.07	0.30	0.98		
313.97	0.40	1.31		Sample CE10-2
313.87	0.50	1.64		
313.77	0.60	1.97		End of test pit – 0.6 m
313.67	0.70	2.30		
313.57	0.80	2.62		
313.47	0.90	2.95		
313.37	1.00	3.28		
313.27	1.10	3.61		
313.17	1.20	3.94		
313.07	1.30	4.26		
312.97	1.40	4.59		
312.87	1.50	4.92		
312.77	1.60	5.25		
312.67	1.70	5.58		
312.57	1.80	5.90		
312.47	1.90	6.23		
312.37	2.00	6.56		
312.27	2.10	6.89		
312.17	2.20	7.22		
312.07	2.30	7.54		
311.97	2.40	7.87		
311.87	2.50	8.20		
311.77	2.60	8.53		
311.67	2.70	8.86		
311.57	2.80	9.18		
311.47	2.90	9.51		
311.37	3.00	9.84		
311.27	3.10	10.17		
311.17	3.20	10.50		
311.07	3.30	10.82		
310.97	3.40	11.15		
310.87	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT D

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.80

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.80	0.00	0.00	Topsoil	
314.70	0.10	0.33	Fill – medium sand, black to red	Sample D-1
314.60	0.20	0.66	with clean brown sand lenses. Iron	
314.50	0.30	0.98	rods and slag throughout.	
314.40	0.40	1.31		
314.30	0.50	1.64		
314.20	0.60	1.97		
314.10	0.70	2.30		
314.00	0.80	2.62	Dark brown silty soil	
313.90	0.90	2.95	Medium to fine sand, brown till	Sample D-2
313.80	1.00	3.28	with pebbles, cobbles	
313.70	1.10	3.61	and boulders	
313.60	1.20	3.94		End of test pit – 1.2 m
313.50	1.30	4.26		
313.40	1.40	4.59		
313.30	1.50	4.92		
313.20	1.60	5.25		
313.10	1.70	5.58		
313.00	1.80	5.90		
312.90	1.90	6.23		
312.80	2.00	6.56		
312.70	2.10	6.89		
312.60	2.20	7.22		
312.50	2.30	7.54		
312.40	2.40	7.87		
312.30	2.50	8.20		
312.20	2.60	8.53		
312.10	2.70	8.86		
312.00	2.80	9.18		
311.90	2.90	9.51		
311.80	3.00	9.84		
311.70	3.10	10.17		
311.60	3.20	10.50		
311.50	3.30	10.82		
311.40	3.40	11.15		
311.30	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT DSW7

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	314.82

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.82	0.00	0.00	Foundry sand	Sample DSW7-1 and DSW7-1a
314.72	0.10	0.33		
314.62	0.20	0.66		
314.52	0.30	0.98		
314.42	0.40	1.31		
314.32	0.50	1.64		End of test pit – 0.5 m
314.22	0.60	1.97		
314.12	0.70	2.30		
314.02	0.80	2.62		
313.92	0.90	2.95		
313.82	1.00	3.28		
313.72	1.10	3.61		
313.62	1.20	3.94		
313.52	1.30	4.26		
313.42	1.40	4.59		
313.32	1.50	4.92		
313.22	1.60	5.25		
313.12	1.70	5.58		
313.02	1.80	5.90		
312.92	1.90	6.23		
312.82	2.00	6.56		
312.72	2.10	6.89		
312.62	2.20	7.22		
312.52	2.30	7.54		
312.42	2.40	7.87		
312.32	2.50	8.20		
312.22	2.60	8.53		
312.12	2.70	8.86		
312.02	2.80	9.18		
311.92	2.90	9.51		
311.82	3.00	9.84		
311.72	3.10	10.17		
311.62	3.20	10.50		
311.52	3.30	10.82		
311.42	3.40	11.15		
311.32	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT EW 8

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	313.83

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
313.83	0.00	0.00	Asphalt and gravel	
313.73	0.10	0.33		
313.63	0.20	0.66	Fill – black charred material and	Sample EW-1
313.53	0.30	0.98	some red oxidized slag	
313.43	0.40	1.31	Fill – silt, black with black staining	Sample EW-2
313.33	0.50	1.64	Medium to fine sand, brown till	Sample EW-3
313.23	0.60	1.97	with pebbles, cobbles, and boulders	
313.13	0.70	2.30		End of test pit – 0.7 m
313.03	0.80	2.62		
312.93	0.90	2.95		
312.83	1.00	3.28		
312.73	1.10	3.61		
312.63	1.20	3.94		
312.53	1.30	4.26		
312.43	1.40	4.59		
312.33	1.50	4.92		
312.23	1.60	5.25		
312.13	1.70	5.58		
312.03	1.80	5.90		
311.93	1.90	6.23		
311.83	2.00	6.56		
311.73	2.10	6.89		
311.63	2.20	7.22		
311.53	2.30	7.54		
311.43	2.40	7.87		
311.33	2.50	8.20		
311.23	2.60	8.53		
311.13	2.70	8.86		
311.03	2.80	9.18		
310.93	2.90	9.51		
310.83	3.00	9.84		
310.73	3.10	10.17		
310.63	3.20	10.50		
310.53	3.30	10.82		
310.43	3.40	11.15		
310.33	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT ESW 8

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 313.83

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
313.83	0.00	0.00		
313.73	0.10	0.33	Gravel, yellow	
313.63	0.20	0.66	Fill – brown soil on south	
313.53	0.30	0.98	face with intermixed	
313.43	0.40	1.31	slag on north face	Sample ESW–1 at 0.4 m
313.33	0.50	1.64		
313.23	0.60	1.97		Sample ESW–2 at 0.7 m
313.13	0.70	2.30		End of test pit – 0.7 m
313.03	0.80	2.62		
312.93	0.90	2.95		
312.83	1.00	3.28		
312.73	1.10	3.61		
312.63	1.20	3.94		
312.53	1.30	4.26		
312.43	1.40	4.59		
312.33	1.50	4.92		
312.23	1.60	5.25		
312.13	1.70	5.58		
312.03	1.80	5.90		
311.93	1.90	6.23		
311.83	2.00	6.56		
311.73	2.10	6.89		
311.63	2.20	7.22		
311.53	2.30	7.54		
311.43	2.40	7.87		
311.33	2.50	8.20		
311.23	2.60	8.53		
311.13	2.70	8.86		
311.03	2.80	9.18		
310.93	2.90	9.51		
310.83	3.00	9.84		
310.73	3.10	10.17		
310.63	3.20	10.50		
310.53	3.30	10.82		
310.43	3.40	11.15		
310.33	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT H

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 313.75

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
313.75	0.00	0.00	Fill – sandy topsoil with iron debris	Sample H–1
313.65	0.10	0.33		
313.55	0.20	0.66		
313.45	0.30	0.98		
313.35	0.40	1.31	Fill – silt, brown	
313.25	0.50	1.64	Sand – medium to fine, brown till with pebbles, cobbles, and boulders	Sample H–2
313.15	0.60	1.97		
313.05	0.70	2.30		
312.95	0.80	2.62	Bedrock	End of test pit – 0.8 m
312.85	0.90	2.95		
312.75	1.00	3.28		
312.65	1.10	3.61		
312.55	1.20	3.94		
312.45	1.30	4.26		
312.35	1.40	4.59		
312.25	1.50	4.92		
312.15	1.60	5.25		
312.05	1.70	5.58		
311.95	1.80	5.90		
311.85	1.90	6.23		
311.75	2.00	6.56		
311.65	2.10	6.89		
311.55	2.20	7.22		
311.45	2.30	7.54		
311.35	2.40	7.87		
311.25	2.50	8.20		
311.15	2.60	8.53		
311.05	2.70	8.86		
310.95	2.80	9.18		
310.85	2.90	9.51		
310.75	3.00	9.84		
310.65	3.10	10.17		
310.55	3.20	10.50		
310.45	3.30	10.82		
310.35	3.40	11.15		
310.25	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT HW16

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	314.94

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.94	0.00	0.00	Topsoil – sand dark brown	Sample HW16-1
314.84	0.10	0.33	Sand, medium to fine brown	Sample HW16-2
314.74	0.20	0.66	till with pebbles, cobbles	
314.64	0.30	0.98	and boulders	
314.54	0.40	1.31		
314.44	0.50	1.64		End of test pit – 0.5 m
314.34	0.60	1.97		
314.24	0.70	2.30		
314.14	0.80	2.62		
314.04	0.90	2.95		
313.94	1.00	3.28		
313.84	1.10	3.61		
313.74	1.20	3.94		
313.64	1.30	4.26		
313.54	1.40	4.59		
313.44	1.50	4.92		
313.34	1.60	5.25		
313.24	1.70	5.58		
313.14	1.80	5.90		
313.04	1.90	6.23		
312.94	2.00	6.56		
312.84	2.10	6.89		
312.74	2.20	7.22		
312.64	2.30	7.54		
312.54	2.40	7.87		
312.44	2.50	8.20		
312.34	2.60	8.53		
312.24	2.70	8.86		
312.14	2.80	9.18		
312.04	2.90	9.51		
311.94	3.00	9.84		
311.84	3.10	10.17		
311.74	3.20	10.50		
311.64	3.30	10.82		
311.54	3.40	11.15		
311.44	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT HNE19

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.12

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.12	0.00	0.00	Topsoil – brown granular	
314.02	0.10	0.33		
313.92	0.20	0.66	Fill – granular, dark brown with red stained sand	
313.82	0.30	0.98		
313.72	0.40	1.31		Sample HNE19–1 at 0.4 m
313.62	0.50	1.64		
313.52	0.60	1.97		
313.42	0.70	2.30		Sample HNE 19–2 at 0.8 m
313.32	0.80	2.62		End of test pit – 0.8 m
313.22	0.90	2.95		
313.12	1.00	3.28		
313.02	1.10	3.61		
312.92	1.20	3.94		
312.82	1.30	4.26		
312.72	1.40	4.59		
312.62	1.50	4.92		
312.52	1.60	5.25		
312.42	1.70	5.58		
312.32	1.80	5.90		
312.22	1.90	6.23		
312.12	2.00	6.56		
312.02	2.10	6.89		
311.92	2.20	7.22		
311.82	2.30	7.54		
311.72	2.40	7.87		
311.62	2.50	8.20		
311.52	2.60	8.53		
311.42	2.70	8.86		
311.32	2.80	9.18		
311.22	2.90	9.51		
311.12	3.00	9.84		
311.02	3.10	10.17		
310.92	3.20	10.50		
310.82	3.30	10.82		
310.72	3.40	11.15		
310.62	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT I

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	315.00

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.00	0.00	0.00	Concrete	
314.90	0.10	0.33		
314.80	0.20	0.66	Sandy gravel	
314.70	0.30	0.98	Fill – mixed sand with bricks and	
314.60	0.40	1.31	metal debris	
314.50	0.50	1.64		Sample I–1, grab at 0.5 m
314.40	0.60	1.97		
314.30	0.70	2.30		Sample I–2, grab at 0.7 m
314.20	0.80	2.62		
314.10	0.90	2.95	Dark silty soil	Sample I–3
314.00	1.00	3.28	Sand, brown till with	Sample 1–4
313.90	1.10	3.61	cobbles and boulders	
313.80	1.20	3.94		
313.70	1.30	4.26		
313.60	1.40	4.59		
313.50	1.50	4.92	Sand, coarse grey till with	
313.40	1.60	5.25	cobbles and boulders	
313.30	1.70	5.58		
313.20	1.80	5.90	Bedrock	End of test pit – 1.8 m
313.10	1.90	6.23		
313.00	2.00	6.56		
312.90	2.10	6.89		
312.80	2.20	7.22		
312.70	2.30	7.54		
312.60	2.40	7.87		
312.50	2.50	8.20		
312.40	2.60	8.53		
312.30	2.70	8.86		
312.20	2.80	9.18		
312.10	2.90	9.51		
312.00	3.00	9.84		
311.90	3.10	10.17		
311.80	3.20	10.50		
311.70	3.30	10.82		
311.60	3.40	11.15		
311.50	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT INE 15

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.65

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.65	0.00	0.00	Concrete and gravel	
315.55	0.10	0.33		
315.45	0.20	0.66		
315.35	0.30	0.98	Fill – mixed sand, stained red to	Sample INE–1
315.25	0.40	1.31	black containing bricks and	
315.15	0.50	1.64	metal rods	
315.05	0.60	1.97		
314.95	0.70	2.30		
314.85	0.80	2.62		
314.75	0.90	2.95		
314.65	1.00	3.28	Sand, red with small pebbles	Sample INE–2
314.55	1.10	3.61	and cobbles	
314.45	1.20	3.94		
314.35	1.30	4.26	Silt, brown to black	Sample INE –3
314.25	1.40	4.59	Sand, brown till with boulders	Sample INE–4
314.15	1.50	4.92		End of test pit – 1.5 m
314.05	1.60	5.25		
313.95	1.70	5.58		
313.85	1.80	5.90		
313.75	1.90	6.23		
313.65	2.00	6.56		
313.55	2.10	6.89		
313.45	2.20	7.22		
313.35	2.30	7.54		
313.25	2.40	7.87		
313.15	2.50	8.20		
313.05	2.60	8.53		
312.95	2.70	8.86		
312.85	2.80	9.18		
312.75	2.90	9.51		
312.65	3.00	9.84		
312.55	3.10	10.17		
312.45	3.20	10.50		
312.35	3.30	10.82		
312.25	3.40	11.15		
312.15	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT IE15

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.42

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.42	0.00	0.00	Gravel	
315.32	0.10	0.33		
315.22	0.20	0.66		
315.12	0.30	0.98	Fill – medium sand, stained black	Sample IE15–1
315.02	0.40	1.31	to green with red blotches	
314.92	0.50	1.64	and metal debris	
314.82	0.60	1.97		
314.72	0.70	2.30		
314.62	0.80	2.62	Fill – granular, grey and black	Sample IE15–2
314.52	0.90	2.95	Sand, brown till with	Sample IE15–3
314.42	1.00	3.28	cobbles and boulders	
314.32	1.10	3.61		
314.22	1.20	3.94		
314.12	1.30	4.26		End of test pit – 1.3 m
314.02	1.40	4.59		
313.92	1.50	4.92		
313.82	1.60	5.25		
313.72	1.70	5.58		
313.62	1.80	5.90		
313.52	1.90	6.23		
313.42	2.00	6.56		
313.32	2.10	6.89		
313.22	2.20	7.22		
313.12	2.30	7.54		
313.02	2.40	7.87		
312.92	2.50	8.20		
312.82	2.60	8.53		
312.72	2.70	8.86		
312.62	2.80	9.18		
312.52	2.90	9.51		
312.42	3.00	9.84		
312.32	3.10	10.17		
312.22	3.20	10.50		
312.12	3.30	10.82		
312.02	3.40	11.15		
311.92	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT JE15

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.36

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.36	0.00	0.00	Topsoil – silty, stained black	Sample IE15–1
315.26	0.10	0.33	Fill – sand, brown to green with bricks and slag	Sample JE15–2
315.16	0.20	0.66		
315.06	0.30	0.98		
314.96	0.40	1.31		
314.86	0.50	1.64		
314.76	0.60	1.97	Fill – coarse sand, grey with gravel	Sample JE15–3
314.66	0.70	2.30	Sand – brown, orange, till with cobbles	Sample JE 15–4
314.56	0.80	2.62		
314.46	0.90	2.95		
314.36	1.00	3.28		End of test pit – 1.0 m
314.26	1.10	3.61		
314.16	1.20	3.94		
314.06	1.30	4.26		
313.96	1.40	4.59		
313.86	1.50	4.92		
313.76	1.60	5.25		
313.66	1.70	5.58		
313.56	1.80	5.90		
313.46	1.90	6.23		
313.36	2.00	6.56		
313.26	2.10	6.89		
313.16	2.20	7.22		
313.06	2.30	7.54		
312.96	2.40	7.87		
312.86	2.50	8.20		
312.76	2.60	8.53		
312.66	2.70	8.86		
312.56	2.80	9.18		
312.46	2.90	9.51		
312.36	3.00	9.84		
312.26	3.10	10.17		
312.16	3.20	10.50		
312.06	3.30	10.82		
311.96	3.40	11.15		
311.86	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT JS15

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	314.49

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.49	0.00	0.00	Fill – sand, black	
314.39	0.10	0.33	Fill – sand, red with metal debris	Sample JS15–1
314.29	0.20	0.66	Fill – fine sand, black to brown	Sample JS15–2
314.19	0.30	0.98	Fill – sand with slag and brick	Sample JS15–3
314.09	0.40	1.31		
313.99	0.50	1.64		
313.89	0.60	1.97		
313.79	0.70	2.30	Fill – silt, black to brown	Sample JS15–4
313.69	0.80	2.62	Sand, till, brown with	Sample JS15–5
313.59	0.90	2.95	cobbles and boulders	
313.49	1.00	3.28		
313.39	1.10	3.61		
313.29	1.20	3.94		
313.19	1.30	4.26		
313.09	1.40	4.59		End of test pit – 1.4 m
312.99	1.50	4.92		
312.89	1.60	5.25		
312.79	1.70	5.58		
312.69	1.80	5.90		
312.59	1.90	6.23		
312.49	2.00	6.56		
312.39	2.10	6.89		
312.29	2.20	7.22		
312.19	2.30	7.54		
312.09	2.40	7.87		
311.99	2.50	8.20		
311.89	2.60	8.53		
311.79	2.70	8.86		
311.69	2.80	9.18		
311.59	2.90	9.51		
311.49	3.00	9.84		
311.39	3.10	10.17		
311.29	3.20	10.50		
311.19	3.30	10.82		
311.09	3.40	11.15		
310.99	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT K

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.81

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.81	0.00	0.00	Fill – granular, brown to red	Sample K–1
315.71	0.10	0.33		
315.61	0.20	0.66		
315.51	0.30	0.98		
315.41	0.40	1.31		
315.31	0.50	1.64		
315.21	0.60	1.97		
315.11	0.70	2.30		End of test pit – 0.7 m
315.01	0.80	2.62		
314.91	0.90	2.95		
314.81	1.00	3.28		
314.71	1.10	3.61		
314.61	1.20	3.94		
314.51	1.30	4.26		
314.41	1.40	4.59		
314.31	1.50	4.92		
314.21	1.60	5.25		
314.11	1.70	5.58		
314.01	1.80	5.90		
313.91	1.90	6.23		
313.81	2.00	6.56		
313.71	2.10	6.89		
313.61	2.20	7.22		
313.51	2.30	7.54		
313.41	2.40	7.87		
313.31	2.50	8.20		
313.21	2.60	8.53		
313.11	2.70	8.86		
313.01	2.80	9.18		
312.91	2.90	9.51		
312.81	3.00	9.84		
312.71	3.10	10.17		
312.61	3.20	10.50		
312.51	3.30	10.82		
312.41	3.40	11.15		
312.31	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT KNW10

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.20

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.20	0.00	0.00	Concrete	
316.10	0.10	0.33	Fill – hard silty matrix with	Sample KNW10–1
316.00	0.20	0.66	wood, plastic, brick, and	
315.90	0.30	0.98	slag debris. This material pinches	
315.80	0.40	1.31	under brown sand and gravel to	
315.70	0.50	1.64	the west of the pit.	
315.60	0.60	1.97		
315.50	0.70	2.30	Sand till, brown with	Sample KNW10–2
315.40	0.80	2.62	cobbles and boulders	
315.30	0.90	2.95		
315.20	1.00	3.28		
315.10	1.10	3.61		End of test pit – 1.1m
315.00	1.20	3.94		
314.90	1.30	4.26		
314.80	1.40	4.59		
314.70	1.50	4.92		
314.60	1.60	5.25		
314.50	1.70	5.58		
314.40	1.80	5.90		
314.30	1.90	6.23		
314.20	2.00	6.56		
314.10	2.10	6.89		
314.00	2.20	7.22		
313.90	2.30	7.54		
313.80	2.40	7.87		
313.70	2.50	8.20		
313.60	2.60	8.53		
313.50	2.70	8.86		
313.40	2.80	9.18		
313.30	2.90	9.51		
313.20	3.00	9.84		
313.10	3.10	10.17		
313.00	3.20	10.50		
312.90	3.30	10.82		
312.80	3.40	11.15		
312.70	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT KE13

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	316.09

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.09	0.00	0.00	Gravel	
315.99	0.10	0.33	Fill – sand, dark brown to red	Sample KE13–1
315.89	0.20	0.66	with slag, brick and wood fragments	
315.79	0.30	0.98		
315.69	0.40	1.31		
315.59	0.50	1.64		
315.49	0.60	1.97		
315.39	0.70	2.30	Fill – coarse sand, red	Sample KE13–2
315.29	0.80	2.62		
315.19	0.90	2.95	Silt, brown to yellow	Sample KE13–3
315.09	1.00	3.28	Sand fill, brown with cobbles	
314.99	1.10	3.61		
314.89	1.20	3.94		
314.79	1.30	4.26		
314.69	1.40	4.59	Coarse sand till, grey with cobbles	Sample KE13–5
314.59	1.50	4.92		Strong petroleum odour
314.49	1.60	5.25		throughout seepage at 1.7 m,
314.39	1.70	5.58	PID (KE13–5) = 300 ppm	sheen visible
314.29	1.80	5.90	Bedrock	End of test pit – 1.8 m
314.19	1.90	6.23		
314.09	2.00	6.56		
313.99	2.10	6.89		
313.89	2.20	7.22		
313.79	2.30	7.54		
313.69	2.40	7.87		
313.59	2.50	8.20		
313.49	2.60	8.53		
313.39	2.70	8.86		
313.29	2.80	9.18		
313.19	2.90	9.51		
313.09	3.00	9.84		
312.99	3.10	10.17		
312.89	3.20	10.50		
312.79	3.30	10.82		
312.69	3.40	11.15		
312.59	3.50	11.48		

Comments: Groundwater in test pit upon completion
Test pit backfilled January 22, 1991
PID = Photoionization detector used to measure headspace concentration of volatile organics

LOG OF TEST PIT KW32

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.25

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.25	0.00	0.00	Asphalt	
316.15	0.10	0.33		
316.05	0.20	0.66	Fill – sand with slag and brick	Sample KW32-1
315.95	0.30	0.98		
315.85	0.40	1.31		
315.75	0.50	1.64		
315.65	0.60	1.97		
315.55	0.70	2.30		
315.45	0.80	2.62		
315.35	0.90	2.95		
315.25	1.00	3.28	Coarse sand till, brown with cobbles	Sample KW32-2
315.15	1.10	3.61		
315.05	1.20	3.94		End of test pit – 1.2 m
314.95	1.30	4.26		
314.85	1.40	4.59		
314.75	1.50	4.92		
314.65	1.60	5.25		
314.55	1.70	5.58		
314.45	1.80	5.90		
314.35	1.90	6.23		
314.25	2.00	6.56		
314.15	2.10	6.89		
314.05	2.20	7.22		
313.95	2.30	7.54		
313.85	2.40	7.87		
313.75	2.50	8.20		
313.65	2.60	8.53		
313.55	2.70	8.86		
313.45	2.80	9.18		
313.35	2.90	9.51		
313.25	3.00	9.84		
313.15	3.10	10.17		
313.05	3.20	10.50		
312.95	3.30	10.82		
312.85	3.40	11.15		
312.75	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT L

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 1

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 317.30

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
317.30	0.00	0.00		
317.20	0.10	0.33	Fill – granular, brown	Sample L–1
317.10	0.20	0.66		
317.00	0.30	0.98	Fill – granular dark brown to red	Sample L–2
316.90	0.40	1.31	with foundry sands	
316.80	0.50	1.64		
316.70	0.60	1.97		
316.60	0.70	2.30		
316.50	0.80	2.62	Silt, red to brown	Sample L–3
316.40	0.90	2.95		
316.30	1.00	3.28	Sand till, brown with pebbles,	Sample L–4
316.20	1.10	3.61	cobbles and boulders	
316.10	1.20	3.94		
316.00	1.30	4.26		End of test pit – 1.3m
315.90	1.40	4.59		
315.80	1.50	4.92		
315.70	1.60	5.25		
315.60	1.70	5.58		
315.50	1.80	5.90		
315.40	1.90	6.23		
315.30	2.00	6.56		
315.20	2.10	6.89		
315.10	2.20	7.22		
315.00	2.30	7.54		
314.90	2.40	7.87		
314.80	2.50	8.20		
314.70	2.60	8.53		
314.60	2.70	8.86		
314.50	2.80	9.18		
314.40	2.90	9.51		
314.30	3.00	9.84		
314.20	3.10	10.17		
314.10	3.20	10.50		
314.00	3.30	10.82		
313.90	3.40	11.15		
313.80	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT LN2

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 1

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 317.30

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
317.30	0.00	0.00	Topsoil – sandy, dark brown	Sample LN2–1
317.20	0.10	0.33	Fill – foundry sands	Sample LN2–2
317.10	0.20	0.66		
317.00	0.30	0.98		
316.90	0.40	1.31		
316.80	0.50	1.64		End of Test Pits – 0.5m
316.70	0.60	1.97		
316.60	0.70	2.30		
316.50	0.80	2.62		
316.40	0.90	2.95		
316.30	1.00	3.28		
316.20	1.10	3.61		
316.10	1.20	3.94		
316.00	1.30	4.26		
315.90	1.40	4.59		
315.80	1.50	4.92		
315.70	1.60	5.25		
315.60	1.70	5.58		
315.50	1.80	5.90		
315.40	1.90	6.23		
315.30	2.00	6.56		
315.20	2.10	6.89		
315.10	2.20	7.22		
315.00	2.30	7.54		
314.90	2.40	7.87		
314.80	2.50	8.20		
314.70	2.60	8.53		
314.60	2.70	8.86		
314.50	2.80	9.18		
314.40	2.90	9.51		
314.30	3.00	9.84		
314.20	3.10	10.17		
314.10	3.20	10.50		
314.00	3.30	10.82		
313.90	3.40	11.15		
313.80	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT LW23

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 317.3

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
317.30	0.00	0.00	Gravel	
317.20	0.10	0.33	Fill – hard granular, brown to red	Sample LW23–1
317.10	0.20	0.66	with brick and slag	
317.00	0.30	0.98	Fill – sandy with some purple	Sample LW23–2
316.90	0.40	1.31	staining	
316.80	0.50	1.64		
316.70	0.60	1.97		
316.60	0.70	2.30		
316.50	0.80	2.62		
316.40	0.90	2.95		
316.30	1.00	3.28		
316.20	1.10	3.61	Silty brown to black soil	Sample LW23–3
316.10	1.20	3.94		
316.00	1.30	4.26	Sand till, brown with cobbles and	Sample LW23–4 and LW23-(P
315.90	1.40	4.59	boulders	PID (LW23–4) = 61 ppm
315.80	1.50	4.92		
315.70	1.60	5.25		
315.60	1.70	5.58		
315.50	1.80	5.90	Coarse sand till, grey with boulders	Samples LOrg, LW23–5 and L
315.40	1.90	6.23	and cobbles	Hydrocarbon odour and green
315.30	2.00	6.56		staining throughout, seepage
315.20	2.10	6.89		at 2.2m
315.10	2.20	7.22		PID (LW23(Org)) = 61 ppm
315.00	2.30	7.54	Bedrock	End of Test Pit – 2.3m
314.90	2.40	7.87		
314.80	2.50	8.20		
314.70	2.60	8.53		
314.60	2.70	8.86		
314.50	2.80	9.18		
314.40	2.90	9.51		
314.30	3.00	9.84		
314.20	3.10	10.17		
314.10	3.20	10.50		
314.00	3.30	10.82		
313.90	3.40	11.15		
313.80	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991
PID = Photoionization detector used to measure headspace concentration of volatile organics

LOG OF TEST PIT 1

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	314.88

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.88	0.00	0.00	Asphalt and Gravel	Frozen
314.78	0.10	0.33		
314.68	0.20	0.66		
314.58	0.30	0.98	Fill – sand matrix, intermixed	Sample 1-1, composite
314.48	0.40	1.31	slag, clay pipe and brick	of 0.3–1.0m
314.38	0.50	1.64		
314.28	0.60	1.97		
314.18	0.70	2.30		
314.08	0.80	2.62		
313.98	0.90	2.95		
313.88	1.00	3.28	Sand till, medium to fine, brown	Sample 1-2, composite
313.78	1.10	3.61	to yellow with pebbles,	of 1.0–1.2m
313.68	1.20	3.94	cobbles and boulders	
313.58	1.30	4.26		
313.48	1.40	4.59		
313.38	1.50	4.92	Sand till, coarse, brown to grey	Sample 1-3
313.28	1.60	5.25	with pebbles, cobbles & boulders	
313.18	1.70	5.58		End of Test Pit – 1.7m
313.08	1.80	5.90		
312.98	1.90	6.23		
312.88	2.00	6.56		
312.78	2.10	6.89		
312.68	2.20	7.22		
312.58	2.30	7.54		
312.48	2.40	7.87		
312.38	2.50	8.20		
312.28	2.60	8.53		
312.18	2.70	8.86		
312.08	2.80	9.18		
311.98	2.90	9.51		
311.88	3.00	9.84		
311.78	3.10	10.17		
311.68	3.20	10.50		
311.58	3.30	10.82		
311.48	3.40	11.15		
311.38	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 2

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.41

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.41	0.00	0.00	Topsoil – sandy	
315.31	0.10	0.33		
315.21	0.20	0.66	Fill – sand, red stained and gravel	Sample 2–1
315.11	0.30	0.98		
315.01	0.40	1.31		
314.91	0.50	1.64	Fine sand and silt	Sample 2–2
314.81	0.60	1.97		
314.71	0.70	2.30		End of Test Pit – 0.7m
314.61	0.80	2.62		
314.51	0.90	2.95		
314.41	1.00	3.28		
314.31	1.10	3.61		
314.21	1.20	3.94		
314.11	1.30	4.26		
314.01	1.40	4.59		
313.91	1.50	4.92		
313.81	1.60	5.25		
313.71	1.70	5.58		
313.61	1.80	5.90		
313.51	1.90	6.23		
313.41	2.00	6.56		
313.31	2.10	6.89		
313.21	2.20	7.22		
313.11	2.30	7.54		
313.01	2.40	7.87		
312.91	2.50	8.20		
312.81	2.60	8.53		
312.71	2.70	8.86		
312.61	2.80	9.18		
312.51	2.90	9.51		
312.41	3.00	9.84		
312.31	3.10	10.17		
312.21	3.20	10.50		
312.11	3.30	10.82		
312.01	3.40	11.15		
311.91	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 3

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.45

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.45	0.00	0.00	Asphalt and Gravel	
314.35	0.10	0.33		
314.25	0.20	0.66		
314.15	0.30	0.98	Fill – sand, red stained matrix with brick and slag	Sample 3–1, grab at 0.3m
314.05	0.40	1.31		
313.95	0.50	1.64		
313.85	0.60	1.97		
313.75	0.70	2.30		
313.65	0.80	2.62		Sample 3–2, grab at 0.8m
313.55	0.90	2.95	Sand till, brown with cobbles	Sample 3–3
313.45	1.00	3.28		
313.35	1.10	3.61		
313.25	1.20	3.94		
313.15	1.30	4.26		
313.05	1.40	4.59	Coarse sand till, grey with boulders	
312.95	1.50	4.92		
312.85	1.60	5.25		End of Test Pit – 1.6m
312.75	1.70	5.58		
312.65	1.80	5.90		
312.55	1.90	6.23		
312.45	2.00	6.56		
312.35	2.10	6.89		
312.25	2.20	7.22		
312.15	2.30	7.54		
312.05	2.40	7.87		
311.95	2.50	8.20		
311.85	2.60	8.53		
311.75	2.70	8.86		
311.65	2.80	9.18		
311.55	2.90	9.51		
311.45	3.00	9.84		
311.35	3.10	10.17		
311.25	3.20	10.50		
311.15	3.30	10.82		
311.05	3.40	11.15		
310.95	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 4

EO: 90K26
Project: IMICO, Gueiph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.46

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.46	0.00	0.00	Fill – sandy black stained matrix with metal rods and brick	Sample 4–1
314.36	0.10	0.33		
314.26	0.20	0.66		
314.16	0.30	0.98		
314.06	0.40	1.31		
313.96	0.50	1.64		
313.86	0.60	1.97		
313.76	0.70	2.30		
313.66	0.80	2.62	Silt, brown to black	Sample 4–2
313.56	0.90	2.95	Sand till, brown with cobbles and boulders	Sample 4–3
313.46	1.00	3.28		
313.36	1.10	3.61		
313.26	1.20	3.94		End of test pit – 1.2 m
313.16	1.30	4.26		
313.06	1.40	4.59		
312.96	1.50	4.92		
312.86	1.60	5.25		
312.76	1.70	5.58		
312.66	1.80	5.90		
312.56	1.90	6.23		
312.46	2.00	6.56		
312.36	2.10	6.89		
312.26	2.20	7.22		
312.16	2.30	7.54		
312.06	2.40	7.87		
311.96	2.50	8.20		
311.86	2.60	8.53		
311.76	2.70	8.86		
311.66	2.80	9.18		
311.56	2.90	9.51		
311.46	3.00	9.84		
311.36	3.10	10.17		
311.26	3.20	10.50		
311.16	3.30	10.82		
311.06	3.40	11.15		
310.96	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 5

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 314.78

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
314.78	0.00	0.00	Asphalt and gravel	
314.68	0.10	0.33		
314.58	0.20	0.66		
314.48	0.30	0.98		
314.38	0.40	1.31	Sand – dark stained with some clean	Sample 5–1
314.28	0.50	1.64	red and brown lenses	
314.18	0.60	1.97		
314.08	0.70	2.30		
313.98	0.80	2.62		
313.88	0.90	2.95		
313.78	1.00	3.28		
313.68	1.10	3.61	Silt, black stained	Sample 5–2
313.58	1.20	3.94	Sand till, brown with cobbles	Sample 5–3
313.48	1.30	4.26	and boulders. Clay tile	
313.38	1.40	4.59	intersected at 1.2 m from	
313.28	1.50	4.92	north to west face of pit	End of test pit – 1.2 m
313.18	1.60	5.25		
313.08	1.70	5.58		
312.98	1.80	5.90		
312.88	1.90	6.23		
312.78	2.00	6.56		
312.68	2.10	6.89		
312.58	2.20	7.22		
312.48	2.30	7.54		
312.38	2.40	7.87		
312.28	2.50	8.20		
312.18	2.60	8.53		
312.08	2.70	8.86		
311.98	2.80	9.18		
311.88	2.90	9.51		
311.78	3.00	9.84		
311.68	3.10	10.17		
311.58	3.20	10.50		
311.48	3.30	10.82		
311.38	3.40	11.15		
311.28	3.50	11.48		

Comments: Test pit dry upon completion
Clay tile at 1.2 m is probably connected to nearby storm drain
Test pit backfilled January 22, 1991

LOG OF TEST PIT 6

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.07

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.07	0.00	0.00	Asphalt and gravel	
314.97	0.10	0.33		
314.87	0.20	0.66	Fill – sandy matrix stained red	Sample 6–1
314.77	0.30	0.98	to black with metal, wood	
314.67	0.40	1.31	and brick debris	
314.57	0.50	1.64		
314.47	0.60	1.97		
314.37	0.70	2.30		
314.27	0.80	2.62		
314.17	0.90	2.95	Silt	Sample 6–2
314.07	1.00	3.28		
313.97	1.10	3.61	Sand till, brown with cobbles	
313.87	1.20	3.94	and boulders	
313.77	1.30	4.26		End of test pit – 1.3 m
313.67	1.40	4.59		
313.57	1.50	4.92		
313.47	1.60	5.25		
313.37	1.70	5.58		
313.27	1.80	5.90		
313.17	1.90	6.23		
313.07	2.00	6.56		
312.97	2.10	6.89		
312.87	2.20	7.22		
312.77	2.30	7.54		
312.67	2.40	7.87		
312.57	2.50	8.20		
312.47	2.60	8.53		
312.37	2.70	8.86		
312.27	2.80	9.18		
312.17	2.90	9.51		
312.07	3.00	9.84		
311.97	3.10	10.17		
311.87	3.20	10.50		
311.77	3.30	10.82		
311.67	3.40	11.15		
311.57	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 7

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 316.17

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.17	0.00	0.00	Fill – sandy soil, brown with gravel and wood chips	Sample 7-1
316.07	0.10	0.33		
315.97	0.20	0.66		
315.87	0.30	0.98		
315.77	0.40	1.31	Fill – sandy gravel matrix with bits of brick, red to purple staining tapering to the north	Samples 7-2
315.67	0.50	1.64		
315.57	0.60	1.97		
315.47	0.70	2.30		
315.37	0.80	2.62		
315.27	0.90	2.95	Silt, black stained	Samples 7-3
315.17	1.00	3.28	Sand, brown with cobbles and boulders	Samples 7-4
315.07	1.10	3.61		
314.97	1.20	3.94		End of test pit - 1.2 m
314.87	1.30	4.26		
314.77	1.40	4.59		
314.67	1.50	4.92		
314.57	1.60	5.25		
314.47	1.70	5.58		
314.37	1.80	5.90		
314.27	1.90	6.23		
314.17	2.00	6.56		
314.07	2.10	6.89		
313.97	2.20	7.22		
313.87	2.30	7.54		
313.77	2.40	7.87		
313.67	2.50	8.20		
313.57	2.60	8.53		
313.47	2.70	8.86		
313.37	2.80	9.18		
313.27	2.90	9.51		
313.17	3.00	9.84		
313.07	3.10	10.17		
312.97	3.20	10.50		
312.87	3.30	10.82		
312.77	3.40	11.15		
312.67	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 8

EO:	90K26	Date:	January 22, 1991
Project:	IMICO, Guelph, Ontario	Field Supervisor:	J.P. Francois
Location:	See Figure 5	Elevation of Ground Surface:	316.17

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
316.17	0.00	0.00	Fill – silty, black, sooty	Sample 8–1
316.07	0.10	0.33		
315.97	0.20	0.66	Fill – sand, brown with slag, brick	Sample 8–2
315.87	0.30	0.98	and black to red staining	
315.77	0.40	1.31		
315.67	0.50	1.64		
315.57	0.60	1.97		
315.47	0.70	2.30		
315.37	0.80	2.62		
315.27	0.90	2.95		
315.17	1.00	3.28	Silty clay, black stained	Sample 8–3
315.07	1.10	3.61		Seepage at 1.1 m
314.97	1.20	3.94	Sand till, brown with cobbles	Sample 8.4, composite of 1.2–
314.87	1.30	4.26	and boulders	1.3 m
314.77	1.40	4.59		End of test pit – 1.3 m
314.67	1.50	4.92		
314.57	1.60	5.25		
314.47	1.70	5.58		
314.37	1.80	5.90		
314.27	1.90	6.23		
314.17	2.00	6.56		
314.07	2.10	6.89		
313.97	2.20	7.22		
313.87	2.30	7.54		
313.77	2.40	7.87		
313.67	2.50	8.20		
313.57	2.60	8.53		
313.47	2.70	8.86		
313.37	2.80	9.18		
313.27	2.90	9.51		
313.17	3.00	9.84		
313.07	3.10	10.17		
312.97	3.20	10.50		
312.87	3.30	10.82		
312.77	3.40	11.15		
312.67	3.50	11.48		

Comments: Test pit wet upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 9

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.12

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.12	0.00	0.00	Topsoil – sandy with gravel	
315.02	0.10	0.33		
314.92	0.20	0.66		
314.82	0.30	0.98	Fill – sandy black – red stained with	Sample 9–1
314.72	0.40	1.31	intermixed metal, slag and	
314.62	0.50	1.64	brick debris	
314.52	0.60	1.97		
314.42	0.70	2.30	Silt, brown	Sample 9–2
314.32	0.80	2.62	Sand till, brown with	Sample 9–3
314.22	0.90	2.95	cobbles and boulders	
314.12	1.00	3.28		
314.02	1.10	3.61		
313.92	1.20	3.94		
313.82	1.30	4.26		
313.72	1.40	4.59	Sand till, coarse, grey	Sample 9–4
313.62	1.50	4.92	with cobbles and boulders	
313.52	1.60	5.25		
313.42	1.70	5.58		End of test pit – 1.7 m
313.32	1.80	5.90		
313.22	1.90	6.23		
313.12	2.00	6.56		
313.02	2.10	6.89		
312.92	2.20	7.22		
312.82	2.30	7.54		
312.72	2.40	7.87		
312.62	2.50	8.20		
312.52	2.60	8.53		
312.42	2.70	8.86		
312.32	2.80	9.18		
312.22	2.90	9.51		
312.12	3.00	9.84		
312.02	3.10	10.17		
311.92	3.20	10.50		
311.82	3.30	10.82		
311.72	3.40	11.15		
311.62	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 10

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.03

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.03	0.00	0.00	Topsoil – sandy, dark brown	Sample 10-1
314.93	0.10	0.33	with gravel	
314.83	0.20	0.66	Fill – sand with brick and clay	Sample 10-2
314.73	0.30	0.98		
314.63	0.40	1.31		
314.53	0.50	1.64		
314.43	0.60	1.97		
314.33	0.70	2.30		
314.23	0.80	2.62		
314.13	0.90	2.95		
314.03	1.00	3.28	Silt – brown	Sample 10-3
313.93	1.10	3.61		
313.83	1.20	3.94		
313.73	1.30	4.26	Sand till, brown with cobbles	
313.63	1.40	4.59	and boulders	
313.53	1.50	4.92		
313.43	1.60	5.25	Bedrock	End of Test Pit – 1.6m
313.33	1.70	5.58		
313.23	1.80	5.90		
313.13	1.90	6.23		
313.03	2.00	6.56		
312.93	2.10	6.89		
312.83	2.20	7.22		
312.73	2.30	7.54		
312.63	2.40	7.87		
312.53	2.50	8.20		
312.43	2.60	8.53		
312.33	2.70	8.86		
312.23	2.80	9.18		
312.13	2.90	9.51		
312.03	3.00	9.84		
311.93	3.10	10.17		
311.83	3.20	10.50		
311.73	3.30	10.82		
311.63	3.40	11.15		
311.53	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 11

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.30

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.30	0.00	0.00	Sand and gravel, brown	
315.20	0.10	0.33		
315.10	0.20	0.66	Fill – sand, hard, yellow to red	
315.00	0.30	0.98	to black with slag and bricks	
314.90	0.40	1.31		
314.80	0.50	1.64		Sample 11-1 at 0.5 m
314.70	0.60	1.97		
314.60	0.70	2.30		
314.50	0.80	2.62		
314.40	0.90	2.95		
314.30	1.00	3.28		Sample 11-2 grab at 1.0 m
314.20	1.10	3.61		
314.10	1.20	3.94	Silt, brown to black	Sample 11-3
314.00	1.30	4.26	Sand till, brown with cobbles	Sample 11-4
313.90	1.40	4.59	and boulders	
313.80	1.50	4.92		
313.70	1.60	5.25		
313.60	1.70	5.58		
313.50	1.80	5.90	Bedrock	End of Test Pit – 1.8 m
313.40	1.90	6.23		
313.30	2.00	6.56		
313.20	2.10	6.89		
313.10	2.20	7.22		
313.00	2.30	7.54		
312.90	2.40	7.87		
312.80	2.50	8.20		
312.70	2.60	8.53		
312.60	2.70	8.86		
312.50	2.80	9.18		
312.40	2.90	9.51		
312.30	3.00	9.84		
312.20	3.10	10.17		
312.10	3.20	10.50		
312.00	3.30	10.82		
311.90	3.40	11.15		
311.80	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 12

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.42

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.42	0.00	0.00	Concrete	
315.32	0.10	0.33		
315.22	0.20	0.66	Fill – fine sand, sooty	Sample 12 (Pt)
315.12	0.30	0.98		and 12–1
315.02	0.40	1.31	Fill – sand stained red to green	Sample 12–2
314.92	0.50	1.64		
314.82	0.60	1.97		
314.72	0.70	2.30		
314.62	0.80	2.62		
314.52	0.90	2.95		
314.42	1.00	3.28	Coarse sand till, brown to	
314.32	1.10	3.61	grey with cobbles and boulders	
314.22	1.20	3.94	Coarse sand	Sample 12–3
314.12	1.30	4.26	Silt, brown to black	Sample 12–4
314.02	1.40	4.59	Sand till, brown	Sample 12–5
313.92	1.50	4.92	Bedrock	End of test pit – 1.5m
313.82	1.60	5.25		
313.72	1.70	5.58		
313.62	1.80	5.90		
313.52	1.90	6.23		
313.42	2.00	6.56		
313.32	2.10	6.89		
313.22	2.20	7.22		
313.12	2.30	7.54		
313.02	2.40	7.87		
312.92	2.50	8.20		
312.82	2.60	8.53		
312.72	2.70	8.86		
312.62	2.80	9.18		
312.52	2.90	9.51		
312.42	3.00	9.84		
312.32	3.10	10.17		
312.22	3.20	10.50		
312.12	3.30	10.82		
312.02	3.40	11.15		
311.92	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

LOG OF TEST PIT 12SE10

EO: 90K26
Project: IMICO, Guelph, Ontario
Location: See Figure 5

Date: January 22, 1991
Field Supervisor: J.P. Francois
Elevation of Ground Surface: 315.01

Elevation MASL	Depth Metres	Depth Feet	Soil Description	Remarks
315.01	0.00	0.00	Topsoil – sand dark brown	
314.91	0.10	0.33		
314.81	0.20	0.66	Fill – Gravel	
314.71	0.30	0.98	Fill – Silt, black	Sample 12SE10–1
314.61	0.40	1.31	Fill – Sand, red to black with gravel	Sample 12SE10–2
314.51	0.50	1.64		
314.41	0.60	1.97		
314.31	0.70	2.30		
314.21	0.80	2.62		
314.11	0.90	2.95		
314.01	1.00	3.28		
313.91	1.10	3.61		
313.81	1.20	3.94		
313.71	1.30	4.26		
313.61	1.40	4.59	Silt, brown	
313.51	1.50	4.92	Sand till, brown with cobbles	Sample 12SE10–3
313.41	1.60	5.25	and boulders	
313.31	1.70	5.58	Bedrock	End of Test Pit – 1.7m
313.21	1.80	5.90		
313.11	1.90	6.23		
313.01	2.00	6.56		
312.91	2.10	6.89		
312.81	2.20	7.22		
312.71	2.30	7.54		
312.61	2.40	7.87		
312.51	2.50	8.20		
312.41	2.60	8.53		
312.31	2.70	8.86		
312.21	2.80	9.18		
312.11	2.90	9.51		
312.01	3.00	9.84		
311.91	3.10	10.17		
311.81	3.20	10.50		
311.71	3.30	10.82		
311.61	3.40	11.15		
311.51	3.50	11.48		

Comments: Test pit dry upon completion
Test pit backfilled January 22, 1991

TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP1

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 316.0 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL					PID = 0 ppm
		Backfill					
0.3		**SANDY SILT**					
		Sandy silt with gravel and cobbles, poorly sorted		TP1-1			PID = 0 ppm
		Cobbles increasing in size with depth.					Sample interval between 0.4-0.5 m.
1							
		Cobble diameter up to 0.31 m.		TP1-2			Sample interval between 1.3-1.4 m.
2.0		Test pit terminated at 1.98 m in sandy silt.					

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Gartner Lee Limited

TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP2

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 315.6 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Greyish brown fill					PID = 0 ppm
0.3		SILTY SAND Dark grey silty sand with some gravel, some rootlets, poorly sorted.		T 2-1			Sample interval between 0.3m to 0.4 m. PID = 0 ppm
1		-Becoming a brown sandy silt with cobbles, gravel, rootlets, poorly sorted at 0.91 m.					PID = 0 ppm
				T 2-2			Sample interval between 1.4m to 1.5m. PID = 0 ppm
2 2.1		Test pit terminated at 2.13 m in sandy silt.					

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Gartner Lee Limited

TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP3

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 315.7 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Dark brown fine sand-silt fill, cobbles and gravel, poorly sorted.		T S-1			Sample interval between 0.3m to 0.4 m.
1		-Becoming a coarse sand with iron slag, cobbles and gravel at 1.52 m.		T S-2			Sample interval between 1.5m to 1.6m.
2 2.1		Test pit terminated at 2.13 m in fill.					

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP4

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 316.0 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		SAND AND GRAVEL Coarse sand and gravel, cobbles.					PID = 0 ppm
1							PID = 0 ppm
				TP4-1			Sample interval between 1.5m to 1.6m.
2							
2.1		Test pit terminated at 2.13 m at top of bedrock.					

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Gartner Lee Limited

TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP5

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 315.7 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Brown clay fill.		T S-1			Sample interval between 0.3m to 0.4m.
0.8		**CLAY** Black stained clay, gravel, oily sheen.					PID = 250 ppm Sample interval between 0.76m to 0.86m.
1							
1.5		**SAND** Grey coarse sand with cobbles, poorly sorted, black oil with a very strong odour.					PID= 254 ppm
2							
2.1		Test pit terminated at 2.13 m at top of bedrock.					Sample interval between 2.0m to 2.1m.

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP6

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 1 September 1998
GEOLOGIST HTM
ELEVATION 315.6 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Yellow poorly sorted fill					
0.3		CLAY Brownish black stained clay.		T 6-1			Sample interval between 0.3m to 0.4m.
				T 6-2			Sample interval between 0.6m to 0.61m
0.9		SAND Brown black poorly sorted sand, large cobbles, oil smell.					
1							
2							
2.4		Test pit terminated at 2.43 m at top of bedrock.		T 6-3			Sample interval between 2.33m to 2.43m.

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP7

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.7 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Brown sand with yellow lenses (backfill), gravel.					
0.3		SAND Brown sand with black lenses with oily smell, poorly sorted, cobbles.		T TP-1			Sample interval between 0.3m to 0.4m.
1				T TP-2			Sample interval between 0.9m to 1.0m. PID = 7.4 ppm
							PID = 284 ppm
1.8		Test pit terminated at 1.83 m at top of bedrock.		T TP-3			Sample interval between 1.7m to 1.8m

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP8

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.4 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Backfill					
0.3		**SAND** Yellow sand, poorly sorted.					Sample interval between 0.3m to 0.4m.
		Becoming yellow brown, poorly sorted with cobbles and gravel at 0.61 m.					
1							Sample interval between 0.9m to 1.0m.
2		-Becoming grey at 2.13 m.					
2.6		Test pit terminated at 2.59 m at top of bedrock.					Sample interval between 2.49m to 2.59m.

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP9

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.6 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		SANDY CLAY Orange brown sandy clay, poorly sorted. -Gravel found at 0.31 m.		T 9-1			Sample interval between 0.3m to 0.4m.
0.6		**SANDY SILT** Brown sandy silt, poorly sorted, gravel and cobbles.					PID = 250 ppm
1		-Black staining and oil odour at 1.22 m.		T 9-2			Sample interval between 1.2m to 1.3m.
		-Becoming grey at 1.52 m.					
2							PID = 236 ppm
2.4		Test pit terminated at 2.44 m at top of bedrock.		T 9-3			Sample interval between 2.3m to 2.4m

Gartner Lee Limited

TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP10

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.1 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		CLAYEY SAND Orange brown clayey sand and gravel -Grey seams of coarse material mixed with brown clayey sand at 0.31 m.					PID = 0 ppm
0.6		**SAND** Dark brown-black, golden coloured sand, gravel and cobbles. -Becoming a grey coarse sand, gravel and cobbles, moist, oil stained at 0.91 m.		T TP10-1			Sample interval between 0.6m to 0.7m.
1				T TP10-2			Sample interval between 1.2m to 1.3m
		-Strong odour detected at 1.83 m					
2							PID = 17 ppm
2.4		Test pit terminated at 2.44 m at top of bedrock.		T TP10-3			Sample interval between 2.3m to 2.4m.

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP11

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.7 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		CONCRETE					
0.2		FILL Brick fill					
0.8		Test pit terminated at 0.81 m at top of concrete.					

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TEST PIT LOG

PROJECT: 98-393

TEST PIT: TP12

FORMER IMICO FOUNDRY SITE
GUELPH, ONTARIO
FOR: CITY OF GUELPH

DATE: 2 September 1998
GEOLOGIST HTM
ELEVATION 315.2 m ASL

DEPTH (m)	STRATIGRAPHY	SOILS DESCRIPTION	MONITOR DETAILS	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE ANALYSED	COMMENTS
		FILL Brown sandy clayey fill, gravel and cobbles. -Layer of slag from 0.31 to 0.61 m.					
0.6		**SAND** Yellow brown sand, gravel, cobbles.		T TP2 1			Sample interval between 0.6m to 0.7m. PID= 0 ppm
1		-Becoming a grey coarse sand, gravel and cobbles at 1.22 m.		T TP2-2			Sample interval between 1.2m to 1.3m.
		-Becoming moist at 1.83 m.					PID = 0 ppm
2				T			Sample interval between 2.0m to 2.1m.
2.1		Test pit terminated at 2.13 m at top of bedrock.		TP2-3			

Printed: 26 NOV 98

Gartner Lee Limited

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP1**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.05m								
	314.95	**ASPHALT** - 100 mm thick								
	0.10	**DEBRIS (FILL)** , brick, nails, dark brown staining				TP1-5"		N ⊕		Sample analyzed for PCBs, PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	314.75									
	0.30	**GRAVEL (FILL)** , brown								
	314.44									
	0.61	**COBBLES, SAND and SILT (NATIVE)** , grey				TP1-3'		N ⊕		
1										
	313.45									
	1.60	**END of TESTPIT @ 1.60 m**								
		Refusal on bedrock @ 1.60 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP2**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Stratigraphy / Ground Surface Elevation: 315.27m				**Samples**				
	315.17	**TOPSOIL** , some roots								
	0.10	**DEBRIS (FILL)**				TP2-5"		N ⊕		
	314.97									
	0.30	**COBBLES and GRAVEL (FILL)** , brown								
	314.51									
	0.76	**COBBLES (NATIVE)** , grey								
1						TP2-4'		N ⊕		Sample analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	313.59									
	1.68	**END of TESTPIT @ 1.68 m**								
		Refusal on bedrock @ 1.68 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP3**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.68m								
	315.58	**TOPSOIL** , some roots								
	0.10	**DEBRIS (FILL)** , mottled				TP3-6"		N ⊕		Sample analyzed for PCBs, PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	315.07									
	0.61	**COBBLES and SAND (NATIVE)** , brown				TP3-3'		N ⊕		
1										
	313.85									
	1.83	**END of TESTPIT @ 1.83 m**								
		Refusal on bedrock @ 1.83 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP4**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.34m								
	315.24 / 0.10	**TOPSOIL** , some roots								
		DEBRIS (FILL) , red rusty klinker				TP4-6"		N ⊕		Sample analyzed for PCBs, PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	315.04 / 0.30	**COBBLES and SAND (NATIVE)** , grey								
1						TP4-4'		N ⊕		
	313.81 / 1.53	**END of TESTPIT @ 1.53 m**								
		Refusal on bedrock @ 1.53 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP5**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.54m								
		GRAVEL (FILL) , grey limestone				TP5-5''		N ⊕		
1						TP5-4'		N ⊕		Sample analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
		- water encountered @ 1.53 m.								
	313.71 1.83	**END of TESTPIT @ 1.83 m** Refusal on bedrock @ 1.83 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **02/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP6**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.49m								
		GRAVEL (FILL) , grey limestone				TP6-4"		N ⊕		Sample analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
1						TP6-5'		N ⊕		
	313.66 / 1.83	**END of TESTPIT @ 1.83 m** Refusal on bedrock @ 1.83 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **03/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP8**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.35m								
	315.25	**TOPSOIL** , some roots								
	0.10	**GRAVEL (FILL)** , brown, some brick and cobbles				TP8-4"		N ⊕		Sample and duplicate analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
1						TP8-5'		N ⊕		
	313.52									
	1.83	**END of TESTPIT @ 1.83 m**								
		Refusal on bedrock @ 1.83 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **03/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP9**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 316.16m								
	316.01	**TOPSOIL** , some roots								
	0.15	**COBBLES, SAND and GRAVEL (FILL)** , brown				TP9-1'		N	⊕	Sample analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
1						TP9-4'		N	⊕	
	314.63									
	1.53	**END of TESTPIT @ 1.53 m**								
		Refusal on bedrock @ 1.53 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **03/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP10**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.85m								
	315.75	**ASPHALT** - 100 mm thick								
	0.10	**SANDY SILT (FILL)** , grey, mottled				TP10-8"		N ⊕		
	315.39									
	0.46	**COBBLES and SAND (NATIVE)** , brown								
1						TP10-4'		N ⊕		Sample analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	314.17									
	1.68	**END of TESTPIT @ 1.68 m**								
		Refusal on bedrock @ 1.68 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

Project: **IMICO - Guelph** Contract No: **701996**

Excavation date: **03/12/2013** Supervised by: **M. McCormick**

Test Pit Location: **IMICO - Guelph**

Contractor: **Fred E. Prior Excavating**

Excavation Method: **Rubber tired backhoe**

Test Pit: **TP11**

Monitoring Well: **n/a**

Sheet 1 of 1

Scale (m)	Elev. (m) / Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Conditon	Odour	Headspace TOV ⊕ (ppm) 100 200 300 400 / Headspace TOV □ (%LEL) 20 40 60 80	Remarks and Sample Analyses
		Ground Surface Elevation: 315.60m								
	315.50	**TOPSOIL**								
	0.10	**COBBLES, BRICK and SAND (FILL)** , brown				TP11-6'		N ⊕		Sample and duplicate analyzed for PAHs, PHC (F1-F4), VOCs, Metals and Inorganics.
	315.14									
	0.46	**COBBLES and SAND (NATIVE)** , grey								
1										
						TP11-5'		N ⊕		
	313.77									
	1.83	**END of TESTPIT @ 1.83 m**								
		Refusal on bedrock @ 1.83 m.								

ODOUR:
N - None
T - Trace
M - Moderate
S - Strong
VS- Very Strong

Prepared by: **D. Arnaud**

Checked by: **S. Prior**

Date: **07/01/14**

DCS
DECOMMISSIONING CONSULTING SERVICES LIMITED

JACOBS

RECORD OF BOREHOLE: BH17-200

CLIENT: City of Guelph | DATE DRILLED: October 10, 2017 | DRILLER: ATCOST | NORTHING: 4822281.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | DRILL RIG: CME 850 Rotary Power | EASTING: 562191.7

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 315.41 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.26	Soil cuttings	
					FILL: Slag, black to dark brown, dry to moist, trace sand/silt and fine gravel.		0.15	Bentonite seal	
	72	SS1	9						6.6
							314.50		
1	75	SS2	3	Metals & Inorg. SVOCs (16:06) (0.91-1.07)	**PEAT:** Black, moist to very moist, some silt, trace rootlets and woody stalk.		0.91		1.5
							314.34		
					SANDY SILT: Brown, moist, medium plasticity, fine grain sand, trace clay, trace gravel.		1.07		
				PHCs & BTEX VOCs (16:06) (1.07-1.22)			314.19		
	58	SS3	50+		**SAND AND GRAVEL WITH COBBLES:** Brownish/light grey, moist, fine to coarse sand and gravel, trace silt and clay (pockets on coarse gravel).		1.22		18.0
				Metals & Inorg. SVOCs (16:16) (1.22-1.83)					
2	88	SS4	50/ 5cm		- Increased moisture below 1.83 mbgs.		313.49		2.2
				PHCs & BTEX VOCs (16:29) (1.83-1.98)			1.92		
					GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Buff.		313.38		
					Bottom of borehole at 2.03 mbgs		2.03		
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

IMICO_BH_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 4/16/19

JACOBS

RECORD OF BOREHOLE: BH17-201

CLIENT: City of Guelph | DATE DRILLED: October 10, 2017 | DRILLER: ATCOST | NORTHING: 4822296.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | DRILL RIG: CME 850 Rotary Power | EASTING: 562218.7

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 315.39 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
									100 200 300 400
	79	SS1	28	PCBs (17:10) (0.00-0.30) Metals & Inorg. PAHs PHCs & BTEX (17:10) (0.00-0.61) Metals & Inorg. PHCs & BTEX PAHs (17:25) (0.61-0.91)	**FILL:** Gravel with Sand and Silt, black, moist, fine grained sand and gravel, trace brick and rootlets.		315.09 / 0.30	Soil cuttings; Bentonite seal	2.5
					Sandy Silt, light to dark brown, dry to moist, fine grained sand, trace gravel, trace brick, trace rootlets.		314.78 / 0.61		
	41	SS2	50/ 13cm		**SAND AND GRAVEL WITH COBBLES:** Brownish light grey, moist, fine to coarse sand and gravel, some silt.		314.50 / 0.89		28.0
1					- Attempt second borehole, refusal at same depth on suspected bedrock. Bottom of borehole at 0.89 mbgs				
2									
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

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RECORD OF BOREHOLE: BH17-202

CLIENT: City of Guelph | DATE DRILLED: October 10, 2017 | DRILLER: ATCOST | NORTHING: 4822314.7

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | DRILL RIG: CME 850 Rotary Power | EASTING: 562299.9

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 315.55 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.40 / 0.15	Soil cuttings	
				Metal & Inorg. PAHs (14:22) (0.15-0.61)	**FILL:** Sand, black, moist, fine grained, trace silt.			Bentonite seal	
	100	SS1	15		- Brown trace slag below 0.30 mbgs.				3.7
				PHCs & BTEX VOCs (14:30) (0.61-1.22)	- 5 cm seam gravel at 0.45 mbgs, followed by increased silt and Fe staining. Sandy Silt, brown, dry to moist, low plasticity, fine sand, trace black and Fe staining, trace slag and rootlets.		315.07 / 0.48		
1	54	SS2	10		- 15 cm seam of fine sand at 0.66 mbgs.				92.0
				Metals & Inorg. PAHs (14:40) (1.22-1.83)			314.10 / 1.45		
	100	SS3	50+		**SILTY SAND AND GRAVEL:** Dry to moist, grey/brown, fine sand, trace medium and coarse sand, fine to coarse gravel, some cobbles.				1.2
				PHCs & BTEX VOCs (15:12) (1.83-2.44)					
2	83	SS4	70/ 15cm		- Increased moisture below 2.08 mbgs.		313.42 / 2.13		0.6
					- Refusal on suspected bedrock.				
					Bottom of borehole at 2.13 mbgs				
3									
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH17-203

CLIENT: City of Guelph | DATE DRILLED: October 11, 2017 | DRILLER: ATCOST | NORTHING: 4822397.1

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | DRILL RIG: CME 850 Rotary Power | EASTING: 562335.1

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 316.39 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
				PHCs & BTEX VOCs (10:06) (0.15-0.61)	**CONCRETE:**		316.24 / 0.15	Soil cuttings	
	61	SS1	11		**FILL:** Silty sand, dark brown, moist, fine grained, trace, slag.			Bentonite seal	12.6
							315.70 / 0.69		
1	46	SS2	10		Silt and slag, dark orange/brown, moist, trace fine sand and gravel, trace metallic fragments.				1.2
							315.17 / 1.22		
	79	SS3	50+		**SAND AND GRAVEL WITH COBBLES:** Brown to light grey, dry to moist, fine to coarse sand and gravel, some silt top 10 cm then trace, trace rootlets.				2.6
2	79	SS4	50+	TOC (10:42) (1.83-2.44)					2.4
					- Refusal on suspected bedrock. Bottom of borehole at 2.39 mbgs		314.00 / 2.39		
3									
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH17-204

CLIENT: City of Guelph | DATE DRILLED: October 13, 2017 | DRILLER: ATCOST | NORTHING: 4822347.0

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | DRILL RIG: CME 850 Rotary Power | EASTING: 562290.9

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 315.24 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0				Metals & Inorg. SVOCs PHCs & BTEX VOCs (12:48) (0.15-0.61)	**CONCRETE:**		315.04 / 0.20	Soil cuttings; Bentonite seal	100 200 300 400
	72	SS1	7		**FILL:** Silty sand and slag, black, moist, fine grained.		314.78 / 0.46		10.3
	8	SS2	50/ 10cm		Sand, gravel, slag and concrete, black to light grey, moist, fine sand and gravel, trace Fe staining.		314.53 / 0.71		
1					**CONCRETE:**		314.02 / 1.22		
					- Auger refusal in concrete, multiple attempts made to advance boring, all met with refusal in concrete. Bottom of borehole at 1.22 mbgs				
2									
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

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RECORD OF BOREHOLE: BH18-204

CLIENT: City of Guelph | DATE DRILLED: July 23, 2018 | DRILLER: Aardvark Drilling | NORTHING: 4822414.4

LOCATION: 200 Beverley St., Guelph | LOGGED BY: L. Ribeiro | DRILL RIG: CME 75 Power Auger | EASTING: 562362.4

PROJECT NUMBER: 694757 | DRILL METHOD: 159 mm HSA | GROUND ELEVATION: 316.42 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.27	Soil cuttings	
					FILL: Sand, dark brown and grey, dry, fine to coarse, some gravel, medium dense.		0.15	Bentonite seal	
	33	SS1	12						1.7
1	50	SS2	25						2.4
				VOCs (09:10) (1.52-2.13)			314.90		
					SILTY SAND AND GRAVEL WITH COBBLES: Dark brown transitioning to light grey, dry, medium to very dense.		1.52		
	71	SS3	50+						3.3
2					- Slight hydrocarbon like odour below 2.29 mbgs increasing with depth.				
	17	SS4	18						2.9
3				VOCs (09:30) (3.05-3.40)	- Dark grey, wet below 3.05 mbgs.				
	33	SS5	75/ 20cm						4.7
							313.02		
					- Refusal on suspected bedrock. Bottom of borehole at 3.40 mbgs		3.40		
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH18-205

CLIENT: City of Guelph | DATE DRILLED: July 20, 2018 | DRILLER: Aardvark Drilling | NORTHING: 4822412.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: L. Ribeiro | DRILL RIG: CME 75 Power Auger | EASTING: 562388.6

PROJECT NUMBER: 694757 | DRILL METHOD: 159 mm HSA | GROUND ELEVATION: 316.46 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.31 / 0.15	Soil cuttings	
					FILL: Sand, dark to light brown and grey, dry, fine to coarse, some concrete, medium dense.			Bentonite seal	
	67	SS1	21						2.4
				VOCs (09:40) (0.76-1.37)			315.70 / 0.76		
1	58	SS2	50+		**SAND AND GRAVEL WITH COBBLES:** Dark brown, dry, fine to coarse sand, very dense.				6.4
	100	SS3	50/ 5cm	PHCs & BTEX VOCs (09:50) (1.52-1.57)	Light brown, moist below 1.52 mbgs . - Refusal on suspected boulder. Bottom of borehole at 1.58 mbgs		314.88 / 1.58		2.0
2									
3									
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH18-206

CLIENT: City of Guelph | DATE DRILLED: July 23, 2018 | DRILLER: Aardvark Drilling | NORTHING: 4822360.3

LOCATION: 200 Beverley St., Guelph | LOGGED BY: L. Ribeiro | DRILL RIG: CME 75 Power Auger | EASTING: 562310.6

PROJECT NUMBER: 694757 | DRILL METHOD: 159 mm HSA | GROUND ELEVATION: 315.29 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
	13	SS1	16		**FILL:** Sand with silt, grey to light grey, dry, fine, some gravel, medium dense.			Soil cuttings	0.4
				Metals & Inorg. (15:10) (0.76-1.37)				Bentonite seal	
							314.53 / 0.76		
1	71	SS2	42		Sand, dark brown to grey, dry, fine to coarse, some gravel, dense.				0.4
				PHCs & BTEX (15:30) (1.52-1.96)			313.77 / 1.52		
	58	SS3	83/ 28cm		**SAND AND GRAVEL WITH COBBLES:** Brown, dry, fine sand, very dense.				0.0
2	8	~~SS4~~	50/ 0cm				313.00 / 2.29		
					- Refusal on suspected bedrock. Bottom of borehole at 2.29 mbgs				
3									
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF BOREHOLE: BH18-207

CLIENT: City of Guelph | DATE DRILLED: July 20, 2018 | DRILLER: Aardvark Drilling | NORTHING: 4822397.6

LOCATION: 200 Beverley St., Guelph | LOGGED BY: L. Ribeiro | DRILL RIG: CME 75 Power Auger | EASTING: 562377.6

PROJECT NUMBER: 694757 | DRILL METHOD: 159 mm HSA | GROUND ELEVATION: 316.46 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.31 / 0.15	Soil cuttings	
				Metals (10:40) (0.15-0.61)	**FILL:** Sand, dark to light brown, dry, fine to coarse, some concrete, very dense.			Bentonite seal	
	50	SS1	50+						1.7
	100	SS2	50/ 10cm	Metals PHCs & BTEX (11:00) (0.76-0.89)			315.70 / 0.76		1.3
1					**SAND AND GRAVEL WITH COBBLES:** Dark brown, dry, fine to coarse sand, very dense.				
	0	SS3	50/ 8cm						
2									
					- Auger refusal on suspected bedrock. Bottom of borehole at 2.29 mbgs		314.17 / 2.29		
3									
4									
5									
6									
7									

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF BOREHOLE: BH18-207i

CLIENT: City of Guelph | DATE DRILLED: February 21, 2020 | DRILLER: Aardvark Drilling | NORTHING: 4822395.7

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | DRILL RIG: CME 75 Power Auger | EASTING: 562378.4

PROJECT NUMBER: 694757 | DRILL METHOD: 83 mm HSA | GROUND ELEVATION: 316.45 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.30	Bentonite seal	100 200 300 400
				PAHs VOCs (09:55) (0.15-0.76)	**FILL:** Sand, dark brown, some concrete and gravel.		0.15		
	8	SS1							
1	29	SS2							1.6
				Metals VOCs (10:20) (1.52-2.13)			314.93		
					SAND AND GRAVEL: With cobbles.		1.52		
	83	SS3							3.2
2				Metals VOCs (10:40) (2.29-2.90)	- Fe staining below 2.28 mbgs.				
	49	SS4							1.9
							313.40		
3	100	SS5					3.05		
					GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:		313.38		
					Bottom of borehole at 3.07 mbgs		3.07		
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF BOREHOLE: BH18-208

CLIENT: City of Guelph | DATE DRILLED: July 23, 2018 | DRILLER: Aardvark Drilling | NORTHING: 4822386.6

LOCATION: 200 Beverley St., Guelph | LOGGED BY: L. Ribeiro | DRILL RIG: CME 75 Power Auger | EASTING: 562257.8

PROJECT NUMBER: 694757 | DRILL METHOD: 159 mm HSA | GROUND ELEVATION: 315.56 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.41 / 0.15	Soil cuttings	
					FILL: Sand with, dark brown, dry, coarse, loose to very dense.			Bentonite seal	
	42	SS1	46	Metals PAHs (16:30) (0.76-1.37)					2.2
							314.80 / 0.76		
1	67	SS2	14		**SAND AND GRAVEL WITH COBBLES:** Dark brown to light grey, dry, fine to coarse sand, medium dense.				0.7
	17	SS3	18						0.1
2							313.50 / 2.06		
					- Refusal on suspected bedrock. Bottom of borehole at 2.06 mbgs				
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH19-209

CLIENT: City of Guelph | DATE DRILLED: April 16, 2019 | DRILLER: Aardvark Drilling | NORTHING: 4822423.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: J. Gowing | DRILL RIG: CME 45 Rotary Power | EASTING: 562365.7

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 316.44 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.36 / 0.08	Bentonite seal	
	25	SS1	8		**FILL:** Silty Sand and Gravel, dark to medium brown, moist, loose to medium dense, fine to coarse sand and gravel, trace clay, trace brick.				1.0
1	25	SS2	26	VOCs (11:50) (0.76-0.76)	- Increased gravel and cobbles below 0.91 mbgs.				0.8
							315.22 / 1.22		
	50	SS3	32		**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, very dense, fine sand and gravel, trace silt.				3.4
2	69	SS4	39	VOCs (12:00) (2.13-2.13)					1.2
	54	SS5	50+						1.2
				VOCs (12:10) (2.90-2.90)	- Moist to wet below 2.73 mbgs.		313.54 / 2.90		
3					Bottom of borehole at 2.90 mbgs - Refusal on suspected bedrock.				
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF BOREHOLE: BH19-210

CLIENT: City of Guelph | DATE DRILLED: April 16, 2019 | DRILLER: Aardvark Drilling | NORTHING: 4822408.0

LOCATION: 200 Beverley St., Guelph | LOGGED BY: J. Gowing | DRILL RIG: CME 45 Rotary Power | EASTING: 562363.1

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 316.37 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.29 / 0.08	Bentonite seal	100 200 300 400
	17	SS1	6		**FILL:** Silty Sand and Gravel, dark to medium brown, moist, medium dense, fine to coarse sand and gravel, trace clay, trace brick.				0.4
1	25	SS2	18	VOCs (12:40) (0.76-0.76)					0.8
	67	SS3	21						1.0
2	63	SS4	50+	VOCs (12:50) (1.83-1.83)	- Increased gravel and cobbles, very dense below 1.67 mbgs.				1.7
				VOCs (13:00) (2.29-2.29)			313.78 / 2.59		
	67	SS5	50+		**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, very dense, fine sand and gravel, trace silt.				1.0
3				VOCs (13:05) (2.90-2.90)			313.40 / 2.97		
					Bottom of borehole at 2.97 mbgs - Refusal on suspected bedrock.				
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF BOREHOLE: BH19-211

CLIENT: City of Guelph | DATE DRILLED: April 16, 2019 | DRILLER: Aardvark Drilling | NORTHING: 4822403.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: J. Gowing | DRILL RIG: CME 45 Rotary Power | EASTING: 562384.6

PROJECT NUMBER: 694757 | DRILL METHOD: 108 mm HSA | GROUND ELEVATION: 316.46 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		316.38 / 0.08	Bentonite seal	100 200 300 400
	17	SS1	37		**FILL:** Silty Sand and Gravel, light to medium brown, moist, very dense, fine to coarse sand and gravel, trace clay, trace brick.				1.3
	40	SS2	50+/ 23cm	VOCs (13:30) (0.76-0.76)					1.9
1							315.39 / 1.07		
	67	SS3	50+	VOCs (13:40) (1.22-1.22)	**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, very dense, fine sand and gravel, trace silt.				2.6
2	83	SS4	50+						3.7
	58	SS5	50+						2.1
3				VOCs (13:50) (3.05-3.05)	Bottom of borehole at 3.05 mbgs - Refusal on suspected bedrock.		313.41 / 3.05		
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF BOREHOLE: BH20-212

CLIENT: City of Guelph | DATE DRILLED: February 21, 2020 | DRILLER: Aardvark Drilling | NORTHING: 4822378.4

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | DRILL RIG: CME 75 Power Auger | EASTING: 562279.9

PROJECT NUMBER: 694757 | DRILL METHOD: 83 mm HSA | GROUND ELEVATION: 315.65 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.50 / 0.15	Bentonite seal	100 200 300 400
	42	SS1		Metals & Inorg. PHCs VOCs (12:15) (0.15-0.76)	**FILL:** Silt and Sand, dark brown, some gravel, moist.				0.7
					FILL: Slag.		314.95 / 0.70		
1	33	SS2			**CLAYEY SILT:** Medium brown, medium plasticity, trace sand and gravel increasing with depth, trace cobbles, Fe staining, upper contact dark brown with rootlets.		314.89 / 0.76		0.8
					- Dark brown below 1.52 mbgs.		313.95		
	75	SS3			**SILTY SAND AND GRAVEL:** Moist, light brown, trace cobbles, fine to coarse sand and gravel.		1.70		0.9
2	100	SS4			**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:**		313.36 / 2.29		
					Bottom of borehole at 2.31 mbgs		313.34 / 2.31		
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF BOREHOLE: BH20-213

CLIENT: City of Guelph | DATE DRILLED: February 21, 2020 | DRILLER: Aardvark Drilling | NORTHING: 4822295.8

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | DRILL RIG: CME 75 Power Auger | EASTING: 562196.6

PROJECT NUMBER: 694757 | DRILL METHOD: 83 mm HSA | GROUND ELEVATION: 315.34 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.19	Bentonite seal	100 200 300 400
				SVOCs Metals & Inorg. (14:30) (0.15-0.76)	**FILL:** Silty sand with slag, dark brown and black, moist, pockets of silt with heavy Fe staining, trace gravel.		0.15		
	46	SS1							105.2
							314.58		
1	58	SS2			**SILT AND CLAY:** Dark brown, some fine sand, medium plasicity, moist, trace fine gravel and small cobbles, few rootlets.		0.76		1.6
							314.12		
					SAND: Medium brown, moist, some silt and fine gravel.		1.22		
					SILTY SAND: Medium brown, some gravel and cobbles, dry to moist, some Fe staining.		313.97 1.37		
	50	SS3							1.4
2							313.21		
					Bottom of borehole at 2.13 mbgs - Refusal on suspected bedrock at 2.13 mbgs.		2.13		
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF BOREHOLE: BH20-214

CLIENT: City of Guelph | DATE DRILLED: February 21, 2020 | DRILLER: Aardvark Drilling | NORTHING: 4822403.3

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | DRILL RIG: CME 75 Power Auger | EASTING: 562251.5

PROJECT NUMBER: 694757 | DRILL METHOD: 83 mm HSA | GROUND ELEVATION: 315.52 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					CONCRETE:		315.37	Bentonite seal	100 200 300 400
				Metals & Inorg. PHCs VOCs PAHs (13:30) (0.15-0.30)	**FILL:** Slag, some coal.		0.15		
	75	SS1							1.4
							314.91		
				Metals & Inorg. PHCs VOCs PAHs (13:45) (0.76-0.91)	**CLAY:** Reddish brown, stiff, sand and fine gravel.		0.61		
1	13	SS2							1.6
	100	SS3					313.69		
2					Bottom of borehole at 1.83 mbgs - Refusal on suspected bedrock at 1.83 mbgs.		1.83		
3									
4									
5									
6									
7									

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW17-100S

CLIENT: City of Guelph
DATE DRILLED: October 13, 2017
GROUND ELEVATION: 315.56 masl
NORTHING: 4822361.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 316.22 masl
EASTING: 562267.1

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.97 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, HQ water core
WATER LEVEL DATE: October 31, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
							CONCRETE:		315.36	315.56 / 0.00	Monument casing secured in concrete 0.66 m stick up	
	54	SS1	10			Metals & Inorg. PHCs & BTEX (11:33) (0.30-0.46)	**FILL:** Sand and Gravel, dark brown, moist, fine to coarse sand and gravel, trace silt. Silty Sand, brown, moist, fine grained, trace slag. Slag.		0.20 315.31 0.25 315.20 0.36	315.26 0.30	210 mm borehole	18.6
1	54	SS2	4						314.49 1.07			9.0
	75	SS3	50+			Metals & Inorg. (12:14) (1.37-1.83)	**SILT:** Brown top 10 cm then grey, dry to moist, medium plasticity, trace fine sand, high organic content, trace rootlets and orange mottling, trace clay. - Trace fine gravel below 1.22 mbgs. **SAND AND GRAVEL WITH COBBLES:** Light grey, dry to moist, fine to coarse sand and gravel, trace silt increasing with depth.		314.19 1.37			29.7
2	50	SS4	50+/ 20cm			PHCs & BTEX VOCs (12:25) (1.83-2.13)	- Sampler refusal on suspected bedrock at 2.18 mbgs, ream HW casing to 2.95 mbgs, HQ coring begins at 2.67 mbgs.					29.6
									312.92 2.64	312.92 2.64	96 mm corehole	
3	93	Run1		0	10+ 7 3 6		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, moderately fractured core, frequent (<30 mm) vugs. - Fissile shaley bedding partings between 3.10 and 3.81 mbgs, easily fractured, localized weathering common at fractures. - Weathered and Fe stained fractures at 3.12, 3.28, and 3.45 to 3.79 mbgs.			312.36 3.20 312.18 3.38	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
4	100	Run2		22	5 4 6 3		- Below 4.11 mbgs greyish brown, vugs smaller (<10 mm) and more frequent, dark grey bedding planes.					
5							Bottom of corehole at 4.90 mbgs		310.66 4.90	310.66 4.90		
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

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JACOBS

RECORD OF MONITORING WELL: MW17-101D

CLIENT: City of Guelph | DATE DRILLED: Oct 20 to Oct 24, 2017 | GROUND ELEVATION: 315.25 masl | NORTHING: 4822375.8

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.01 masl | EASTING: 562327.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.55 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							CONCRETE:		315.10 / 0.15	315.25 / 0.00	Monument casing secured in concrete	
							FILL: Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace silt.			314.95 / 0.30	210 mm borehole Bentonite seal	
							Silt, Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace dark brown and Fe staining, trace brick.		314.69 / 0.56			
1							**SAND AND GRAVEL:** Light grey, dry to moist, fine to coarse sand and gravel, trace silt.		314.28 / 0.97			
									313.35 / 1.91	313.27 / 1.98	123 mm corehole	
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Greyish light brown, fosiliferous, fine grained, medium strong, slightly weathered, very close to close joint spacing, thinly to medium bedded, slightly to moderately fractured core. Frequent small vugs (<5 mm), dark grey bedding planes. - Hydrocarbon like odour, black staining and sheen within fractures below 2.44 mbgs, decreasing below 3.43 mbgs and not present below 4.19 mbgs. - Vertical fracture from 2.44 to 2.84 mbgs					
3							- Core water return loss below 3.20 mbgs, due to large fractures between 3.20 and 3.28 mbgs.					
4							- Greyish dark brown, fine grained, strong, slightly weathered, close joint spacing, thinly bedded, moderately fractured to sound core. Vugs become less frequent but larger (<50 mm) with calcite lining below 4.04 mbgs.					
					0					310.35 / 4.90	96 mm corehole	
5					4		- Lithology to 4.88 mbgs inferred from MW17-101S, MW17-101D HSA to top of bedrock, ream PW casing to 2.29 mbgs and PQ core to 4.90 mbgs, HW casing reamed to 5.26 mbgs, HQ core logging resumes at 4.88 mbgs. - 23 cm core loss from top of Run 3					
					3		-Fossils present below 5.49 mbgs.		309.76 / 5.49			
	85	Run3		60	2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Greyish dark brown, fine grained, strong, slightly weathered, close joint spacing, thinly bedded, moderately fractured to sound core, fossils. Some vugs (<50 mm) with calcite lining.					
6					1					309.15 / 6.10	#3 silica sand filter pack	
					2					308.95 / 6.30	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					4		- Close joint spacing and sound core below 6.40 mbgs. - Core water return loss below 6.48 mbgs, large fractures 6.48 to 6.93 mbgs.					
7					3							
	93	Run4		77	1							
					2					307.43 / 7.82	Core loss	
									307.33	307.33		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW17-101D

CLIENT: City of Guelph | DATE DRILLED: Oct 20 to Oct 24, 2017 | GROUND ELEVATION: 315.25 masl | NORTHING: 4822375.8

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.01 masl | EASTING: 562327.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.55 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							Bottom of corehole at 7.92 mbgs		7.92	7.92		
9												
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

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RECORD OF MONITORING WELL: MW17-101S

CLIENT: City of Guelph | DATE DRILLED: October 20, 2017 | GROUND ELEVATION: 315.24 masl | NORTHING: 4822374.3 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.13 masl | EASTING: 562326.6

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.62 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: ELEV. (masl) / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.24 / 0.00	100 200 300 400
							CONCRETE:		315.09 / 0.15		
	61	SS1	47			PCBs (08:47) (0.15-0.46)	**FILL:** Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace silt.			314.94 / 0.30	6.8
									314.68 / 0.56		
1	75	SS2	34			Metals & Inorg. SVOCs (09:08) (0.61-0.91)	Silt, Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace dark brown and Fe staining, trace brick.		314.27 / 0.97		8.4
							SAND AND GRAVEL: Light grey, dry to moist, fine to coarse sand and gravel, trace silt.			314.17 / 1.07	
	21	SS3	50/ 13cm			Metals & Inorg. SVOCs PHCs & BTEX VOCs 1 4-Dioxane (10:01) (1.22-1.68)				314.02 / 1.22	11.9
							- Auger refusal at 1.65 mbgs, ream HW casing to 2.59 mbgs, HQ coring from 1.91 mbgs.		313.34 / 1.91	313.34 / 1.91	
2					10		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Greyish light brown, fosiliferous, fine grained, medium strong, slightly weathered, very close to close joint spacing, thinly to medium bedded, slightly to moderately fractured core. Frequent small vugs (<5 mm), dark grey bedding planes.				
					3						
	95	Run1		30	2		- Hydrocarbon like odour, black staining and sheen within fractures below 2.44 mbgs, decreasing below 3.43 mbgs and not present below 4.19 mbgs.				
					1		- Vertical fracture from 2.44 to 2.84 mbgs				
3					3						
							- Core water return loss below 3.20 mbgs, due to large fractures between 3.20 and 3.28 mbgs.				
					2						
					3						
4					3		- Greyish dark brown, fine grained, strong, slightly weathered, close joint spacing, thinly bedded, moderately fractured to sound core. Vugs become less frequent but larger (<50 mm) with calcite lining below 4.04 mbgs.			310.97 / 4.27	
	98	Run2		25	2					310.82 / 4.42	
					2						
5									310.26 / 4.98	310.26 / 4.98	
							Bottom of corehole at 4.98 mbgs				
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 0.89 m stick up
- Monument casing secured in concrete
- Bentonite seal 210 mm borehole
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen
- 96 mm corehole
- Bentonite seal

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

JACOBS

RECORD OF MONITORING WELL: MW17-102D

CLIENT: City of Guelph | DATE DRILLED: Oct 26 to Oct 30, 2017 | GROUND ELEVATION: 315.41 masl | NORTHING: 4822260.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.21 masl | EASTING: 562245.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.71 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ, NQ water core | WATER LEVEL DATE: November 3, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: ELEV. (masl) / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.80 m stick up	100 200 300 400
							CONCRETE:		315.26 / 0.15	315.41 / 0.00	Monument casing secured in concrete	
							FILL: Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace silt.		315.18 / 0.23	315.11 / 0.30	210 mm borehole	
	.67	SS1	22			SVOCs (17:42) (0.15-1.22) PHCs & BTEX VOCs (17:42) (0.15-0.30)	Silt, Sand and Gravel, light to dark brown, fine to coarse sand and gravel, trace slag.					0.4
1	33	SS2	23									0.7
						Metals & Inorg. (18:02) (1.22-1.68)	- Trace black sand below 1.30 mbgs.					
	46	SS3	7									0.7
							SILTY SAND AND GRAVEL WITH COBBLES: Light grey to light brown, moist, fine to coarse sand and gravel.		313.68 / 1.73			
2	64	SS4	50/ 20cm			Metals & Inorg. PAHs PHCs & BTEX VOCs (18:12) (1.83-2.13)	- Sampler refusal at 2.18 mbgs, ream PW casing to 2.59 mbgs, PQ coring from 2.26 mbgs.		313.15 / 2.26	313.12 / 2.29	123 mm corehole	2.0
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fosiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, thinly bedded, slightly to moderately fractured core, some vugs (<15 mm).					
					2		- Fe staining in 75% of fractures from 2.69 to 4.80 mbgs.					
	100	Run1		29	1							
3							- Water return loss observed below 3.17 mbgs, continues for remainder of corehole.					
					4		- Highly weathered partly open to open fractures at 3.18, 3.28, 3.48 and 3.65 mbgs; potentially water bearing.					
					3							
4					+10		- Light greyish brown, frequent large vugs (<60 mm), moderately decomposed, increased weathering below 3.71 mbgs.					
	100	Run2		40			- Fracture zone 4.14 to 4.80 mbgs.					
					+10							
					+10							
										310.53 / 4.88		
5					4		- Vugs less frequent below 4.90 mbgs, trace fossils <5 mm.				96 mm corehole	
					2		- 85 mm vug at 5.13 mbgs, mineral carbonate lining and Fe staining.					
					0		- Highly weathered open fracture (up to 6 cm from fracture), potentially water bearing, at 5.49 mbgs.					
	98	Run3		80			- 10 cm long, very tight vertical fracture at 5.74 mbgs.					
					3				309.49 / 5.92			
6					1		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark greyish brown, strong, fresh to slightly weathered, close fracture spacing, sound core. Bedding planes more evident, trace fossils <5 mm, some vugs < 15 mm.					
					3		- PQ core to 6.43 mbgs, ream HW casing to 6.63 mbgs, HQ coring from 6.40 mbgs.					
					2		- Increased frequency of vugs 6.71 to 7.01 mbgs.					
7					1							
	100	Run4		70			- Very tight vertical fracture 7.24 to 7.44 mbgs.					
					4							
					1		- 7.62 to 7.92 mbgs frequent vugs (<30 mm), increased weathering, decreased strength from 7.75 mbgs.					
					2							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

RECORD OF MONITORING WELL: MW17-102D

CLIENT: City of Guelph | DATE DRILLED: Oct 26 to Oct 30, 2017 | GROUND ELEVATION: 315.41 masl | NORTHING: 4822260.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.21 masl | EASTING: 562245.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.71 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ, NQ water core | WATER LEVEL DATE: November 3, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	94	Run5		64	4 2		- Trace vugs (<5 mm) below 7.92 mbgs. - Vugs and localized weathering at 8.36 mbgs. - Vugs and increased weathering at 8.66 mbgs.			306.57 / 8.84	76 mm corehole
10	84	Run6		0	1 2 3		- 5 cm core loss from bottom of Run 5. - Extremely poor rock quality 8.81 to 9.30 mbgs. - HQ core to 8.84 mbgs, ream NW casing to 9.30 mbgs, NQ coring from 8.81 mbgs. - Dark greyish brown, fine crystalline, strong, fresh to slightly weathered, close fracture spacing, thinly bedded, slightly fractured to sound core. Frequent to some fossils <5 mm, seams of high fossil deposition, trace vugs <5 mm, bedding planes evident, frequent shale partings below 8.84 mbgs.				
11	93	Run7		65	5 1 2 1		- Core loss (10 cm) from Run 7, location of loss not evident. Driller remark: Seems like voids in rock, hard slow coring then quick drop in core string. - At 9.50 and 9.53 mbgs, shale parting fractures, weak rock with localized weathering, potentially water bearing.				
12	100	Run8		77	1 3 3 1		- Increasing dark brown colouration below 11.28 mbgs. - 6 cm weak fractured rock zone, coinciding with 15 cm very tight vertical fracture at 11.30 mbgs. - 3 cm very tight vertical fracture at 12.04 mbgs.				
13	100	Run9		53	1 4 2 2 3		- 5 cm very tight vertical fracture at 13.64 mbgs. - Very tight weathered fracture, potentially water bearing, at 13.69 mbgs.			301.79 / 13.62 ~~301.64~~ / 13.77	#3 silica sand filter pack 32 mm diameter SCH 40 PVC pipe #10-slot well screen
14					5 1		- 4 cm vertical very tight joint at 13.98 mbgs. - 3 cm vertical very tight joint at 14.15 mbgs.				
15	92	Run 10		73	2 2 1		- 6 cm very tight vertical fracture at 14.45 mbgs. - Dark greyish brown below 14.53 mbgs. - Vuggy (20 mm diameter) at 14.55 mbgs.		300.11 / 15.30 300.02 / 15.39	300.12 / 15.29 300.02 / 15.39	Core loss

ERAMOSA FORMATION / VINEMOUNT MEMBER
SHALY DOLOSTONE: Dark greyish brown, fine crystalline, strong, fresh to slightly weathered, close fracture spacing, thinly bedded, slightly fractured to sound core.

Bottom of corehole at 15.39 mbgs

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW17-103D

CLIENT: City of Guelph	DATE DRILLED: October 26, 2017	GROUND ELEVATION: 315.54 masl	NORTHING: 4822329.3	
LOCATION: 200 Beverley St., Guelph	DRILLER: Atcost Drilling	TOP OF PIPE: 316.31 masl	EASTING: 562231.0	
PROJECT NUMBER: 694757	DRILL RIG: CME 850 Rotary Power	WATER ELEVATION: 312.64 masl	MOE WELL TAG#: A202490	
LOGGED BY: M. Shiry	DRILL METHOD: 108 mm HSA, PQ, HQ water core	WATER LEVEL DATE: November 2, 2017		

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.77 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown to black, moist, fine grained, trace brick and fine gravel.		315.54 / 0.00	315.54 / 0.00	Monument casing secured in concrete	
							Brick rubble.		315.34 / 0.20			
							Sand, black, moist, fine grained, trace slag.		315.26 / 0.28	315.24 / 0.30	210 mm borehole Bentonite seal	
							Sand and slag, brown to black, dry to moist, trace coal.		315.08 / 0.46			
									314.73 / 0.81			
1							**SILT:** Dark to light brown, moist, low plasticity, high organic content, trace rootlets and fine gravel.					
							- Deceased organic content, transitioning to lower contact below 1.07 mbgs.		314.32 / 1.22			
							SILTY SAND AND GRAVEL WITH COBBLES: Light grey to dark brown, trace olive grey (silt), dry to moist, fine to coarse sand and gravel.					
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, slightly to moderately fractured core, occasional (<40 mm) vugs.		313.64 / 1.91	313.64 / 1.91	123 mm corehole	
							- 15 cm core loss from top of Run 1.					
							- Fe staining in fractures from 2.26 to 2.90 mbgs.					
							- 4 cm very tight vertical fracture at 2.34.					
							- 5 cm weak rock at 2.36 mbgs, potentially water bearing.					
3							- 50 mm vug at 2.64 mbgs, mineral carbonate lining, increased localized weathering, potentially water bearing.					
							- Highly weathered partly open fracture, potentially water bearing, at 3.18 mbgs.					
							- Highly weathered open fracture, potentially water bearing, at 3.22, very tight vertical fracture below.					
							- Below 3.33 mbgs light greyish brown, fine grained, medium strong, slightly weathered, very close to close fracture spacing, thinly bedded, slightly to moderately fractured core, dark grey bedding planes, frequent small vugs (<5 mm) with trace large vugs 25 to 65 mm.					
4							- Fe staining in fracture at 4.32 mbgs.					
							- 25 mm vug with localized increased weathering, partial filled with carbonate minerals at 4.72 mbgs.					
5							- Highly weathered partly open to open fractures, potentially water bearing, at 4.75 and 4.80 mbgs.					
							- Highly weathered partly open to open fractures with weak rock, potentially water bearing, at 5.39, 5.61 and 5.64 mbgs.			309.90 / 5.64	96 mm corehole	
6							- 40 mm vug with localized increased weathering, carbonate mineral lining at 5.87 mbgs.					
							- Light to dark greyish brown below 5.94 mbgs.					
							- 65 mm vug at 6.10 mbgs, penetrates core, carbonate mineral lining, some localized increased weathering		309.11 / 6.43			
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark greyish brown.					
					2		- Lithology to 6.43 mbgs inferred from MW17-103S, MW17-103D HSA to top of bedrock, ream PW casing to 2.29 mbgs and PQ core to 5.64 mbgs, HW casing reamed to 5.79 mbgs, HQ core logging resumes at 6.55 mbgs.					
7					2		- 10 cm of increased weathering with frequent vugs at 7.09 mbgs.			308.38 / 7.16		
	98	Run4		77	2					308.22 / 7.32	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					2							
					2		- Below 7.62 mbgs trace small (<5 mm) fossils, shale partings in fractures common, rock strong, fresh to slightly weathered, close fracture spacing and moderately fractured to sound core, occasional high fossil content bedding seams.					

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW17-103D

CLIENT: City of Guelph | DATE DRILLED: October 26, 2017 | GROUND ELEVATION: 315.54 masl | NORTHING: 4822329.3

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.31 masl | EASTING: 562231.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.64 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: November 2, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run5		85	2 2 1 1 1		- 15 cm weak, fractured (mechanical) rock at 7.92 mbgs. - Some vugs 5 to 25 mm from 8.38 to 8.66 mbgs. - Highly weathered, partly open, fracture with weak rock, potentially water bearing, at 8.56 mbgs. - Dark greyish brown, finely crystalline, strong, fresh to slightly weathered, close fracture spacing, thinly bedded, slightly fractured to sound core. Trace vugs (<25 mm) with carbonate mineral lining, some fossils <5 mm diameter below 8.63 mbgs.			306.70 8.84 ~~306.55~~ 8.99	Bentonite seal	
									305.94 9.60	305.94 9.60		
							Bottom of corehole at 9.60 mbgs					
10												
11												
12												
13												
14												
15												

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW17-103S

CLIENT: City of Guelph | DATE DRILLED: Oct 25 to Oct 26, 2017 | GROUND ELEVATION: 315.54 masl | NORTHING: 4822330.7 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.30 masl | EASTING: 562233.2

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.70 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 2, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: ELEV. (masl) / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.76 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown to black, moist, fine grained, trace brick and fine gravel.		315.34 / 0.20	315.54 / 0.00	Monument casing secured in concrete	
	92	SS1	17			Metals & Inorg. SVOCs (15:23) (0.30-0.46) TOC (15:23) (0.31-0.91) PHCs & BTEX VOCs (15:27) (0.61-0.91) Metals & Inorg. SVOCs PHCs & BTEX VOCs TOC (15:37) (1.22-1.83)	Brick rubble.					20.6
							Sand, black, moist, fine grained, trace slag.		315.26 / 0.28	315.24 / 0.30	210 mm borehole Bentonite seal	
							Sand and slag, brown to black, dry to moist, trace coal.		315.08 / 0.46			
1	63	SS2	16				**SILT:** Dark to light brown, moist, low plasticity, high organic content, trace rootlets and fine gravel.		314.73 / 0.81			60.0
							- Deceased organic content, transitioning to lower contact below 1.07 mbgs.		314.32 / 1.22			
	71	SS3	50+				**SILTY SAND AND GRAVEL WITH COBBLES:** Light grey to dark brown, trace olive grey (silt), dry to moist, fine to coarse sand and gravel.					56.3
	0	SS4	50/ 3cm		2		- Sampler refusal at 1.91 mbgs, ream HW casing to 2.24 mbgs, HQ coring begins at 1.91 mbgs.		313.64 / 1.91	313.64 / 1.91	96 mm corehole	
2					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, slightly to moderately fractured core, occasional (<40 mm) vugs.					
					3		- 15 cm core loss from top of Run 1.			313.10 / 2.44	#3 silica sand filter pack	
	90	Run1		53			- Fe staining in fractures from 2.26 to 2.90 mbgs.			312.95 / 2.59	50 mm diameter SCH 40 PVC pipe	
					1		- 4 cm very tight vertical fracture at 2.34.					
3							- 5 cm weak rock at 2.36 mbgs, potentially water bearing.				#10-slot well screen	
					4		- 50 mm vug at 2.64 mbgs, mineral carbonate lining, increased localized weathering, potentially water bearing.					
							- Highly weathered partly open fracture, potentially water bearing, at 3.18 mbgs.					
					3		- Highly weathered open fracture, potentially water bearing, at 3.22, very tight vertical fracture below.					
					4		- Below 3.33 mbgs light greyish brown, fine grained, medium strong, slightly weathered, very close to close fracture spacing, thinly bedded, slightly to moderately fractured core, dark grey bedding planes, frequent small vugs (<5 mm) with trace large vugs 25 to 65 mm.					
4										311.43 / 4.11		
					3					311.27 / 4.27		
	100	Run2		53			- Fe staining in fracture at 4.32 mbgs.				Bentonite seal	
					1							
					3		- 25 mm vug with localized increased weathering, partial filled with carbonate minerals at 4.72 mbgs.					
5							- Highly weathered partly open to open fractures, potentially water bearing, at 4.75 and 4.80 mbgs.					
					1							
					3		- Highly weathered partly open to open fractures with weak rock, potentially water bearing, at 5.39, 5.61 and 5.64 mbgs.					
	100	Run3		80	2							
					2		- 40 mm vug with localized increased weathering, carbonate mineral lining at 5.87 mbgs.					
6							- Light to dark greyish brown below 5.94.					
					3		- 65 mm vug at 6.10 mbgs, penetrates core, carbonate mineral lining, some localized increased weathering					
									309.11 / 6.43	309.11 / 6.43		
							Bottom of corehole at 6.43 mbgs					
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW17-104D

CLIENT: City of Guelph | DATE DRILLED: October 17, 2017 | GROUND ELEVATION: 315.60 masl | NORTHING: 4822392.2

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.40 masl | EASTING: 562296.9

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.92 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.60 / 0.00	100 200 300 400
							CONCRETE:		315.45 / 0.15		
	67	SS1	22				**FILL:** Silt, Sand and Gravel, brown to grey, moist, fine to coarse sand, fine gravel, trace brick.		315.30 / 0.30	Monument casing secured in concrete; 210 mm borehole; Bentonite seal	8.3
						Metals & Inorg. SVOCs (10:08) (0.61-1.22)	**CLAYEY SILT:** Dark brown, moist, high plasticity, trace sand and fine gravel, trace rootlets.		315.14 / 0.46		
1	50	SS2	25				- Increased sand and fine to coarse gravel below 0.91 mbgs.				12.2
						PHCs & BTEX VOCs (10:18) (1.22-1.83)			314.28 / 1.32		
	71	SS3	50+				**SILTY SAND AND GRAVEL WITH COBBLES:** Light brown/grey, dry to moist, fine to coarse sand and gravel.				18.6
	100	SS4	50/ 5cm				- Sampler refusal at 1.88 mbgs, ream HW casing to 2.08 mbgs, HQ coring begins at 1.96 mbgs.		313.64 / 1.96		
2					10+				313.49 / 2.11	96 mm corehole	
					5		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, slightly to moderately fractured core, occasional (<35 mm) vugs. - Hydrocarbon like odour 2.11 to 7.90 mbgs, sheen observed in fractures to 2.77 mbgs. - 2.39 to 2.90 mbgs, more frequent vugs with weathering, some carbonate mineral lining.				
	100	Run1		35	3						
3					3						
					5						
					5						
4					4						
	100	Run2		23	4		- Below 3.99 mbgs light greyish brown, fine grained, strong, slightly weathered, close fracture spacing, thinly bedded, sightly to moderately fractured core, dark grey bedding planes, frequent small vugs (<5 mm). - 15 cm vertical fracture at 4.14 mbgs, very tight.				
					4						
					4		- 8 cm vertical fracture at 4.62 mbgs, very tight.				
					2						
5					6		- 45 mm vug at 5.11 mbgs, increased localized weathering, and some carbonate mineral lining.				
					1						
	100	Run3		63	2						
					2					309.81 / 5.79	
6					3		- 45 mm vug at 5.87 mbgs, 80% filled with carbonate minerals.			#3 silica sand filter pack	
					3					309.50 / 6.10	
					4		- 65 mm vug at 6.27 mbgs, penetrates core, some carbonate mineral lining.			50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					3		- 23 cm of increased weathering below 6.58 mbgs.				
7					4						
	100	Run4		48	4		- Very widely open fracture, carbonate mineral lining, potentially water bearing at 7.19 mbgs.				
					3				307.98 / 7.62		
					5		- Large (135 mm) vertically orientated vug, penetrates core, carbonate mineral lining below 7.75 mbgs.		307.83 / 7.77		
									307.68		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

RECORD OF MONITORING WELL: MW17-104D

CLIENT: City of Guelph | DATE DRILLED: October 17, 2017 | GROUND ELEVATION: 315.60 masl | NORTHING: 4822392.2

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.40 masl | EASTING: 562296.9

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.92 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run5		78	3 2 1 1		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Dark greyish brown, fine grained, strong, fresh to slightly weathered, close fracture spacing, thinly bedded, sound core. Trace vugs (<20 mm) with carbonate mineral lining. - 8.05 to 8.15 mbgs, no core water return observed, 4 fractures with apertures of 0.5 to 2.5 mm. - 20 cm seam frequent small vugs (<5 mm) at 8.13 mbgs. - 20 mm vug in seam of weathered rock, 50% filled with carbonate minerals.			7.92	Bentonite seal	100 200 300 400
									306.18 9.42	306.18 9.42		
							Bottom of corehole at 9.42 mbgs					
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

RECORD OF MONITORING WELL: MW17-104S

CLIENT: City of Guelph | DATE DRILLED: October 18, 2017 | GROUND ELEVATION: 315.61 masl | NORTHING: 4822393.7 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.39 masl | EASTING: 562296.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 313.18 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
							CONCRETE:		315.46	315.61 / 0.00	0.78 m stick up	
							FILL: Silt, Sand and Gravel, brown to grey, moist, fine to coarse sand, fine gravel, trace brick.		0.15	315.31 / 0.30	Monument casing secured in concrete	
									315.15		210 mm borehole Bentonite seal	
							CLAYEY SILT: Dark brown, moist, high plasticity, trace sand and fine gravel, trace rootlets.		0.46			
1							- Increased sand and fine to coarse gravel below 0.91 mbgs.			314.70 / 0.91	#3 silica sand filter pack	
										314.39 / 1.22		
							SILTY SAND AND GRAVEL WITH COBBLES: Light brown/grey, dry to moist, fine to coarse sand and gravel.		314.29 / 1.32		50 mm diameter SCH 40 PVC pipe #10-slot well screen	
2							- Sampler refusal at 1.88 mbgs, ream HW casing to 2.08 mbgs, HQ coring begins at 1.96 mbgs.		313.50	313.50		
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown, fossiliferous, fine grained, medium strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, slightly to moderately fractured core, occasional (<35 mm) vugs.		2.11	2.11	96 mm corehole	
3												
							- Lithology inferred from adjacent MW17-104D. Bottom of corehole at 3.66 mbgs		311.95 / 3.66	311.95 / 3.66		
4												
5												
6												
7												

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

JACOBS

RECORD OF MONITORING WELL: MW17-105D

CLIENT: City of Guelph
DATE DRILLED: Oct 24 to Oct 25, 2017
GROUND ELEVATION: 316.02 masl
NORTHING: 4822354.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 316.80 masl
EASTING: 562351.1

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.54 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: October 31, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
						Metals & Inorg. (11:48) (0.00-0.09) SVOCs (12:00) (0.15-0.46)	**FILL:** Sand and Gravel, dark brown, moist, fine to coarse sand and gravel, trace rootlets and organics, trace brick and asphalt, trace silt.		315.87 / 0.15	316.02 / 0.00	0.78 m stick up	
							Foundry Sand and Slag, black, fine sand, dry to moist.			315.72 / 0.30	Monument casing secured in concrete 210 mm borehole Bentonite seal	
							Sand and Gravel, brown, dry to moist, fine to coarse sand and gravel, trace silt.		315.56 / 0.46			
1						Metals & Inorg. PHCs & BTEX VOCs TOC SVOCs (12:12) (1.22-1.83) PHCs & BTEX VOCs (12:32) (1.83-2.06)	**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, fine to coarse sand and gravel, trace silt.		314.70 / 1.32			
2									313.35 / 2.67	313.35 / 2.67	123 mm corehole	
3							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm). - Fe staining in fracture at 2.84 mbgs. - Fe staining in fracture at 2.90 mbgs.					
							- Light to dark greyish brown below 3.43 mbgs					
							- 18 cm vertical fracture at 3.73 mbgs, tight.					
4							- No coring water return observed below 3.86 mbgs, loss potentially from fractures between 3.68 to 3.89 mbgs. - Large vugs (30 - 50 mm) with localized increased weathering and carbonate mineral lining from 4.01 to 4.06 mbgs. - Light-end hydrocarbon like odour from 4.04 to 4.09 mbgs.		311.60 / 4.42			
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm).					
5							- Vugs (10 - 25 mm) with localized increased weathering, some carbonate mineral lining at 5.00 mbgs. - Dark greyish brown, fresh to slightly weathered, close fracture spacing, slightly fractured to sound core. Trace vugs with localized increased weathering and carbonate mineral lining , frequent small (<5 mm) fossils below 5.00 mbgs					
										310.23 / 5.79	96 mm corehole	
6												
					2		- At 6.58 mbgs, vug (50 mm) weak weathered rock. - Lithology to 6.60 mbgs inferred from adjacent MW17-105S, MW17-105D HSA to top of bedrock, ream PW casing to 2.29 mbgs and PQ core to 5.79 mbgs, HW casing reamed to 6.12 mbgs, HQ core logging resumes at 6.63 mbgs. - Large (100 mm), partially healed vertically orientated vug, some carbonate mineral lining at 6.63 mbgs.			309.24 / 6.78		
7					4					309.09 / 6.93	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
	100	Run4		56	3							
					1							
					1							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

RECORD OF MONITORING WELL: MW17-105D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: M. Shiry

DATE DRILLED: Oct 24 to Oct 25, 2017
DRILLER: Atcost Drilling
DRILL RIG: CME 850 Rotary Power
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 316.02 masl
TOP OF PIPE: 316.80 masl
WATER ELEVATION: 312.54 masl
WATER LEVEL DATE: October 31, 2017

NORTHING: 4822354.9
EASTING: 562351.1
MOE WELL TAG#: A202490

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
	108	Run5		58	2		- Between 7.95 to 8.36 mbgs, disconnected vertical fractures with apertures <0.1 mm.					
									307.56 / 8.46	307.56 / 8.46		
							Bottom of corehole at 8.46 mbgs Driller Remark: Feels as if there are small voids within Eramosa Formation / Reformatory Quarry Member at some fractures as coring will become hard and slow followed by sudden drop of coring string.					
9												
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS
Reviewed by: DS/ML

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW17-105S

CLIENT: City of Guelph
DATE DRILLED: October 24, 2017
GROUND ELEVATION: 316.06 masl
NORTHING: 4822353.5

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 316.84 masl
EASTING: 562353.3

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.59 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, HQ water core
WATER LEVEL DATE: October 31, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
									316.06 / 0.00	316.06 / 0.00	100 200 300 400
										0.78 m stick up	
	46	SS1	15				**FILL:** Sand and Gravel, dark brown, moist, fine to coarse sand and gravel, trace rootlets and organics, trace brick and asphalt, trace silt.		315.91 / 0.15		
							Foundry Sand and Slag, black, fine sand, dry to moist.		315.76 / 0.30	Monument casing secured in concrete	3.0
										210 mm borehole	
									315.60 / 0.46		
1	58	SS2	28				Sand and Gravel, brown, dry to moist, fine to coarse sand and gravel, trace silt.				5.7
									314.74 / 1.32		
	100	SS3	50+				**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, fine to coarse sand and gravel, trace silt.				11.4
2	78	SS4	50/ 8cm								16.0
					4				313.39 / 2.67	313.39 / 2.67	
					2		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm).			96 mm corehole	
3	91	Run1		49	1		- Fe staining in fracture at 2.84 mbgs. - Fe staining in fracture at 2.90 mbgs.			313.01 / 3.05	
										#3 silica sand filter pack	
										312.86 / 3.20	
					3		- Light to dark greyish brown below 3.43 mbgs			50 mm diameter SCH 40 PVC pipe	
					4		- 18 cm vertical fracture at 3.73 mbgs, tight.			#10-slot well screen	
4					2		- No coring water return observed below 3.86 mbgs, loss potentially from fractures between 3.68 to 3.89 mbgs. - Large vugs (30 - 50 mm) with localized increased weathering and carbonate mineral lining from 4.01 to 4.06 mbgs.				
	100	Run2		57			- Light-end hydrocarbon like odour from 4.04 to 4.09 mbgs.		311.64 / 4.42		
					4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm).			311.34 / 4.72	
					1					311.18 / 4.88	
5					2		- Vugs (10 - 25 mm) with localized increased weathering, some carbonate mineral lining at 5.00 mbgs. - Dark greyish brown, fresh to slightly weathered, close fracture spacing, slightly fractured to sound core. Trace vugs with localized increased weathering and carbonate mineral lining , frequent small (<5 mm) fossils below 5.00 mbgs			Bentonite seal	
					2						
					2						
	98	Run3		88	2						
6					2						
					1						
							- Bottom of Run 3 at 6.58 mbgs, vug (50 mm) weak weathered rock.		309.48 / 6.58	309.48 / 6.58	
							Bottom of corehole at 6.58 mbgs				
7											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

RECORD OF MONITORING WELL: MW17-106D

CLIENT: City of Guelph | DATE DRILLED: October 19, 2017 | GROUND ELEVATION: 315.40 masl | NORTHING: 4822342.7 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.34 masl | EASTING: 562287.5

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.75 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.40 0.00	0.94 m stick up	100 200 300 400
							FILL: Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace silt.			315.10 0.30	Monument casing secured in concrete 210 mm borehole Bentonite seal	
1							- Trace brick and slag below 0.58 mbgs.					
									313.60			
2							**CONCRETE:** Concrete floor of suspected pit.		1.80			
									313.09	313.09		
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown, fossiliferous, fine grained, medium strong, slightly weathered, close fracture spacing, medium to thinly bedded, sightly to moderately fractured core, some small (<10 mm) vugs. - Top 18 cm of rock frequent small vugs and fossils (<5 mm), increased weathering and decreased strength, potentially water bearing fractures with apertures 0.5 to 2.5 mm. - Fracture with Fe staining at 2.62 mbgs. - Fracture with Fe staining at 2.82 mbgs. - 2.95 to 3.71 mbgs, rock becomes more weathered, frequency and size of vugs increased (<25 mm). - Large vug (55 mm) with localized increased weathering at 3.23 mbgs.		2.31	2.31	123 mm corehole	
3							- No core water return observed at fractures at 3.68 and 3.71 mbgs, lower fracture has Fe staining. - Below 3.71 mbgs rock transitioning to greyish brown with dark grey bedding planes, some vugs have carbonate minerals. - Potential water bearing partly open fracture, localized weathering at 3.84 mbgs. - Potential water bearing tight fracture and vug (60 mm), localized weathering at 4.14 mbgs.					
4							- Potential water bearing open fracture, and vug (65 mm) localized weathering, at 4.55 mbgs.					
5												
										309.46		
6							- Below 5.94 mbgs rock becomes light brown, and more competent, close fracture spacing, slightly fractured to sound core. - Large vug (35 mm) with some carbonate minerals at 6.27 mbgs. - Large vug (60 mm) with some carbonate minerals at 6.43 mbgs. - Lithology to 6.48 mbgs inferred from adjacent MW17-106S, MW17-106D HSA to top of concrete slab, ream PW casing to 2.34 mbgs and PQ core to 5.94 mbgs, HW casing reamed to 6.22 mbgs, HQ core logging resumes at 6.48 mbgs. - Below 6.71 mbgs, greyish brown with some dark grey bedding planes. - Between 7.32 and 7.90 mbgs large frequent vugs (25 to 65 mm) with localized weathering, potential water bearing zone.		5.94		96 mm corehole	
					3					308.54		
					0					6.86		
7	98	Run4		68	2					308.39 7.01	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					4							
					1							
									307.51			
							ERAMOSA FORMATION / REFORMATORY QUARRY		7.89			

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW17-106D

CLIENT: City of Guelph | DATE DRILLED: October 19, 2017 | GROUND ELEVATION: 315.40 masl | NORTHING: 4822342.7

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.34 masl | EASTING: 562287.5

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.75 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	97	Run5		75	0 2 3 3 1		**MEMBER DOLOSTONE:** Light brown, close fracture spacing, slightly fractured to sound core, some small (<10 mm) vugs. - 8.08 to 8.41 mbgs some carbonate mineral vertical filling fractures and vugs. - Brownish dark grey to grey, some large (<45 mm) vugs with some carbonate mineral, trace fossils (<5 mm) below 8.76 mbgs. - 5 cm very tight vertical fracture at 9.09 mbgs. - 4 cm seam increased weathering and weak rock at 9.14 mbgs.		305.88	306.87 8.53 306.71 8.69 305.88	Bentonite seal	100 200 300 400
							Bottom of corehole at 9.53 mbgs		9.53	9.53		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

JACOBS

RECORD OF MONITORING WELL: MW17-106S

CLIENT: City of Guelph
DATE DRILLED: October 18, 2017
GROUND ELEVATION: 315.43 masl
NORTHING: 4822343.1

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 316.30 masl
EASTING: 562285.8

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.86 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, HQ water core
WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.43 / 0.00	100 200 300 400
	63	SS1	20				**FILL:** Sand and Gravel, brown, moist, fine to coarse sand and gravel, trace silt.			315.13 / 0.30	10.2
1	83	SS2	13				- Trace brick and slag below 0.58 mbgs.				8.0
	82	SS3	17								2.5
									313.63		
2							**CONCRETE:** Concrete floor of suspected pit.		1.80		
					3				313.12	313.12	
					2		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, medium strong, slightly weathered, close fracture spacing, medium to thinly bedded, sightly to moderately fractured core, some small (<10 mm) vugs.		2.31	2.31	
	100	Run1		52	4		- Top 18 cm of rock frequent small vugs and fossils (<5 mm), increased weathering and decreased strength, potentially water bearing fractures with apertures 0.5 to 2.5 mm.			312.69 / 2.74	
3					3		- Fracture with Fe staining at 2.62 mbgs. - Fracture with Fe staining at 2.82 mbgs.			312.38 / 3.05	
					2		- 2.95 to 3.71 mbgs, rock becomes more weathered, frequency and size of vugs increased (<25 mm). - Large vug (55 mm) with localized increased weathering at 3.23 mbgs.				
					4		- No core water return observed at fractures at 3.68 and 3.71 mbgs, lower fracture has Fe staining. - Below 3.71 mbgs rock transitioning to greyish brown with dark grey bedding planes, some vugs have carbonate minerals.				
4					4		- Potential water bearing partly open fracture, localized weathering at 3.84 mbgs.				
	100	Run2		45	2		- Potential water bearing tight fracture and vug (60 mm), localized weathering at 4.14 mbgs.			310.86 / 4.57	
					3		- Potential water bearing open fracture, and vug (65 mm) localized weathering, at 4.55 mbgs.			310.71 / 4.72	
5					2						
					3						
					3						
	98	Run3		77	0		- Below 5.94 mbgs rock becomes light brown, and more competent, close fracture spacing, slightly fractured to sound core.				
6					2		- Large vug (35 mm) with some carbonate minerals at 6.27 mbgs. - Large vug (60 mm) with some carbonate minerals at 6.43 mbgs.				
									308.88	308.88	
							Bottom of corehole at 6.55 mbgs		6.55	6.55	
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 0.87 m stick up
- Monument casing secured in concrete
- 210 mm borehole Bentonite seal
- 96 mm corehole
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen
- Bentonite seal

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS
Reviewed by: DS/ML

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW17-107S

CLIENT: City of Guelph | DATE DRILLED: October 12, 2017 | GROUND ELEVATION: 315.30 masl | NORTHING: 4822254.3 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.05 masl | EASTING: 562197.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 312.66 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 1, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
						Metals & Inorg. SVOCs PHCs & BTEX VOCs (09:40) (0.15-0.61)	**CONCRETE:**		315.15 / 0.15	315.30 / 0.00	Monument casing secured in concrete	
	61	SS1	10				**FILL:** Silty Sand, dark brown, moist, trace wood debris, trace slag.			315.00 / 0.30	210 mm borehole	47.2
							- 8 cm seam yellow brick rubble, then some slag at 0.45 mbgs.		314.59 / 0.71			
1	42	SS2	12				**SANDY SILT:** Brown to light brown, moist, medium plasticity, fine grained sand, trace clay, trace fine gravel, trace orange mottling.					14.2
						Metals & Inorg. SVOCs PHCs & BTEX VOCs (10:01) (1.37-1.68)			313.88 / 1.42			14.5
	54	SS3	50/ 28cm				**SILTY SAND AND GRAVEL WITH COBBLES:** Light brownish grey, moist, medium sand with trace fine and coarse, fine to coarse gravel, trace clay.					
	50	SS4	50/ 5cm				- Sampler refusal at 1.88 mbgs, set HW casing to 2.18 mbgs, HQ coring begins at 2.03 mbgs.		313.27 / 2.03	313.27 / 2.03	96 mm corehole	
2					6		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, moderately fractured core. Frequent small (<5 mm) vugs, trace fossils <10 mm.					
					5					312.71 / 2.59		
	96	Run1		7	10+		- Fracture zone 2.69 to 2.82 mbgs.			312.58 / 2.72	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
3					10+							
					1		- 3 cm weak and weathered rock at 3.18 mbgs. - Fracture zone 3.18 to 3.28 mbgs.					
					10+		- Below 3.40 mbgs grey brown, core appears to have little tensile strength and is highly fractured from coring to 3.86 mbgs. - Fracture zone 3.63 to 3.76 mbgs.					
					10+							
4	100	Run2		28	7				310.96 / 4.34			
					4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark greyish brown, shale fracture partings. Vugs are less frequent but slightly larger (<15mm).					
					7				310.45 / 4.85	310.45 / 4.85		
5							Bottom of corehole at 4.85 mbgs					
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 5/26/20

JACOBS

RECORD OF MONITORING WELL: MW17-108S

CLIENT: City of Guelph
DATE DRILLED: October 11, 2017
GROUND ELEVATION: 316.36 masl
NORTHING: 4822390.8

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 317.10 masl
EASTING: 562370.7

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.61 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, HQ water core
WATER LEVEL DATE: October 31, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.74 m stick up	100 200 300 400
						TOC (11:08) (0.00-0.30) Grain Size (11:08) (0.30-0.91) Metals & Inorg. SVOCs (11:15) (0.61-0.91)	**FILL:** Silty Sand, dark brown, moist, fine grained sand, organics and rootlets, trace brick and fine gravel.		316.11 / 0.25	316.36 / 0.00	Monument casing secured in concrete	
	88	SS1	50+/ 28cm				- Black, increased gravel content below 0.13 mbgs.					3.8
							Sand, Gravel and Cobbles with Silt, light grey, moist to dry, trace clay.			316.06 / 0.30	210 mm borehole	
							- Heavy dark orange staining at 0.36 mbgs.					
	82	SS2	60/ 13cm				- Trace slag and rootlets at 0.61 mbgs.					6.3
1												
	75	SS3	50/ 10cm									10.8
										314.74 / 1.62	#3 silica sand filter pack	
	100	SS4	50/ 5cm							314.43 / 1.93	50 mm diameter SCH 40 PVC pipe #10-slot well screen	2.7
2												
						Metals & Inorg. (12:04) (2.44-2.67)	**SILTY SAND AND GRAVEL WITH COBBLES:** Brown/grey, fine sand, dry to moist.		313.92 / 2.44			
	89	SS5	50/ 8cm									4.2
	83	SS6	50/ 15cm			PHCs & BTEX VOCs 1 4-Dioxane (12:20) (2.74-2.90)	- Very moist, black staining below 2.73 mbgs, hydrocarbon like odour 2.73 to 2.90 mbgs.					9.2
3							- Increased silt below 3.05 mbgs.					
	80	SS7	62/ 13cm		3							2.7
	40	Run1		0	5	PHCs & BTEX VOCs 1 4-Dioxane PAHs (12:32) (3.05-3.20)	- Auger and sampler refusal at 3.18 mbgs, ream HW casing to 3.35 mbgs, HQ coring begins at 2.95 mbgs.		313.11 / 3.25	313.11 / 3.25	96 mm corehole	
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, strong, slightly weathered, very close to moderately fracture spacing, medium to thinly bedded, moderately fractured core. Frequent small (<10 mm) vugs.					
4					3		- Black staining, sheen and hydrocarbon like odour in fractures from 3.25 to 3.51 mbgs, potentially water bearing apertures 0.1 to 2.5 mm.					
	100	Run2		60	2		- Vug (30 mm) at 3.68 mbgs, localized increased weathering.					
					4		- Black staining in open fracture at 4.60 mbgs, potentially water bearing.					
5									311.38 / 4.98	311.38 / 4.98		
							Bottom of corehole at 4.98 mbgs					
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW17-109S

CLIENT: City of Guelph | DATE DRILLED: October 16, 2017 | GROUND ELEVATION: 315.47 masl | NORTHING: 4822426.3 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Atcost Drilling | TOP OF PIPE: 316.26 masl | EASTING: 562305.8

PROJECT NUMBER: 694757 | DRILL RIG: CME 850 Rotary Power | WATER ELEVATION: 313.25 masl | MOE WELL TAG#: A202490

LOGGED BY: M. Shiry | DRILL METHOD: 108 mm HSA, HQ water core | WATER LEVEL DATE: November 2, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0	67	SS1	21			PCBs (09:38) (0.00-0.30) Metals & Inorg. (09:38) (0.00-0.61)	**FILL:** Sand and Gravel, light brown, moist, fine to coarse, trace silt, top 10 cm silty, dark brown, organics and rootlets, very moist at lower contact.			315.47 / 0.00	
										315.17 / 0.30	17.3
									314.84 / 0.63		
1	75	SS2	16				Sand and Gravel, grey, moist to very moist, fine to coarse sand, fine grained gravel, trace coarse gravel, trace silt.				54.2
	50	SS3	50/ 15cm			PHCs & BTEX VOCs Metals & Inorg. (09:56) (1.22-1.52)	- Grey and brown below 1.37 mbgs.				61.8
							- Sampler refusal on suspected bedrock at 1.52 mbgs, ream HW casing to 2.01 mbgs, HQ coring begins at 1.68 mbgs.				
	0	Run1		0			- No core recovery from Run 1 (1.68 to 1.88 mbgs).		313.59 / 1.88	313.59 / 1.88	
2					10+		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to greyish light brown, fine grained, medium strong, slightly weathered, close fracture spacing, thinly bedded, extremely to moderately fractured core. Trace amounts of thin dark grey bedding planes. Frequent small (<10 mm) vugs.				
					10+					313.03 / 2.44	
	60	Run2		0	10+		- Poor core recovery from Run 2 (1.88 to 3.40 mbgs), core loss too great to accurately determine depths of core loss. Upper portion of recovered core (approximately 45 cm) completed fractured from coring.			312.67 / 2.80	
3					10+						
					10+		- Slight hydrocarbon like odour from 3.28 to 4.32 mbgs.				
					3						
	100	Run3		61	4		- Sheen observed in fractures between 3.73 to 4.06 mbgs.				
4					2						
							Bottom of corehole at 4.32 mbgs		311.15 / 4.32	311.15 / 4.32	
5											
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 0.79 m stick up
- Monument casing secured in concrete
- 210 mm borehole
- 96 mm corehole
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

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RECORD OF MONITORING WELL: MW17-110S

CLIENT: City of Guelph	DATE DRILLED: October 16, 2017	GROUND ELEVATION: 315.70 masl	NORTHING: 4822401.4	Page 1 of 1
LOCATION: 200 Beverley St., Guelph	DRILLER: Atcost Drilling	TOP OF PIPE: 316.49 masl	EASTING: 562264.1	
PROJECT NUMBER: 694757	DRILL RIG: CME 850 Rotary Power	WATER ELEVATION: 313.21 masl	MOE WELL TAG#: A202490	
LOGGED BY: M. Shiry	DRILL METHOD: 108 mm HSA, HQ water core	WATER LEVEL DATE: November 2, 2017		

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
1	83	SS1	10			Metals & Inorg. SVOCs TOC Grain Size (15:38) (0.00-0.61)	**FILL:** Silty Sand, dark brown, moist, trace medium and coarse sand, trace brick, trace rootlets and organics. Sand, black, dry to moist, fine grained, trace clay, trace coal, trace slag.		315.60 / 0.10	315.70 / 0.00	0.79 m stick up
							- 5 cm seam slag at 0.56 mbgs.			315.40 / 0.30	Monument casing secured in concrete; 210 mm borehole
	67	SS2	9								8.3; 24.9
									314.56 / 1.14		
						PHCs & BTEX VOCs PAHs TOC Metals & Inorg. (15:54) (1.22-1.83)	**SILT:** Brown to dark brown, dry to moist, medium plasticity, trace fine to coarse sand and fine gravel, trace orange mottling.		314.43 / 1.27		
	71	SS3	42				**SILTY SAND AND GRAVEL WITH COBBLES:** Dark brown and light grey, dry to moist, fine to coarse sand and gravel.				53.7
2							- Sampler refusal at 1.80 mbgs, ream HW casing to 2.01 mbgs, HQ coring begins at 1.98 mbgs.			313.72 / 1.98	
					10+				313.59 / 2.11		96 mm corehole
					5		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fine grained, medium strong, slightly weathered, very close to close fracture spacing, thinly laminated, moderately fractured core. Frequent small (<10 mm) vugs, trace large (<65 mm) vugs.				
	100	Run1		10	3		- Fe staining in 78% of fractures 2.11 to 2.79 mbgs.			312.96 / 2.74	#3 silica sand filter pack
3					6		- Large vug (55 mm), carbonate mineral lining and moderately weathered at 2.49 mbgs.			312.70 / 3.00	50 mm diameter SCH 40 PVC pipe #10-slot well screen
					3		- Large vug (45 mm), carbonate mineral lining and moderately weathered at 2.57 mbgs.				
					5		- 5 cm weak rock at 2.74 mbgs.				
					3		- Large vug (65 mm) carbonate mineral lining and moderately weathered at 3.07 mbgs.				
4	74	Run2		29	6		- 5 cm weak rock and Fe staining at 3.23 mbgs.				
							- Vertical fracture, very tight 3.30 to 3.42 mbgs.				
							- 13 cm core loss from top of Run 2 (3.45 mbgs).				
							- Below 3.58 mbgs, greyish light brown, vugs become more frequent and smaller (<5 mm), dark grey bedding planes.				
							- Vertical fracture, very tight, 3.68 to 4.27 mbgs.				
							- 2.5 cm core loss at 3.99 mbgs.				
									311.18 / 4.52	311.18 / 4.52	
							Bottom of corehole at 4.52 mbgs				
5											
6											
7											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW17-111S

CLIENT: City of Guelph
DATE DRILLED: Oct 12 to Oct 13, 2017
GROUND ELEVATION: 315.42 masl
NORTHING: 4822235.8

LOCATION: 200 Beverley St., Guelph
DRILLER: Atcost Drilling
TOP OF PIPE: 316.31 masl
EASTING: 562141.7

PROJECT NUMBER: 694757
DRILL RIG: CME 850 Rotary Power
WATER ELEVATION: 312.69 masl
MOE WELL TAG#: A202490

LOGGED BY: M. Shiry
DRILL METHOD: 108 mm HSA, HQ water core
WATER LEVEL DATE: November 2, 2017

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
						Metals & Inorg. (15:09) (0.00-0.61) PCB (14:55) (0.00-0.30)	**FILL:** Silty Sand, black top 10 cm, then dark brown 15 cm, then orange/brown 10 cm, then grey, dry to moist, fine grained, trace slag and coal, rootlets upper 15 cm.			315.42 / 0.00	0.89 m stick up	
	92	SS1	15							315.12 / 0.30	Monument casing secured in concrete 210 mm borehole	26.3
						PHCs & BTEX VOCs (15:22) (0.61-1.22)	Silt, dark to light brown, dry to moist, medium plasticity, trace clay, trace fine gravel, trace black staining.		314.86 / 0.56			
1	67	SS2	24									27.7
									314.15 / 1.27			
	71	SS3	50+				**SILTY SAND AND GRAVEL WITH COBBLES:** Light brown to light grey, dry to moist, fine sand, fine to coarse gravel, trace clay.					25.2
2	46	SS4	50+/ 17cm			VOCs (15:35) (1.83-2.13)						22.2
							- Sampler refusal on suspected bedrock at 2.18 mbgs, ream HW casing to 2.72 mbgs, HQ coring begins at 2.41 mbgs.		313.01 / 2.41	313.01 / 2.41	96 mm corehole	
					9		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, fossiliferous, fine grained, strong, slightly weathered, very close to close fracture spacing, medium to thinly bedded, extremely to moderately fractured. Some large vugs (<30 mm).					
					10+		- 8 cm core loss from top of Run 1.					
3	92	Run1		13	4		- 10 cm weak, weathered rock at 2.84 mbgs.			312.30 / 3.12	#3 silica sand filter pack	
					2		- 5 cm weak, weathered rock at 3.18 mbgs.					
					4		- Greyish brown below 3.20 mbgs.			311.99 / 3.43	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					3		- 5 cm weak, weathered rock at 3.18 mbgs, tight vertical fracture.					
					3		- Fossil (20 mm) at 3.58 mbgs.					
4							- 8 cm calcite filled vertical fracture at 3.96 mbgs.					
	100	Run2		40	7				311.15 / 4.27			
					4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Brownish grey to dark greyish brown, with shale partings, vugs less frequent.					
							- Fossil (35 mm) at 4.45 mbgs.					
							- 5 cm tight vertical fracture at 4.55 mbgs.					
5							- Frequent small (<5 mm) vugs and fossils at 4.85 mbgs, weathered and weak rock.		310.47 / 4.95	310.47 / 4.95		
							Bottom of corehole at 4.95 mbgs					
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS/ML

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-105G

CLIENT: City of Guelph
DATE DRILLED: Nov 20 to Nov 21, 2018
GROUND ELEVATION: 315.91 masl
NORTHING: 4822355.6

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.76 masl
EASTING: 562349.2

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.62 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.85 m stick up	100 200 300 400
							FILL: Sand and Gravel, dark brown, moist, fine to coarse sand and gravel, trace rootlets and organics, trace brick and asphalt, trace silt.		315.76 / 0.15	315.91 / 0.00	Monument casing secured in concrete	
							Foundry Sand and Slag, black, fine sand, dry to moist.		315.45 / 0.46	315.61 / 0.30	210 mm borehole Bentonite grout seal	
1							Sand and Gravel, brown, dry to moist, fine to coarse sand and gravel, trace silt.					
							SAND AND GRAVEL WITH COBBLES: Light brown to grey, dry to moist, fine to coarse sand and gravel, trace silt.		314.59 / 1.32			
2												
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm).		313.24 / 2.67	313.24 / 2.67	123 mm corehole	
3							- Fe staining in fracture at 2.84 mbgs. - Fe staining in fracture at 2.90 mbgs.				▼	
							- Light to dark greyish brown below 3.43 mbgs					
							- 18 cm vertical fracture at 3.73 mbgs, tight.					
4							- Large vugs (30 - 50 mm) with localized increased weathering and carbonate mineral lining from 4.01 to 4.06 mbgs. - Light-end hydrocarbon like odour from 4.04 to 4.09 mbgs.					
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Light greyish brown, fine grained, strong, slightly weathered, very close to close fracture spacing, thinly bedded, sightly to moderately fractured core, some vugs (<40 mm).		311.49 / 4.42			
5							- Vugs (10 - 25 mm) with localized increased weathering, some carbonate mineral lining at 5.00 mbgs. - Dark greyish brown, fresh to slightly weathered, close fracture spacing, slightly fractured to sound core. Trace vugs with localized increased weathering and carbonate mineral lining , frequent small (<5 mm) fossils below 5.00 mbgs					
6							- Large (100 mm), partially healed vertically orientated vug, some carbonate mineral lining at 6.63 mbgs.					
7												
					4		- Lithology to 7.62 mbgs inferred from adjacent MW17-105S and MW17-105D, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 7.62 mbgs.					
					2							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-105G

CLIENT: City of Guelph | DATE DRILLED: Nov 20 to Nov 21, 2018 | GROUND ELEVATION: 315.91 masl | NORTHING: 4822355.6

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.76 masl | EASTING: 562349.2

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.62 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run3		77	2 2 1 3 1		- Fossil (80 mm) at 8.08 mbgs. - 13 cm healed vertical fracture at 8.46 mbgs.					
10	100	Run4		93	1 1 2							
11	100	Run5		100	1 1 1 1 1							
12	87	Run6		100	1 2 3		- Ream HW casing, HQ coring below 12.19 mbgs. - Weak rock at 12.65 and 12.85 mbgs.			303.72 / 12.19	96 mm corehole	
13	100	Run7		80	2 3 1		- Two 10 cm veins at 13.01 mbgs. - 15 cm healed vertical fracture at 13.23 mbgs. - 13 cm vein at 13.54 mbgs.					
14					1 1		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Dark grey, strong, moderately fractured.		301.98 / 13.93			
15	100	Run8		88	1 2 1 1 1							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-105G

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 20 to Nov 21, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.91 masl
TOP OF PIPE: 316.76 masl
WATER ELEVATION: 312.62 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822355.6
EASTING: 562349.2
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run9		100	1 1 0 2 3		- 13 cm vertical fracture infilled with carbonate mineralization at 16.33 mbgs. - Weak rock at 17.30, 17.50 and 17.91 mbgs.			299.70 / 16.21 299.09 / 16.82 ~~298.94~~ / 16.97	Bentonite pellet seal #2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	100 200 300 400
18	100	Run 10		60	3 2 1				297.42 / 18.49	297.42 / 18.49		
							Bottom of corehole at 18.49 mbgs					
19												
20												
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-107D

CLIENT: City of Guelph | DATE DRILLED: Jun 22 to Jul 17, 2018 | GROUND ELEVATION: 315.39 masl | NORTHING: 4822252.0

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.44 masl | EASTING: 562201.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.60 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, PQ, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
							CONCRETE:		315.24 / 0.15	315.39 / 0.00 — 1.05 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown, moist, trace wood debris, trace slag. - 8 cm seam yellow brick then some slag at 0.45 mbgs.			315.09 / 0.30 — Monument casing secured in concrete; 100 mm diameter steel casing set with portland & bentonite grout; 267 mm borehole; Bentonite grout seal	
							SANDY SILT: Brown to light brown, moist, medium plasticity, fine grained sand, trace clay, trace fine gravel, trace orange mottling.		314.68 / 0.71		
1							**SILTY SAND AND GRAVEL WITH COBBLES:** Light brownish grey, moist, medium sand with trace fine and coarse, fine to coarse gravel, trace clay.		313.97 / 1.42		
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, vuggy, manganese and iron staining on fractures, vugs and bedding plane partings, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 45 mm). - Lithology to 2.59 mbgs inferred from MW17-107S, HSA to 2.59 mbgs, PQ coring below 2.59 mbgs.		313.36 / 2.03	312.80 / 2.59 — 123 mm corehole	
3	55	Run1		8	5 4 3		- Weak rock/possible fracture zone 3.12 to 3.20 mbgs.				
4	100	Run2		35	3 3 4 3 2		- Manganese rich shaley layer at 4.17 mbgs. - Weak rock/possible fracture zone 4.29 to 4.37 mbgs. - Grey to light grey, vuggy with biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 10 mm) below 4.57 mbgs. - Manganese rich shaley layer at 4.60 mbgs.				
5					6 3 5				309.90 / 5.49		
6	100	Run3		53	2 4 4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, vuggy with biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 10 mm). - Infilled vugs with calcite/dolomite, crinoid fossil at 5.64 mbgs.				
7	100	Run4		38	4 3 3 4 5		- Low vug intensity (1 to 45 mm) below 7.01 mbgs. - Light to dark grey, with brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (<1 mm) below 7.44 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

JACOBS

RECORD OF MONITORING WELL: MW18-107D

CLIENT: City of Guelph
DATE DRILLED: Jun 22 to Jul 17, 2018
GROUND ELEVATION: 315.39 masl
NORTHING: 4822252.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.44 masl
EASTING: 562201.1

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.60 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run5		72	3 3 2 4 3						
10	100	Run6		70	2 3 3 3 1						
11	95	Run7		90	1 1 2 1 1 1		- Dark grey, decreasing fossil content with depth below 11.58 mbgs.				
12	100	Run8		67	2 1 1 1 1 1		- Weathered shale at 13.72 to 13.82 mbgs.				
13							- Fossil content nearly absent below 14.07 mbgs.		301.25 / 14.14	301.16 / 14.23	
14							**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Dark grey, fossils nearly absent, fine crystalline, low vug intensity (<1 mm). - PQ core to 14.22 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, HQ coring below 14.23 mbgs. - Water return loss observed below 14.76 mbgs, continues for remainder of corehole.			96 mm corehole	
15	100	Run9		78	1 3 2 1 3		- Very dark grey below 15.60 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-107D

CLIENT: City of Guelph
DATE DRILLED: Jun 22 to Jul 17, 2018
GROUND ELEVATION: 315.39 masl
NORTHING: 4822252.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.44 masl
EASTING: 562201.1

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.60 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	95	Run 10		80	1, 1, 2, 1, 0, 1, 1, 2		- Weak shaley rock 17.02 to 17.07 mbgs.			298.32 / 17.07	
18	100	Run 11		100						297.41 / 17.98	
19										296.80 / 18.59	
20	100	Run 12		78	1, 1, 1, 1, 2, 4		Bottom of corehole at 20.17 mbgs		295.22 / 20.17	295.27 / 20.12; 295.22 / 20.17	
21											
22											
23											

Bentonite pellet seal

#3 silica sand filter pack

50 mm diameter SCH 40 PVC pipe #10-slot well screen

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

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RECORD OF MONITORING WELL: MW18-112D

CLIENT: City of Guelph | DATE DRILLED: July 24, 2018 | GROUND ELEVATION: 315.00 masl | NORTHING: 4822375.6 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.95 masl | EASTING: 562145.2

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.63 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.00 / 0.00	100 200 300 400
	50	SS1	6				**FILL:** Silty Sand, dark brown to black, dry, trace rootlets, loose.			314.70 / 0.30 Monument casing secured in concrete; 267 mm borehole; Bentonite chip seal; 0.95 m stick up	1.4
									314.24 / 0.76		
1	50	SS2	6				**SILTY SAND:** Dark to light brown, dry, fine, loose.				0.6
	33	SS3	55/ 23cm				- Fragments of dolostone below 1.52 mbgs. - Sampler refusal at 1.91 mbgs, HSA refusal at 1.98 mbgs, HQ coring below 1.98 mbgs.				0.7
2					3				313.02 / 1.98	313.02 / 1.98	
					5		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 40 mm).			96 mm corehole	
	92	Run1		0	6		- Stromatoporoid fossil at 2.59 mbgs.				
3					7						
					6		- Shaley at 3.15 mbgs.				
					5		- Grey to brown, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 3.28 mbgs. - Shaley at 3.29 mbgs.				
					9						
4					6						
	90	Run2		8	4						
					6						
5					10+		- Weak rock/possible fracture zone 4.90 to 5.03 mbgs.				
					10+		- Weak rock/possible fracture zone 5.21 to 5.38 mbgs.				
	100	Run3		48	4					309.21 / 5.79	
					4		- Coralloid fossil at 5.82 mbgs.			#3 silica sand filter pack	
6					3		- Bioturbated at 6.17 mbgs.		308.69 / 6.31		
					3		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark grey, with brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1 to 50 mm).			308.60 / 6.40	
					2					50 mm diameter SCH 40 PVC pipe #10-slot well screen	
7					3						
	95	Run4		57	5						
					4				307.08	307.08	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-112D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 24, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 315.00 masl
TOP OF PIPE: 315.95 masl
WATER ELEVATION: 312.63 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822375.6
EASTING: 562145.2
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							Bottom of corehole at 7.92 mbgs		7.92	7.92		
9												
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-112G

CLIENT: City of Guelph
DATE DRILLED: Nov 13 to Nov 15, 2018
GROUND ELEVATION: 315.00 masl
NORTHING: 4822374.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.80 masl
EASTING: 562147.1

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.80 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
									315.00 / 0.00	Monument casing secured in concrete; 0.80 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown to black, dry, trace rootlets, loose.		314.70 / 0.30	210 mm borehole Bentonite grout seal	
							SILTY SAND: Dark to light brown, dry, fine, loose.		314.24 / 0.76		
1							- Fragments of dolostone below 1.52 mbgs.				
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown to beige, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 40 mm).		313.02 / 1.98		
2							- Stromatoporoid fossil at 2.59 mbgs.		312.46 / 2.54	123 mm corehole	
3							- Shaley at 3.15 mbgs. - Grey to brown, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 3.28 mbgs. - Shaley at 3.29 mbgs.				
4											
5							- Weak rock/possible fracture zone 4.90 to 5.03 mbgs. - Weak rock/possible fracture zone 5.21 to 5.38 mbgs.				
6							- Coralloid fossil at 5.82 mbgs. - Bioturbated at 6.17 mbgs.		308.69 / 6.31		
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Light to dark grey, with brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1 to 50 mm).				
7											
					0		- Lithology to 7.62 mbgs inferred from adjacent MW18-112D, HSA to top of bedrock, ream PW casing and PQ core, logging begins at 7.62 mbgs.				
					2						

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-112G

CLIENT: City of Guelph | DATE DRILLED: Nov 13 to Nov 15, 2018 | GROUND ELEVATION: 315.00 masl | NORTHING: 4822374.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.80 masl | EASTING: 562147.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.80 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run5		88	3		- 10 cm vertical fracture at 8.25 mbgs.				
					0		- 8 cm healed vertical fracture at 8.66 mbgs.				
					0						
					3		- 8 cm weak rock at 9.30 mbgs.				
					1		- 23 cm vertical fracture at 9.53 mbgs.				
10	100	Run6		70	0						
					0						
					0						
					1		- Medium to dark grey, strong, fresh, moderately close joint spacing, fine crystalline, sound, frequent fossils (1 to 3 mm), occasional vugs (1 to 3 mm) below 10.67 mbgs.				
11					2						
	100	Run7		85	0						
					1						
12					2						
					4		- 15 cm vertical fracture at 12.50 mbgs.				
					1						
13	100	Run8		83	1						
					1						
					0						
					2		- 8 cm vein at 13.72 mbgs. - Occasional fossils (2 to 5 mm), few vugs below 13.82 mbgs.				
14					0						
	100	Run9		100	1		- 36 cm vein at 14.55 mbgs.				
					1						
15					1						
					0					299.71 / 15.29	
	100	Run 10		100	1		- Ream HW casing to 15.39 mbgs, HQ coring below 15.29 mbgs.				96 mm corehole
					3		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Light to medium to grey, strong, fresh, close joint spacing, fine crystalline, slightly fractured, frequent fossils (1 to 5 mm).		299.42 / 15.58		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-112G

CLIENT: City of Guelph | DATE DRILLED: Nov 13 to Nov 15, 2018 | GROUND ELEVATION: 315.00 masl | NORTHING: 4822374.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.80 masl | EASTING: 562147.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.80 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
17	100	Run 11		87	1 1 2 2		- 13 cm vertical vein at 15.77 mbgs. - 10 cm vertical fracture at 15.87 mbgs.					
18	100	Run 12		93	1 1 0 2		- Weak rock at 17.43 mbgs.			296.71 / 18.29	Bentonite pellet seal	
19	100	Run 13		98	2 1 2 0 1					296.10 / 18.90 295.65 / 19.35	#2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
20							- Weak rock at 19.89 mbgs. - Medium to dark grey, wide joint spacing, occasional fossils (1 to 5 mm) below 20.09 mbgs.					
21	100	Run 14		95	0 0 0 0 2		- Weak rock at 21.10 mbgs.			294.12 / 20.88 ~~293.97~~ / 21.03	Bentonite chip seal	
22	100	Run 15		98	1 1 1 3		**GOAT ISLAND/ANCASTER MEMBER:** Light grey, strong, fresh, close to moderately close joint spacing, slightly fractured. - Very frequent vugs (1 to 10 mm) at 22.10 mbgs.		293.02 / 21.98			
23					0 0 2		- Light grey and light brown, mudstone, medium to fine grained, few vugs (1 to 5 mm), fossiliferous, undulating stratification below 23.14 mbgs.					
	100	Run		97	1							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-112G

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 13 to Nov 15, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.00 masl
TOP OF PIPE: 315.80 masl
WATER ELEVATION: 312.80 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822374.9
EASTING: 562147.1
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
25	100	Run 17		75	2 0 0 2 1 2 1		- Large vug with calcite crystalline at 25.43 mbgs.				
26							Bottom of corehole at 26.19 mbgs		288.81 / 26.19	288.81 / 26.19	
27											
28											
29											
30											
31											

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-112S

CLIENT: City of Guelph | DATE DRILLED: July 25, 2018 | GROUND ELEVATION: 314.98 masl | NORTHING: 4822373.7 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.90 masl | EASTING: 562145.4

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.59 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0							**FILL:** Silty Sand, dark brown to black, dry, trace rootlets, loose.		314.98 / 0.00	314.98 / 0.00	0.92 m stick up	
									314.68 / 0.30		Monument casing secured in concrete	
											267 mm borehole	
											Bentonite chip seal	
									314.22 / 0.76			
1							**SILTY SAND:** Dark to light brown, dry, fine, loose.					
2							- Lithology to 2.13 mbgs inferred from MW18-112D, HSA to 2.13 mbgs, set HW casing, HQ coring below 2.13 mbgs.		312.85 / 2.13	312.85 / 2.13	96 mm corehole	
					3		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn and Fe staining on fractures and vugs, biostromal fossils, coarse crystalline, high vug intensity (1 to 30 mm).					
					6							
	100	Run1		8	8							
3					10+					311.93 / 3.05	#3 silica sand filter pack	
					10+		- Grey to brown, sparse fossils, medium to fine crystalline, medium vug intensity (1 to 40 mm) below 3.12 mbgs. - Weak rock/possible fracture zone 3.14 to 3.66 mbgs. - Shaley beds at 3.15 mbgs.			311.55 / 3.43	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					5							
4					6							
	80	Run2		0	6							
					6		- Weak rock/possible fracture zone 4.55 to 4.67 mbgs.					
5							Bottom of corehole at 4.95 mbgs		310.03 / 4.95	310.03 / 4.95		
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-113D

CLIENT: City of Guelph
DATE DRILLED: Dec 3 to Dec 4, 2018
GROUND ELEVATION: 315.10 masl
NORTHING: 4822355.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.90 masl
EASTING: 562110.6

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.78 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.10 0.00	0.80 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown, dry, fine to medium, loose, trace rootlets.			314.80 0.30	Monument casing secured in concrete 210 mm borehole Bentonite grout seal	
									314.19			
1							**SILTY SAND:** Dark brown, dry, fine to medium, some fine gravel, loose.		0.91			
									313.40	313.40		
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown to beige, vuggy, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).		1.70	1.70	123 mm corehole	
2							- Weak rock/possible fracture zone 2.51 to 2.64 mbgs.					
3							- Grey to light grey, stromatoporoid fossils, medium crystalline, medium vug intensity (1 to 30 mm) below 2.79 mbgs.					
							- Weak rock/possible fracture zone 3.33 to 4.04 mbgs.					
4							- Shaley beds 4.17 to 4.32 mbgs. - Weak rock/possible fracture zone 4.27 to 4.32 mbgs.					
5							- Lithology to 4.90 mbgs inferred from adjacent MW18-113S, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 6.10 mbgs.					
6					1		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Medium grey, strong, thinly bedded, slightly weathered, fossiliferous.		309.00 6.10			
					3		- Fossil (30 mm) at 6.43 mbgs.					
	100	Run4		68	3							
7					3		- Large vug (50 mm) with calcite crystallization at 7.06 mbgs.					
					3							
					1							
					1							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-113D

CLIENT: City of Guelph
DATE DRILLED: Dec 3 to Dec 4, 2018
GROUND ELEVATION: 315.10 masl
NORTHING: 4822355.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.90 masl
EASTING: 562110.6

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.78 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run5		95	2 2 1 1 1 1		- Weak rock at 8.41 mbgs.				
10	100	Run6		93	2 1 1 1 2 1		- Weak rock at 9.93 mbgs.				
11							- 10 cm vein at 10.87 mbgs.				
12	100	Run7		100	2 1 1 0 1		- 15 cm vein at 12.14 mbgs.		302.91 / 12.19		
13	100	Run8		100	0 1 1 1 0		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Dark grey, strong, moderately fractured, thinly bedded, fossiliferous.				
14	100	Run9		100	0 0 1 1 2						
15	100	Run 10		100	0 1 2		- Ream HW casing, HQ coring below 15.24 mbgs. - Trace fossils (1 to 3 mm) below 15.24 mbgs.		299.86 / 15.24	96 mm corehole	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-113D

CLIENT: City of Guelph
DATE DRILLED: Dec 3 to Dec 4, 2018
GROUND ELEVATION: 315.10 masl
NORTHING: 4822355.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.90 masl
EASTING: 562110.6

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.78 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 11		93	0							100 200 300 400
					0							
					0							
					0							
					2							
	100	Run 12		100	2					297.57 / 17.53	Bentonite pellet seal	
18					1							
					0					296.96 / 18.14		
					0					296.81 / 18.29	#2 silica sand filter pack; 50 mm diameter SCH 40 PVC pipe; #10-slot well screen	
					0							
19					0							
	100	Run 13		100	2							
					1							
					0					295.29 / 19.81		
20							Bottom of corehole at 19.96 mbgs		295.14 / 19.96	295.14 / 19.96		
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-113S

CLIENT: City of Guelph | DATE DRILLED: July 26, 2018 | GROUND ELEVATION: 315.12 masl | NORTHING: 4822354.8 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.09 masl | EASTING: 562108.6

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.64 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.12 / 0.00	100 200 300 400
	58	SS1	7				**FILL:** Silty Sand, dark brown, dry, fine to medium, loose, trace rootlets.			314.82 / 0.30 Monument casing secured in concrete; 267 mm borehole; Bentonite chip seal; 0.97 m stick up	0.8
									314.21 / 0.91		
1	58	SS2	10				**SILTY SAND:** Dark brown, dry, fine to medium, some fine gravel, loose.				1.7
	21	SS3	50/15cm				- Sampler refusal at 1.68 mbgs, HSA refusal at 1.70 mbgs, set HW casing, HQ coring below 1.70 mbgs.		313.42 / 1.70	313.42 / 1.70 96 mm corehole	1.8
					8		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).				
2					9						
	100	Run1		0	8						
					4		- Weak rock/possible fracture zone 2.51 to 2.64 mbgs.				
					9		- Grey to light grey, stromatoporoid fossils, medium crystalline, medium vug intensity (1 to 30 mm) below 2.79 mbgs.				
3					10+					312.07 / 3.05 #3 silica sand filter pack	
					10+		- Weak rock/possible fracture zone 3.33 to 4.04 mbgs.			311.74 / 3.38 50 mm diameter SCH 40 PVC pipe; #10-slot well screen	
					10+						
4	100	Run2		0	7		- Shaley beds 4.17 to 4.32 mbgs. - Weak rock/possible fracture zone 4.27 to 4.32 mbgs.				
					6						
							Bottom of corehole at 4.90 mbgs		310.22 / 4.90	310.22 / 4.90	
5											
6											
7											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-114D

CLIENT: City of Guelph | DATE DRILLED: Dec 4 to Dec 5, 2018 | GROUND ELEVATION: 315.13 masl | NORTHING: 4822357.4 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.89 masl | EASTING: 562156.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.79 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
										315.13 / 0.00	0.76 m stick up
										314.83 / 0.30	Monument casing secured in concrete; 210 mm borehole Bentonite grout seal
							FILL: Sand, dark brown, dry, fine to coarse, loose, trace rootlets.		314.37 / 0.76		
1							**SILTY SAND:** Dark brown, dry, some fine gravel, medium dense.		313.91 / 1.22	313.91 / 1.22	123 mm corehole
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn and Fe staining on fractures and vugs, biostromal fossils, coarse crystalline, high vug intensity (1 to 30 mm), weathered to 1.68 mbgs. - Weak rock/possible fracture zone 1.37 to 11.47 mbgs.				
3							- Shaley bed at 3.11 mbgs. - Grey to brown, sparse fossils, medium to fine crystalline medium vug intensity (1 to 40 mm) below 3.12 mbgs. - Weak rock/possible fracture zone 3.20 to 3.38 mbgs.				
4							- Weak rock/possible fracture zone 3.76 to 3.89 mbgs. - Weak rock/possible fracture zone 4.14 to 4.24 mbgs.				
5							- Lithology to 4.90 mbgs inferred from adjacent MW18-114S, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 6.10 mbgs.				
6					2				308.88 / 6.25		
					1		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Medium to dark grey, strong, thinly bedded, slightly weathered, fossiliferous. - Vug (40 mm) with calcite crystallization at 6.48 mbgs.				
7	100	Run4		78	3		- 15 cm vertical fracture at 6.83 mbgs.				
					2						
					2		- Weathered rock at 7.32 mbgs. - Vug (40 mm) with calcite crystallization at 7.42 mbgs.				
					1						
					3		- 5 cm healed vertical fracture at 7.87 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-114D

CLIENT: City of Guelph | DATE DRILLED: Dec 4 to Dec 5, 2018 | GROUND ELEVATION: 315.13 masl | NORTHING: 4822357.4

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.89 masl | EASTING: 562156.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.79 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run5		60	2 3 2		- 10 cm healed vertical fracture at 8.21 mbgs. - Weak rock at 8.86 mbgs.				
10	100	Run6		90	2 2 1 3 0		- Fossil (25 mm) at 9.39 mbgs.				
11	100	Run7		82	4 2 2 1 1		- 15 cm vertical fracture at 10.74 mbgs. - Weak rock at 11.48 mbgs.				
12											
13	100	Run8		97	2 2 1 0 1 2		- Weak rock at 13.69 mbgs.				
14	100	Run9		93	1 2 1 2		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Dark grey, strong, thinly bedded, moderately fractured, fossiliferous. - Weak rock at 13.87 mbgs.		301.26 13.87		
15	100	Run 10		78	2 1 1 3		- Weak rock at 14.94 mbgs. - Ream HW casing, HQ coring below 15.24 mbgs. - Weak rock at 15.42 mbgs.			299.89 15.24 96 mm corehole	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-114D

CLIENT: City of Guelph | DATE DRILLED: Dec 4 to Dec 5, 2018 | GROUND ELEVATION: 315.13 masl | NORTHING: 4822357.4

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.89 masl | EASTING: 562156.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.79 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 11		93	2		- Fossil (25 mm) at 16.25 mbgs.				100 200 300 400
					2						
					1						
					1		- Weak rock at 17.09 mbgs.				
					4		- Weak rock at 17.32 mbgs. - 5 cm vertical fracture at 17.37 mbgs.				
	100	Run 12		83	1		- 8 cm healed vertical fracture at 17.78 mbgs.				
18					2		- Fossil (25 mm) at 17.96 mbgs.				
					2						
					2					296.69 18.44	Bentonite pellet seal
					0						
19					2					296.08 19.05	
	100	Run 13		73	2		- Weak rock at 19.15 mbgs.			~~295.93~~ 19.20	#2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen
					3						
					2						
20					2						
	100	Run 14		89	2						
					1					294.40 20.73	
21							Bottom of corehole at 20.96 mbgs		294.18 20.96	294.18 20.96	
22											
23											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-114S

CLIENT: City of Guelph | DATE DRILLED: July 25, 2018 | GROUND ELEVATION: 315.15 masl | NORTHING: 4822355.5 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.19 masl | EASTING: 562156.6

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.60 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.15 / 0.00	100 200 300 400
	50	SS1	5			PHC (10:45) (0.00-0.61)	**FILL:** Sand, dark brown, dry, fine to coarse, loose, trace rootlets.			314.85 / 0.30	0.6
1	46	SS2	68/ 23cm			PHC (10:55) (0.76-1.68)	**SILTY SAND:** Dark brown, dry, some fine gravel, medium dense. - Sampler refusal at 1.12 mbgs, Set HW casing, HQ coring below 1.22 mbgs.		314.39 / 0.76		1.2
					10+		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn and Fe staining on fractures and vugs, biostromal fossils, coarse crystalline, high vug intensity (1 to 30 mm), weathered to 1.68 mbgs. - Weak rock/possible fracture zone 1.37 to 11.47 mbgs.		313.93 / 1.22	313.93 / 1.22	
	100	Run1		16	4						
2					4						
					6						
	100	Run2		8	7						
					6						
3					10+		- Shaley bed at 3.11 mbgs. - Grey to brown, sparse fossils, medium to fine crystalline, medium vug intensity (1 to 40 mm) below 3.12 mbgs.			312.10 / 3.05	
					5		- Weak rock/possible fracture zone 3.20 to 3.38 mbgs.			311.77 / 3.38	
					10+		- Weak rock/possible fracture zone 3.76 to 3.89 mbgs.				
4					10+						
	100	Run3		16	4		- Weak rock/possible fracture zone 4.14 to 4.24 mbgs.				
					7						
5							Bottom of corehole at 4.90 mbgs		310.25 / 4.90	310.25 / 4.90	
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 1.04 m stick up
- Monument casing secured in concrete
- 267 mm borehole
- Bentonite chip seal
- 96 mm corehole
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

JACOBS

RECORD OF MONITORING WELL: MW18-115D

CLIENT: City of Guelph
DATE DRILLED: December 6, 2018
GROUND ELEVATION: 315.17 masl
NORTHING: 4822388.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.98 masl
EASTING: 562188.5

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.59 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.17 0.00	0.76 m stick up	100 200 300 400
							FILL: Silty Sand, dark brown, dry, fine to medium, some rootlets and organic matter, trace gravel, loose.			314.87 0.30	Monument casing secured in concrete 210 mm borehole Bentonite grout seal	
									314.41 0.76			
1							**SAND:** Dark brown, dry, fine, some organics, some fine gravel, loose.					
2									312.88 2.29	312.88 2.29	123 mm corehole	
3							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn staining on fractures, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 30 mm), weathered to 2.29 mbgs. - Stromatoporoid fossil at 2.51 mbgs. - Manganese rich shaley bedding at 2.90 mbgs. - Greyish brown, sparse stromatoporoid fossils, medium to fine crystalline, medium vug intensity (1 to 25 mm) below 3.18 mbgs. - Weak rock/possible fracture zone 3.30 to 3.43 mbgs.					
4							- Manganese rich shaley bedding at 4.09 mbgs.					
5							- Lithology to 4.72 mbgs inferred from adjacent MW18-115S, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 6.10 mbgs.					
6					3							
					3							
					1							
7	100	Run5		77	1		- 13 cm healed vertical fracture at 6.73 mbgs.					
					1							
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Medium grey, strong, fresh, thinly bedded, frequent vugs.		307.55 7.62			

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-115D

CLIENT: City of Guelph
DATE DRILLED: December 6, 2018
GROUND ELEVATION: 315.17 masl
NORTHING: 4822388.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 315.98 masl
EASTING: 562188.5

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.59 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run6			0		- Few vugs below 9.14 mbgs. - 8 cm healed fracture at 9.22 mbgs.					100 200 300 400
					1							
10	100	Run7		100	1							
					2							
					1							
11					0							
					2							
	100	Run8		80	4		- Medium to dark grey, moderately fractured, trace vugs (3 to 15 mm), frequent fossils (1 to 15 mm) below 11.28 mbgs.					
					1							
12					1							
					0							
					1							
13	100	Run9		100	1							
					1							
					1							
14					0							
					0							
	100	Run 10		100	1				300.54 / 14.63			
					1		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Dark grey, strong, fresh, moderately fractured, trace vugs (3 to 15 mm), few fossils (1 to 5 mm).					
15					1							
					0					299.93 / 15.24		
	100	Run 11		100	0		- Ream HW casing, HQ coring below 15.24 mbgs.				96 mm corehole	
					0							
					0							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-115D

CLIENT: City of Guelph | DATE DRILLED: December 6, 2018 | GROUND ELEVATION: 315.17 masl | NORTHING: 4822388.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 315.98 masl | EASTING: 562188.5

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.59 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	93	Run 12		100	1 1 0 1 1 1		- Slightly weathered fracture at 16.89 mbgs. - Trace fossils below 16.97 mbgs.				
18	100	Run 13		100	1 1 0 1					296.73 / 18.44	Bentonite pellet seal
19	100	Run 14		100	1 0 1 1 1 1					296.12 / 19.05 ~~295.97~~ / 19.20	#2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen
20	100	Run 15		91	0 1					294.44 / 20.73	
21							Bottom of corehole at 20.88 mbgs		294.29 / 20.88	~~294.29~~ / 20.88	
22											
23											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-115S

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 24, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 315.26 masl
TOP OF PIPE: 316.25 masl
WATER ELEVATION: 312.84 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822387.7
EASTING: 562187.3
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.26 0.00	0.99 m stick up	
	63	SS1	12				**FILL:** Silty Sand, dark brown, dry, fine to medium, some rootlets and organic matter, trace gravel, loose.			314.96 0.30	Monument casing secured in concrete 267 mm borehole Bentonite chip seal	1.8
1	50	SS2	3				**SAND:** Dark brown, dry, fine, some organics, some fine gravel, loose.		314.50 0.76			1.4
	42	SS3	17									1.1
2							- Sampler refusal at 2.06 mbgs, HSA refusal at 2.29 mbgs, HQ coring below 2.29 mbgs.		312.97 2.29	312.97 2.29	96 mm corehole	
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, vuggy, Mn staining on fractures, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 30 mm), weathered to 2.29 mbgs.					
	92	Run1		0	5		- Stromatoporoid fossil at 2.51 mbgs.			312.52 2.74	#3 silica sand filter pack	
3					8		- Manganese rich shaley bedding at 2.90 mbgs.					
					10+					312.06 3.20		
					5		- Greyish brown, sparse stromatoporoid fossils, medium to fine crystalline, medium vug intensity (1 to 25 mm) below 3.18 mbgs. - Weak rock/possible fracture zone 3.30 to 3.43 mbgs.				50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					4							
4	100	Run2		15	5		- Manganese rich shaley bedding at 4.09 mbgs.					
					6							
							Bottom of corehole at 4.72 mbgs		310.54 4.72	310.54 4.72		
5												
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-116D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 27, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 315.45 masl
TOP OF PIPE: 316.51 masl
WATER ELEVATION: 312.57 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822310.8
EASTING: 562196.1
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	ELEV. (masl) / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: ELEV. (masl) / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.45 / 0.00	100 200 300 400
							FILL: Sand, cream to light brown, dry, fine to medium, loose, trace gravel, some organic matter and rootlets.			315.15 / 0.30	
									314.84 / 0.61		
1							**SAND, GRAVEL AND COBBLES:** Light brown, dry, fine to medium sand, very dense. - Lithology to 1.65 mbgs inferred from MW18-116S, HSA to 1.65 mbgs, HQ coring below 1.65 mbgs.		314.44 / 1.01		
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown to beige, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 30 mm).			313.80 / 1.65	
	100	Run1		0	10+		- Weak rock/possible fracture zone 1.73 to 1.88 mbgs.				
2					10+		- Weak rock/possible fracture zone 2.03 to 2.41 mbgs.				
					10+						
	100	Run2		0	10+		- Weak rock/possible fracture zone 2.54 to 2.69 mbgs.				
					10+		- Weak rock/possible fracture zone 2.82 to 2.87 mbgs. - Water return loss observed below 2.87 mbgs, continues for remainder of corehole.				
3					8		- Weak rock/possible fracture zone 3.00 to 3.02 mbgs.				
					10+						
					10+		- Weak rock/possible fracture zone 3.61 to 3.91 mbgs.				
4					6		- Grey to light grey, stromatoporoid fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 3.91 mbgs.				
	100	Run3		7	5		- Weak rock/possible fracture zone 4.14 to 4.19 mbgs.				
					6						
5					10+						
					5		- 60 mm vug infilled with calcite crystal at 5.44 mbgs.				
					4		- Shaley at 5.64 mbgs.				
	100	Run4		15	5					309.53 / 5.92	#3 silica sand filter pack
6					7						
					3					308.95 / 6.50	50 mm diameter SCH 40 PVC pipe #10-slot well screen
					2						
7					4		- Shaley at 7.01 mbgs. - Bioturbated at 7.14 mbgs.		308.29 / 7.16		
	90	Run5		66	2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1 to 3 mm).				
					4		- Weak rock/possible fracture zone 7.82 to 7.87 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-116D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 27, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 315.45 masl
TOP OF PIPE: 316.51 masl
WATER ELEVATION: 312.57 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822310.8
EASTING: 562196.1
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							Bottom of corehole at 8.03 mbgs		307.42 / 8.03	307.42 / 8.03	
9											
10											
11											
12											
13											
14											
15											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-116S

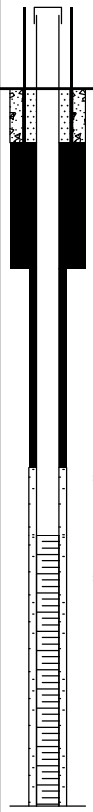
CLIENT: City of Guelph | DATE DRILLED: Jul 27 to Jul 30, 2018 | GROUND ELEVATION: 315.45 masl | NORTHING: 4822312.3 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.51 masl | EASTING: 562198.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.56 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.45 / 0.00	100 200 300 400
	58	SS1	13				**FILL:** Sand, cream to light brown, dry, fine to medium, loose, trace gravel, some organic matter and rootlets.			315.15 / 0.30	2.7
									314.84 / 0.61		
	50	SS2	84/ 15cm				**SAND, GRAVEL AND COBBLES:** Light brown, dry, fine to medium sand, very dense. - Sampler refusal at 1.07 mbgs, HQ coring below 1.02 mbgs.				3.8
1					6				314.44 / 1.01	314.44 / 1.01	
	100	Run1		0	6		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures, medium to coarse crystalline, high vug intensity (1 to 10 mm), weathered to 1.68 mbgs.				
					6						
2					6						
					6					313.32 / 2.13	
	100	Run2		17	4					312.94 / 2.51	
					6						
3					10+						
							- Weak rock/possible fracture zone 3.38 to 3.66 mbgs.				
	100	Run3		0	10+		- Grey to light grey, stromatoporoid fossils, medium to fine crystalline below 3.38 mbgs. - Stromatoporoid fossil at 3.66 mbgs.				
4					3				311.41 / 4.04	311.41 / 4.04	
							Bottom of corehole at 4.04 mbgs				
5											
6											
7											



Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-117S

CLIENT: City of Guelph | DATE DRILLED: July 25, 2018 | GROUND ELEVATION: 315.36 masl | NORTHING: 4822317.7 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.36 masl | EASTING: 562136.1

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.62 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0	71	SS1	11			PHCs & BTEX (14:00) (0.00-0.61)	**FILL:** Sand, dark brown, dry, fine to medium, some silt, trace gravel, medium dense, trace rootlets, trace glass.		315.36 / 0.00	315.06 / 0.30	0.1
1	54	SS2	15			Metals (14:20) (0.76-1.68)	- Fine to coarse, some clay and silt, trace slag below 0.91 mbgs.				0.0
		SS3	50+/ 20cm				**SILTY SAND:** Dark to light brown, dry, some gravel, medium dense.		313.68 / 1.68	313.53 / 1.83	
2					4		- Sampler refusal at 1.88 mbgs, HQ coring below 1.83 mbgs.		313.53 / 1.83		
					6		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 10 mm), weathered to 2.29 mbgs.				
					6						
	100	Run1		6	6						
3					6					312.31 / 3.05	
					10+		- Weak rock/possible fracture zone 3.38 to 3.68 mbgs.			312.01 / 3.35	
					8						
4					7		- Shaley bed at 4.01 mbgs.				
	100	Run2		0	6		- Brownish grey, stromatoporoid fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 4.04 mbgs.				
					10+						
							- Weak rock/possible fracture zone 4.75 to 4.88 mbgs.		310.48 / 4.88	310.48 / 4.88	
5							Bottom of corehole at 4.88 mbgs				
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS: 1.00 m stick up; Monument casing secured in concrete; 267 mm borehole; Bentonite chip seal; 96 mm corehole; #3 silica sand filter pack; 50 mm diameter SCH 40 PVC pipe #10-slot well screen

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

JACOBS

RECORD OF MONITORING WELL: MW18-118S

CLIENT: City of Guelph
DATE DRILLED: July 30, 2018
GROUND ELEVATION: 315.65 masl
NORTHING: 4822335.6

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.66 masl
EASTING: 562185.3

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.58 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											1.01 m stick up	100 200 300 400
0	0	SS1	2				**FILL:** Sand, dark brown, dry, fine to medium, some slag, very loose to loose.			315.65 / 0.00	Monument casing secured in concrete	
										315.35 / 0.30	267 mm borehole Bentonite chip seal	
1	67	SS2	8									0.1
									314.13			
	67	SS3	28				**CLAYEY SILT:** Dark brown, dry, some sand and gravel, medium dense.		1.52			19.7
2							- Sampler refusal at 2.06 mbgs, HSA refusal at 2.13 mbgs, HQ coring below 2.16 mbgs.		313.49	313.49		
					10+		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn staining on fractures, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).		2.16	2.16	96 mm corehole	
					10+		- Weak rock/possible fracture zone 2.24 to 2.31 mbgs.					
	100	Run1		0			- Weak rock/possible fracture zone 2.57 to 2.69 mbgs.			312.91 / 2.74	#3 silica sand filter pack	
3					5							
					5					312.40 / 3.25		
					5						50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					4							
4	100	Run2		0	10+		- Shaley bed at 3.99 mbgs.					
					10+		- Weak rock/possible fracture zone 4.09 to 4.14 mbgs.					
					9		- Grey to light grey, stromatoporoid fossils, medium to fine crystalline, medium vug intensity (1 to 30 mm) below 4.14 mbgs.					
							- Weak rock/possible fracture zone 4.19 to 4.34 mbgs.		310.87	310.87		
5							Bottom of corehole at 4.78 mbgs		4.78	4.78		
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-119D

CLIENT: City of Guelph | DATE DRILLED: Dec 2 to Dec 3, 2018 | GROUND ELEVATION: 315.58 masl | NORTHING: 4822278.0 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.47 masl | EASTING: 562166.7

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.77 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0							**FILL:** Silty Sand, dark brown to black, dry, loose, some organic matter, trace glass.		315.58 / 0.00	315.58 / 0.00	Monument casing secured in concrete	100 200 300 400
										315.28 / 0.30	210 mm borehole Bentonite grout seal	
1									314.06			
							SAND: Light brown, dry, fine to medium, trace gravel, dense.		1.52			
2										313.32 / 2.26	0.89 m stick up	
									313.24 / 2.34		123 mm corehole	
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown to beige, Mn staining, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 10 mm). - Weak rock/possible fracture zone 2.34 to 2.59 mbgs. - Weak rock/possible fracture zone 2.64 to 3.71 mbgs.					
3												
4							- Weak rock/possible fracture zone 3.99 to 4.17 mbgs. - Weak rock/possible fracture zone 4.24 to 4.37 mbgs. - Grey to brown, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 40 mm) below 4.37 mbgs.					
5							- Lithology to 4.98 mbgs inferred from adjacent MW18-119S, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 6.10 mbgs.					
6					1							
					2							
					3		- Weak rock at 6.68 mbgs.		308.81			
7	100	Run5		92	4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to medium grey, strong, fresh, fine crystalline, low vug intensity (1 to 15 mm).		6.77			
					1		- Weak rock at 7.29 mbgs.					
					3		- Vug (50 mm) at 7.52 mbgs. - Medium to dark grey, occasional fossils (1 to 5 mm) below 7.62 mbgs. - Slightly weathered fracture at 7.70 mbgs.					
					2							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-119D

CLIENT: City of Guelph | DATE DRILLED: Dec 2 to Dec 3, 2018 | GROUND ELEVATION: 315.58 masl | NORTHING: 4822278.0

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.47 masl | EASTING: 562166.7

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.77 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run6		80	3 2 4		- Trace vugs (1 to 5 mm) below 8.53 mbgs.				
	100	Run7		72	2 2 2		- Ream HW casing, HQ coring below 9.14 mbgs.			306.44 / 9.14	96 mm corehole
10	97	Run8		97	2 3 1		- Frequent fossils (1 to 5 mm) below 9.93 mbgs.				
11					2 2 1		- Occasional fossils (1 to 5 mm) below 11.28 mbgs.				
12	100	Run9		93	2 1 2						
13					2 2 1						
14	100	Run 10		90	2 1 2						
					1 2 1		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALY DOLOSTONE:** Medium to dark grey, strong, fresh, fine crystalline, thinly bedded.		301.56 / 14.02		
15	100	Run 11		97	3 0 1		- Few fossils (1 to 10 mm) below 15.24 mbgs.				
					3 1		- 20 cm vertical fracture at 15.62 mbgs.			299.58	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-119D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Dec 2 to Dec 3, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.58 masl
TOP OF PIPE: 316.47 masl
WATER ELEVATION: 312.77 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822278.0
EASTING: 562166.7
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 12		87	1 2 0 1 1 2					16.00 298.97 16.61 298.66 16.92	Bentonite pellet seal #2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	100 200 300 400
18	100	Run 13		100	0 1		Bottom of corehole at 18.57 mbgs		297.01 18.57	297.14 18.44 297.01 18.57		
19												
20												
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-119S

CLIENT: City of Guelph | DATE DRILLED: July 30, 2018 | GROUND ELEVATION: 315.61 masl | NORTHING: 4822276.9 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.57 masl | EASTING: 562168.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.59 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.61 / 0.00	100 200 300 400
	58	SS1	2				**FILL:** Silty Sand, dark brown to black, dry, loose, some organic matter, trace glass.			315.31 / 0.30 — Monument casing secured in concrete; 267 mm borehole; Bentonite chip seal; 0.96 m stick up	
1	29	SS2	6								
									314.09 / 1.52		
	38	SS3	33				**SAND:** Light brown, dry, fine to medium, trace gravel, dense.				
2							- Sampler refusal at 2.03 mbgs, HSA refusal at 2.29 mbgs, HQ coring below at 2.34 mbgs.				
									313.27 / 2.34	313.27 / 2.34 — 96 mm corehole	
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn staining, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 10 mm).				
					10+		- Weak rock/possible fracture zone 2.34 to 2.59 mbgs.				
	100	Run1		0			- Weak rock/possible fracture zone 2.64 to 3.71 mbgs.				
3					10+					312.56 / 3.05 — #3 silica sand filter pack	
					10+					312.16 / 3.45 — 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					6						
4					10+		- Weak rock/possible fracture zone 3.99 to 4.17 mbgs.				
	100	Run2		0			- Weak rock/possible fracture zone 4.24 to 4.37 mbgs.				
					3		- Grey to brown, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 40 mm) below 4.37 mbgs.				
					6						
5							Bottom of corehole at 4.98 mbgs		310.63 / 4.98	310.63 / 4.98	
6											
7											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-120D

CLIENT: City of Guelph
DATE DRILLED: Jun 21 to Jul 16, 2018
GROUND ELEVATION: 315.55 masl
NORTHING: 4822210.3

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.50 masl
EASTING: 562154.8

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.62 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.55 / 0.00	100 200 300 400
							CONCRETE:		315.40 / 0.15	315.25 / 0.30	
	42	SS1	21				**FILL:** Sand, light brown, dry, fine, some gravel, medium density.				0.2
						Metals (16:30) (0.76-1.37)			314.79 / 0.76		
1	38	SS2	18				**SAND AND GRAVEL:** Light brown to cream, dry, coarse sand to coarse gravel, medium to very dense.				0.2
	67	SS3	50+								16.0
2	38	SS4	50/ 3cm								9.0
							- Sampler refusal at 2.46 mbgs, HSA refusal at 2.84, PQ coring below 2.84 mbgs.		312.71 / 2.84	312.71 / 2.84	
3					7		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light to dark brown, vuggy, Mn and Fe staining on fractures, vugs and bedding plane partings, stromatoporoid biostromal fossils, medium crystalline, high vug intensity (1 to 30 mm).				123 mm corehole
	100	Run1		31	2						
					1						
					4						
4					1						
					1						
	100	Run2		70	10+		- Weak rock/possible fracture zone 4.57 to 4.72 mbgs.				
					1		- Grey to light grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 10 mm) below 4.75 mbgs.				
5					5						
					3						
					3						
	98	Run3		68	2						
6					1				309.12 / 6.43		
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 10 mm).				
7					2		- Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1-5 mm) below 7.04 mbgs.				
	100	Run4		48	4						
					2						
					3						

BOREHOLE/COREHOLE COMPLETION DETAILS: 0.95 m stick up; Monument casing secured in concrete; 100 mm diameter steel casing set with portland & bentonite grout; 267 mm borehole; Bentonite grout seal

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-120D

CLIENT: City of Guelph
DATE DRILLED: Jun 21 to Jul 16, 2018
GROUND ELEVATION: 315.55 masl
NORTHING: 4822210.3

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.50 masl
EASTING: 562154.8

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.62 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run5		60	2 4 3 2 2 1						
10	100	Run6		87	3 2 2 4 1						
11	100	Run7		97	2 2 2 1						
12	100	Run8		88	2 2 2 2 1		- Infilled vugs with sulfides (pyrite, sphalerite, galena) at 12.5 mbgs. - Dark grey, vugs (<1 mm), decreasing fossil content with depth below 13.41 mbgs.				
13											
14	100	Run9		73	1 1 4 2 1 1 2		- PQ core to 14.15 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, continue coring with HQ. - Vugs (1 to 2 mm) below 14.17 mbgs.			301.40 / 14.15	96 mm corehole
15							**ERAMOSA FORMATION / VINEMOUNT MEMBER**		299.67 / 15.88		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-120D

CLIENT: City of Guelph
DATE DRILLED: Jun 21 to Jul 16, 2018
GROUND ELEVATION: 315.55 masl
NORTHING: 4822210.3

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.50 masl
EASTING: 562154.8

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.62 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 10		90	1		**SHALEY DOLOSTONE:** Dark grey, fine crystalline, trace fossils, low vug intensity (1 to 2 mm).				
					4						
					1						
					1		- Vugs absent below 17.09 mbgs.			298.18 / 17.37	
					1						Bentonite pellet seal
18	100	Run 11		100	1					297.57 / 17.98	
					1						#3 silica sand filter pack
					1					296.96 / 18.59	
					0						50 mm diameter SCH 40 PVC pipe #10-slot well screen
19					1						
					1						
	100	Run 12		97	2						
					1						
20							Bottom of corehole at 20.14 mbgs		295.41 / 20.14	295.43 / 20.12	
										295.41 / 20.14	
21											
22											
23											

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

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RECORD OF MONITORING WELL: MW18-121D

CLIENT: City of Guelph | DATE DRILLED: Jun 28 to Jul 17, 2018 | GROUND ELEVATION: 315.38 masl | NORTHING: 4822231.9 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.40 masl | EASTING: 562214.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.58 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, PQ, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
										315.38 / 0.00	1.02 m stick up	
							FILL: Silty Sand, dark brown to black, dry, fine to medium, some organics, trace rootlets.			315.08 / 0.30	Monument casing secured in concrete 100 mm diameter steel casing set with portland & bentonite grout 267 mm borehole Bentonite grout seal	
									314.62 / 0.76			
1							Sand, dark to light brown, dry, fine to coarse, trace gravel, loose.					
									314.16 / 1.22			
							SILTY SAND: Dark to light brown, dry, some fine gravel.					
2												
									313.09 / 2.29	313.09 / 2.29	123 mm corehole	
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Dark brown, vuggy, Mn and Fe staining on fractures, vugs and bedding plane partings, manganese rich beds, biostromal fossils, medium crystalline, high vug intensity (5 mm).					
3												
4												
					5		- Lithology to 4.27 mbgs inferred from MW18-121S, HSA to 4.27 mbgs, set PW casing, PQ coring thereafter.					
					2		- Weak rock/possible fracture zone 4.52 to 4.83 mbgs.					
	100	Run1		0	3		- Manganese rich shaley layer at 4.67 mbgs.					
5					4		- Grey to light grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (10 to 50 mm) below 4.98 mbgs.					
					3							
					4							
					4							
6	100	Run2		60	4		- Shaley layer at 6.20 mbgs.					
					2				308.86 / 6.52			
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (10 to 50 mm).					
7					1							
					4							
	95	Run3		53	2		- Weak rock/possible fracture zone 7.77 to 7.90 mbgs.					
					4							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

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JACOBS

RECORD OF MONITORING WELL: MW18-121D

CLIENT: City of Guelph
DATE DRILLED: Jun 28 to Jul 17, 2018
GROUND ELEVATION: 315.38 masl
NORTHING: 4822231.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.40 masl
EASTING: 562214.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.58 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run4		66	3 4 2 3 3		- Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity, <3 mm below 8.03 mbgs.					
10	98	Run5		70	1 3 2 4 4		- Less bioturbated, abundant fossils 10.24 to 10.67 mbgs.					
11					3 3		- Decreasing fossil content below 11.58 mbgs.					
12	97	Run6		72	2 2 3 1 1							
13	100	Run7		95	2 2 3 1 1		- Fossils nearly absent below 13.11 mbgs. - Vug partially infilled with pyrite at 13.61 mbgs.		301.51 13.87			
14					2 1 1		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Light to dark grey, nearly absent brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (<3 mm). - Dark grey below 14.15 mbgs. - PQ core to 14.15 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, continue coring with HQ.			301.23 14.15	96 mm corehole	
15	100	Run8		100	2 1 1 2		- Subvertical non-planar (dendritic) vein at 14.96 mbgs. - Shaley bed at 15.16 mbgs. - Subvertical non-planar (dendritic) veins, carbonate minerals infilling vugs associated with veins at 15.62 mbgs. - Very dark grey below 15.65 mbgs. - Subvertical non-planar (dendritic) vein at 15.90 mbgs.			300.37 15.01 299.76 15.62	Bentonite pellet seal #3 silica sand filter pack	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-121D

CLIENT: City of Guelph
DATE DRILLED: Jun 28 to Jul 17, 2018
GROUND ELEVATION: 315.38 masl
NORTHING: 4822231.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.40 masl
EASTING: 562214.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.58 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
17	100	Run9		90	1 3 2 1		- Very dark beds below 16.43 mbgs.			299.05 16.33	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
18	100	Run 10		93	1 1 2 1 1 1		- Water return loss observed below 18.06 mbgs, continues for remainder of corehole.			297.52 17.86 297.40 17.98		
19							Bottom of corehole at 18.69 mbgs		296.69 18.69	296.69 18.69		
20												
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

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RECORD OF MONITORING WELL: MW18-121S

CLIENT: City of Guelph	DATE DRILLED: July 27, 2018	GROUND ELEVATION: 315.37 masl	NORTHING: 4822232.3	Page 1 of 1
LOCATION: 200 Beverley St., Guelph	DRILLER: Aardvark Drilling	TOP OF PIPE: 316.34 masl	EASTING: 562211.7	
PROJECT NUMBER: 694757	DRILL RIG: CME 75 Power Auger	WATER ELEVATION: 312.61 masl	MOE WELL TAG#: A243494	
LOGGED BY: L. Ribeiro	DRILL METHOD: 159 mm HSA, HQ water core	WATER LEVEL DATE: August 20, 2018		

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.37 / 0.00	100 200 300 400
	50	SS1	5				**FILL:** Silty Sand, dark brown to black, dry, fine to medium, some organics, trace rootlets.			315.07 / 0.30	2.4
						Metals (10:25) (0.76-1.37)			314.61 / 0.76		
1	58	SS2	11				Sand, dark to light brown, dry, fine to coarse, trace gravel, loose.				1.6
							SILTY SAND: Dark to light brown, dry, some fine gravel.		314.15 / 1.22		
	58	SS3	50+								4.5
2							- Sampler refusal at 2.06 mbgs, HSA refusal at 2.26 mbgs, HQ coring below 2.26 mbgs.		313.11 / 2.26	313.11 / 2.26	
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to cream, Mn and Fe staining on vugs and fractures, stromatoporoid biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).				96 mm corehole
					10						
	95	Run1		11						312.63 / 2.74	#3 silica sand filter pack
3					9					312.25 / 3.12	
					7						50 mm diameter SCH 40 PVC pipe #10-slot well screen
					10+						
							- Weak rock/possible fracture zone 3.76 to 3.99 mbgs.				
4	100	Run2		8	10+						
					7						
					8		- Weak rock/possible fracture zone 4.57 to 4.65 mbgs.		310.72 / 4.65	310.72 / 4.65	
							Bottom of corehole at 4.65 mbgs				
5											
6											
7											

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-122D

CLIENT: City of Guelph
DATE DRILLED: Jul 26 to Jul 27, 2018
GROUND ELEVATION: 315.36 masl
NORTHING: 4822188.1

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.33 masl
EASTING: 562191.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.71 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										1.11 m stick up	100 200 300 400
	42	SS1	1				**FILL:** Sand, dark brown, dry, fine to medium, very loose to medium dense, some rootlets and organic matter.		315.36 / 0.00	315.06 / 0.30 Monument casing secured in concrete	333.0
1	50	SS2	20			PAHs Metals & Inorg. (13:30) (0.76-1.37)				267 mm borehole Bentonite chip seal	344.0
									313.84		
	29	SS3	21				**SILTY SAND:** Dark to pale brown, dry to moist, fine to medium, some gravel, medium dense.		1.52		170.0
2							- Sampler refusal at 2.39 mbgs, set HW casing, HQ coring below 2.34 mbgs.				
	17	~~SS4~~	50/ 10cm		4				313.02 / 2.34	313.02 / 2.34	153.0
					5		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures and vugs, stromatoporoid biostromal fossils, medium to coarse crystalline, high vug intensity (5 to 20 mm).			96 mm corehole	
	100	Run1		0	2						
3					6						
					5						
					4		- Weak rock/possible fracture zone 3.84 to 4.04 mbgs.				
4	100	Run2		7	5		- Shaley layer at 4.13 mbgs.				
					5		- Grey to light grey, sparse biostromal fossils, medium crystalline, medium vug intensity (1 to 50 mm) below 4.14 mbgs.				
					4						
5					6						
	100	Run3		60	3						
					4						
6					4						
					5						
					3						
7					4						
	100	Run4		52	4						
					3						
					2				307.89		
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Grey to light grey, sparse biostromal fossils, medium crystalline, medium vug intensity (1 to 50 mm).		7.47		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-122D

CLIENT: City of Guelph | DATE DRILLED: Jul 26 to Jul 27, 2018 | GROUND ELEVATION: 315.36 masl | NORTHING: 4822188.1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.33 masl | EASTING: 562191.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.71 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	92	Run5		46	3 5 5 3		- Light to dark grey, brachiopods and shell fragments fossil assembly, fine crystalline, low vug intensity (<1 mm) below 8.51 mbgs. - Bioturbated at 8.52 mbgs.				
10	100	Run6		86	1 2 2 2 4						
11	100	Run7		95	1 3 2 2 3						
12										303.47 / 11.89	#3 silica sand filter pack
										302.92 / 12.44	50 mm diameter SCH 40 PVC pipe #10-slot well screen
13	100	Run8		93	0 1 3 2 3						
									301.49 / 13.87		
14							**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Light to dark grey, brachiopods and shell fragments fossil assembly, fine crystalline, low vug intensity (<1 mm). Bottom of corehole at 13.97 mbgs		301.39 / 13.97	301.39 / 13.97	
15											

100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

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JACOBS

RECORD OF MONITORING WELL: MW18-122G

CLIENT: City of Guelph
DATE DRILLED: Nov 28 to Nov 29, 2018
GROUND ELEVATION: 315.36 masl
NORTHING: 4822188.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.14 masl
EASTING: 562192.2

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.77 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.36 0.00	0.78 m stick up	100 200 300 400
							FILL: Sand, dark brown, dry, fine to medium, very loose to medium dense, some rootlets and organic matter.			315.06 0.30	Monument casing secured in concrete 210 mm borehole Bentonite grout seal	
1												
									313.84 1.52			
2							**SILTY SAND:** Dark to pale brown, dry to moist, fine to medium, some gravel, medium dense.					
									313.02 2.34	313.02 2.34	123 mm corehole	
3							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures and vugs, stromatoporoid biostromal fossils, medium to coarse crystalline, high vug intensity (5 to 20 mm).					
4							- Weak rock/possible fracture zone 3.84 to 4.04 mbgs. - Shaley layer at 4.13 mbgs. - Grey to light grey, sparse biostromal fossils, medium crystalline, medium vug intensity (1 to 50 mm) below 4.14 mbgs.					
5												
6												
7									307.89 7.47			
							ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE: Grey to light grey, sparse biostromal fossils, medium crystalline, medium vug intensity (1 to 50 mm).					

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-122G

CLIENT: City of Guelph | DATE DRILLED: Nov 28 to Nov 29, 2018 | GROUND ELEVATION: 315.36 masl | NORTHING: 4822188.9

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.14 masl | EASTING: 562192.2

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.77 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9							- Light to dark grey, brachiopods and shell fragments fossil assembly, fine crystalline, low vug intensity (<1 mm) below 8.51 mbgs. - Bioturbated at 8.52 mbgs.				
10											
11											
12											
13											
14	93	Run1		90	2 1 1		- Lithology to 13.97 mbgs inferred from adjacent MW18-122D, HSA to top of bedrock, ream PW casing and PQ core, logging resumes at 13.97 mbgs. **ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Medium to dark grey, brachiopods and shell fragments fossil assembly, fine crystalline, low vug intensity (<1 mm).		301.49 13.87		
15					1 1 1 3 2						

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-122G

CLIENT: City of Guelph
DATE DRILLED: Nov 28 to Nov 29, 2018
GROUND ELEVATION: 315.36 masl
NORTHING: 4822188.9
LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.14 masl
EASTING: 562192.2
PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.77 masl
MOE WELL TAG#: A252554
LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
17	97	Run2		90	1 1 1 3							
	100	Run3		43	1 1 0		- 20 cm vertical fracture at 17.32 mbgs. - 41 cm vertical fracture at 17.68 mbgs. - 23 cm vertical fracture at 18.01 mbgs.					
18	100	Run4		100	0 0 1 0		- Ream HW casing, HQ coring below 18.29 mbgs.			297.07 18.29	96 mm corehole	
19	100	Run5		33	2 0		- 102 cm vertical fracture at 19.41 mbgs.			296.61 18.75 296.01 19.35 295.85 19.51	Bentonite pellet seal #2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
20					0 1 2		- Light to medium grey below 19.91 mbgs.					
21	100	Run6		100	1 0		**GOAT ISLAND/ANCASTER MEMBER:** Light to medium grey, strong, fresh, occasional fossils (<5 mm), trace vugs (<3 mm), fossiliferous, undulating stratification.		294.39 20.97	294.33 21.03 294.18 21.18	Bentonite chip seal	
22	93	Run7		93	1 2 0 1 2							
23	100	Run8		100	0 1 2 1		- 25 mm fossil at 22.91 mbgs. - Brownish below 22.96 mbgs.					

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

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RECORD OF MONITORING WELL: MW18-122G

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 28 to Nov 29, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.36 masl
TOP OF PIPE: 316.14 masl
WATER ELEVATION: 312.77 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822188.9
EASTING: 562192.2
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
					1		- Weak rock at 27.43 mbgs.					
							Bottom of corehole at 24.48 mbgs		290.88 / 24.48	290.88 / 24.48		
25												
26												
27												
28												
29												
30												
31												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

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JACOBS

RECORD OF MONITORING WELL: MW18-123D

CLIENT: City of Guelph
DATE DRILLED: Jun 27 to Jun 28, 2018
GROUND ELEVATION: 315.60 masl
NORTHING: 4822282.6

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.58 masl
EASTING: 562288.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.55 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.98 m stick up	100 200 300 400
						Metals & Inorg. (13:30) (0.00-0.60)	**ASPHALT:**		315.52 / 0.08	315.60 / 0.00	Monument casing secured in concrete	
	71	SS1	9				**FILL:** Silty Sand, dark brown, dry, fine, loose to dense, mottled colour.			315.30 / 0.30	100 mm diameter steel casing set with portland & bentonite grout	4.2
1	79	SS2	35			VOCs PAHs (13:45) (0.76-1.37)					267 mm borehole Bentonite grout seal	5.0
	33	SS3	50/ 8cm				**SAND:** Pale white to dark brown, dry, fine sand, very dense, some gravel.		314.08 / 1.52			5.1
2							- Sampler refusal at 1.75 mbgs, HSA refusal at 2.44 mbgs, set PW casing, PQ coring below 2.44 mbgs.		313.16 / 2.44	313.16 / 2.44	123 mm corehole	
					0		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, vuggy, Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 40 mm).					
					6							
3	64	Run1		18	5							
					3							
					5							
					6							
4							- Weak rock/possible fracture zone 3.94 to 3.99 mbgs.					
	100	Run2		20	4							
					4		- Manganese rich shaley layer at 4.39 mbgs.					
					5		- Grey to brownish grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 4.60 mbgs.					
5							- Weak rock/possible fracture zone 4.90 to 5.08 mbgs.					
					5		- Vug size increases to >50 mm, vug intensity decreases with depth below 5.18 mbgs.					
					4							
					3							
	100	Run3		38	2							
6							- Manganese rich shaley layer 6.02 to 6.25 mbgs.					
					5							
					2				308.92 / 6.68			
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to brownish grey, vuggy, biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm).					
7							- Abundant fossils at 6.88 mbgs.					
					4							
	100	Run4		45			- Manganese rich shaley layer at 7.42 mbgs.					
					5							
					4							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-123D

CLIENT: City of Guelph | DATE DRILLED: Jun 27 to Jun 28, 2018 | GROUND ELEVATION: 315.60 masl | NORTHING: 4822282.6

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.58 masl | EASTING: 562288.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.55 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, PQ, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	93	Run5		63	2 2 2 3 5		- Erosional feature/strata at 7.92 mbgs. - Dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1-25 mm) below 7.95 mbgs. - Water return loss observed below 9.27 mbgs, continues for remainder of corehole.				
10	100	Run6		82	2 4 3 4 2						
11					1 2		- Vugs (<1 mm) below 11.58 mbgs.				
12	98	Run7		82	2 2 3						
13	98	Run8		68	2 2 2 1		- Vugs nearly absent below 12.80 mbgs.				
14					3		- Fossil content decreasing with depth below 13.77 mbgs.			301.37 / 14.23	
15	95	Run9		77	3 2 1 1 3 2		- Vugs absent below 14.23 mbgs. - PQ core to 14.23 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, continue coring with HQ. - Shaley rich layer at 15.24 mbgs. **ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline.		300.21 / 15.39	96 mm corehole	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-123D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: Jun 27 to Jun 28, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.60 masl
TOP OF PIPE: 316.58 masl
WATER ELEVATION: 312.55 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822282.6
EASTING: 562288.0
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 10		98	1 1 0 3		- Shaley rich layers 16.28 to 16.41 mbgs. - Very dark grey bed at 16.99 mbgs.			298.66 / 16.94	Bentonite pellet seal	100 200 300 400
18	97	Run 11		80	1 1 2 3 3		- Amigdala filled with [Ca,Mg]CO3 at 17.60 mbgs. - Non-planar veins at 18.08 mbgs.			297.74 / 17.86	#3 silica sand filter pack	
19	100	Run 12		100	1 1 1 1 1 2		- Presence of sulfide minerals, fossils nearly absent below 18.77 mbgs. - Sulfide minerals at 19.71 mbgs. - Amigdala filled with [Ca,Mg]CO3 at 20.02 mbgs.			296.80 / 18.80	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
20							Bottom of corehole at 20.32 mbgs		295.28 / 20.32	295.28 / 20.32		
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-123S

CLIENT: City of Guelph | DATE DRILLED: August 1, 2018 | GROUND ELEVATION: 315.69 masl | NORTHING: 4822287.1 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.62 masl | EASTING: 562283.4

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.58 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											0.93 m stick up	100 200 300 400
							ASPHALT:		315.61 / 0.08	315.69 / 0.00		
							FILL: Silty Sand, dark brown, dry, fine, loose to dense, mottled colour.			315.39 / 0.30	Monument casing secured in concrete 267 mm borehole Bentonite chip seal	
1												
							SAND: Pale white to dark brown, dry, fine sand, very dense, some gravel.		314.17 / 1.52			
2							- Lithology to 2.16 mbgs inferred from MW18-123D, HSA to 2.44 mbgs, HQ coring below 2.44 mbgs.			313.53 / 2.16	96 mm corehole	
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light brown to beige, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).		313.25 / 2.44	312.95 / 2.74	#3 silica sand filter pack	
3	100	Run1		0	4 5 4 2							
					2 6 3 4 6					312.29 / 3.40	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
4	100	Run2		23								
							- Shaley layer at 4.69 mbgs. - Grey to brownish grey, medium to fine crystalline, medium vug intensity below 4.70 mbgs.					
5							Bottom of corehole at 4.93 mbgs		310.76 / 4.93	310.76 / 4.93		
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-124S

CLIENT: City of Guelph
DATE DRILLED: July 24, 2018
GROUND ELEVATION: 315.68 masl
NORTHING: 4822374.7

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.67 masl
EASTING: 562219.5

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 313.04 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.68 / 0.00	0.99 m stick up	100 200 300 400
	17	SS1	14				**FILL:** Sand, brown to dark brown, dry, fine to coarse, some silt and clay, trace rootlets, medium dense.			315.38 / 0.30	Monument casing secured in concrete 267 mm borehole Bentonite chip seal	2.3
1	54	SS2	15			Metals PAHs (08:30) (0.76-1.37)	- No silt, clay or rootlets, trace gravel below 0.76 mbgs.					2.3
						PAHs (08:45) (1.52-2.13)	**SILTY SAND:** Upper contact dark brown and organic, moist, transitioning to pale white, some gravel, medium dense.		314.16 / 1.52			
2	63	SS3	18									2.1
							- Sampler refusal at 2.36 mbgs in bedrock, set HW casing, HQ coring below 2.29 mbgs.		313.39 / 2.29	313.39 / 2.29	96 mm corehole	2.5
	21	SS4	50/ 8cm				**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, vuggy, Mn staining on bedding plane partings, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 15 mm). - Weak rock/possible fracture zone 2.44 to 2.67 mbgs.					
					3							
3	85	Run1		0	8					312.63 / 3.05	#3 silica sand filter pack	
					7							
					7					312.23 / 3.45	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					6		- Weak rock/possible fracture zone, moderate odour 3.81 to 3.87 mbgs. - Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 40 mm) below 3.86 mbgs.					
4	100	Run2		15	6							
					4							
					4				310.70 / 4.98	310.70 / 4.98		
5							Bottom of corehole at 4.98 mbgs					
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

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JACOBS

RECORD OF MONITORING WELL: MW18-125S

CLIENT: City of Guelph | DATE DRILLED: July 31, 2018 | GROUND ELEVATION: 315.33 masl | NORTHING: 4822298.1 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.29 masl | EASTING: 562245.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.56 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
	42	SS1	8			PCBs (11:05) (0.00-0.60)	**FILL:** Sand, dark brown, dry, fine to coarse, some gravel, dark mottling, loose to very dense.			315.33 / 0.00	Monument casing secured in concrete	0.4
										315.03 / 0.30	267 mm borehole Bentonite chip seal	
1	58	SS2	50+			PHCs & BTEX Metals (11:15) (0.76-1.37)						0.2
									313.81			
						PCBs PAHs (11:30) (1.52-2.13)	**SAND:** Light brown, dry, fine to medium, some gravel, very dense.		1.52			
2	63	SS3	50+									0.6
							- Sampler refusal at 2.39 mbgs in bedrock, set HW casing, HQ coring below 2.29 mbgs.		313.04	313.04		
	17	SS4	50/10cm		5		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline high vug intensity (1 to 20 mm).		2.29	2.29	96 mm corehole	0.2
					6							
	100	Run1		0								
3					10+							
					6		- Weak rock/possible fracture zone 3.25 to 3.33 mbgs.					
					4							
										311.52 / 3.81	#3 silica sand filter pack	
4					5							
	100	Run2		13						311.06 / 4.27	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					5							
					7		- Shaley bed at 4.74 mbgs. - Grey to brown, medium crystalline, medium vug intensity (1 to 40 mm) below 4.75 mbgs. - Weak rock/possible fracture zone 4.76 to 4.78 mbgs. - Weak rock/possible fracture zone 4.93 to 4.95 mbgs.					
5					7							
	100	Run3		0	5							
					5							
									309.54	309.54		
							Bottom of corehole at 5.79 mbgs		5.79	5.79		
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-126D

CLIENT: City of Guelph | DATE DRILLED: July 31, 2018 | GROUND ELEVATION: 315.30 masl | NORTHING: 4822291.8 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.28 masl | EASTING: 562254.9

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.54 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.30 / 0.00	100 200 300 400
	58	SS1	56/ 15cm			PAHs Metals (14:20) (0.00-0.30)	**FILL:** Silty Sand, dark brown, dry, fine to medium, medium dense, trace gravel and iron fragments.			315.00 / 0.30	0.4
1	50	SS2	7			PHCs & BTEX VOCs (14:30) (0.76-1.37)			314.08 / 1.22		0.0
							Sand, dark brown to beige, dry, fine to medium, dense.				
	0	SS3	35			PCBs (14:40) (1.52-2.13)					0.0
2							- HSA refusal at 2.44 mbgs, Set HW casing, HQ coring below 2.44 mbgs.		312.86 / 2.44	312.86 / 2.44	
					10+		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, medium to coarse crystalline, high vug intensity (1 to 10 mm).				
					6		- Weak rock/possible fracture zone 2.44 to 2.64 mbgs.				
3	100	Run1		0	8		- Weak rock/possible fracture zone, dark brown staining and moderate odour 2.92 to 3.07 mbgs.				
					3						
					6		- Weak rock/possible fracture zone, dark brown staining and moderate odour 3.23 to 3.30 mbgs.				
					8						
4							- Weak rock/possible fracture zone 3.78 to 3.89 mbgs.				
	100	Run2		8	5						
					7						
					6		- Shaley bed at 4.67 mbgs.				
5					6		- Grey to brown, medium to fine crystalline, medium vug intensity (1 to 50 mm), below 4.70 mbgs.				
					7						
					10+		- Weak rock/possible fracture zone 5.38 to 5.46 mbgs.				
	93	Run3		30	10+		- Weak rock/possible fracture zone 5.66 to 5.87 mbgs.			309.51 / 5.79	
6					3						#3 silica sand filter pack
					4					308.85 / 6.45	
					4						50 mm diameter SCH 40 PVC pipe #10-slot well screen
7					4		- Weak rock/possible fracture zone 7.04 to 7.11 mbgs.		308.14 / 7.16		
	100	Run4		62	3		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to brown, medium to fine crystalline, medium vug intensity (1 to 50 mm).				
					2		- Shaley bed at 7.57 mbgs.				
							- Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1-20 mm) below 7.59 mbgs.		307.32	307.32	

0.98 m stick up

Monument casing secured in concrete

267 mm borehole

Bentonite chip seal

96 mm corehole

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-126D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 31, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 315.30 masl
TOP OF PIPE: 316.28 masl
WATER ELEVATION: 312.54 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822291.8
EASTING: 562254.9
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							Bioturbated, fragments of shells at 7.80 mbgs. Bottom of corehole at 7.98 mbgs		7.98	7.98		
9												
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

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JACOBS

RECORD OF MONITORING WELL: MW18-127S

CLIENT: City of Guelph | DATE DRILLED: July 31, 2018 | GROUND ELEVATION: 315.33 masl | NORTHING: 4822319.4 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.37 masl | EASTING: 562262.8

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.72 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.33 / 0.00	100 200 300 400
	8	SS1	7				**FILL:** Silty Sand, dark brown, dry, fine, loose, organic matter.			315.03 / 0.30	1.1
									314.57 / 0.76		
1	75	SS2	44				Sand, dark brown, dry, fine to coarse, dense, some gravel.				0.3
									314.11 / 1.22		
							SAND: Dark brown, dry, fine to medium, some gravel and cobbles, dense to very dense.				
	50	SS3	34								1.0
2											
	21	SS4	50+/ 18cm				- Sampler refusal at 2.62 mbgs, HSA refusal at 2.74 mbgs, set HW casing, HQ coring below 2.74 mbgs.				1.2
									312.59 / 2.74	312.59 / 2.74	
					2		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown to beige, Mn and Fe staining on fractures and vugs, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).				
3	89	Run1		22	6					312.28 / 3.05	
					1					311.90 / 3.43	
					5						
					6						
4					7						
	100	Run2		8	4						
					4						
							- Shaley bed at 4.80 mbgs.				
5							- Brownish grey, medium crystalline, medium vug intensity (1 to 10 mm) below 4.83 mbgs.		310.38 / 4.95	310.38 / 4.95	
							Bottom of corehole at 4.95 mbgs				
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 1.04 m stick up
- Monument casing secured in concrete
- 267 mm borehole
- Bentonite chip seal
- 96 mm corehole
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-128D

CLIENT: City of Guelph
DATE DRILLED: Jun 26 to Jun 27, 2018
GROUND ELEVATION: 316.46 masl
NORTHING: 4822401.2

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.49 masl
EASTING: 562358.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.52 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
							CONCRETE:		316.31 / 0.15	316.46 / 0.00	1.03 m stick up	
	58	SS1	22				**FILL:** Silty Sand, light brown, dry, medium dense.			316.16 / 0.30	Monument casing secured in concrete 100 mm diameter steel casing set with portland & bentonite grout 267 mm borehole Bentonite grout seal	17.5
1	63	SS2	45									6.9
									314.94 / 1.52			
	42	SS3	40				**SAND, GRAVEL AND COBBLES:** Light to dark brown, dry, fine to medium, dense.					7.0
2												
3									313.49 / 2.97			
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Light to dark brown, vuggy, biostromal fossils, medium to coarse crystalline, medium to high vug intensity (1 to 40 mm).					
4							- Difficult drilling below 2.13 mbgs no samples collected due to cobbles, HSA refusal at 4.27 mbgs, set PW casing, PQ coring below 4.27 mbgs.			312.19 / 4.27	123 mm corehole	
	100	Run1		0	6 4 1		- Weak rock/possible fracture zone 4.57 to 4.67 mbgs. - Water return loss observed at 4.62 mbgs.					
5					2							
					4							
	100	Run2		82	1		- Manganese rich shaley layer at 5.54 mbgs.					
					2		- Shaley layer at 5.77 mbgs.		310.67 / 5.79			
6					3		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, vuggy, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 20 mm).					
					2							
					2							
7					3							
	100	Run3		63	2		- Stromatoporiod fossil at 7.26 mbgs.					
					4							

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-128D

CLIENT: City of Guelph
DATE DRILLED: Jun 26 to Jun 27, 2018
GROUND ELEVATION: 316.46 masl
NORTHING: 4822401.2

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.49 masl
EASTING: 562358.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.52 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run4		87	2 1 2 3 2		- Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (<1 mm) below 9.04 mbgs.				
10	98	Run5		73	3 2 2 2 3		- Water return loss observed at 10.36 mbgs.				
11					0 4 3 3 3		- Fossil abundance decreasing below 11.58 mbgs.				
12	100	Run6		52	1 2 2 3 2		- 3 cm seam weathered shale at 11.96 mbgs.				
13	98	Run7		82	1 2 2 2 3		- Vugs nearly absent below 12.80 mbgs.		302.90 13.56		
14					1 3 2 2 1		**ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, very low vug intensity (<1 mm). - Vugs absent below 14.15 mbgs. - PQ core to 14.15 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, continue coring with HQ.		302.31 14.15	96 mm corehole	
15	98	Run8		90	3 2 2 1 1		- Water return loss observed at 14.63 mbgs. - Shaley layer at 14.91 mbgs.				

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-128D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: Jun 26 to Jun 27, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, PQ, HQ water core

GROUND ELEVATION: 316.46 masl
TOP OF PIPE: 317.49 masl
WATER ELEVATION: 312.52 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822401.2
EASTING: 562358.0
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS:	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 9		80	5, 1, 2, 4		- Weak rock/possible fracture zone 15.98 to 16.10 mbgs. - Sulfide infilling and [Ca,Mg]CO3 of amigdala at 16.79 mbgs. - Increasing frequency of shaley beds below 17.20 mbgs.			298.78 / 17.68	Bentonite pellet seal	100 200 300 400
18	100	Run 10		78	4, 4, 2, 1, 4, 2					298.17 / 18.29	#3 silica sand filter pack	
19	100	Run 11		73	5, 2, 2, 2, 2, 1					297.71 / 18.75	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
20							Bottom of corehole at 20.27 mbgs		296.19 / 20.27	296.19 / 20.27		
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-129D

CLIENT: City of Guelph
DATE DRILLED: July 23, 2018
GROUND ELEVATION: 316.31 masl
NORTHING: 4822361.5

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.27 masl
EASTING: 562369.0

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.51 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
							FILL: Sand, dark to light brown, dry, fine to coarse, medium dense to dense, trace rootlets near ground surface.			316.31 / 0.00	Monument casing secured in concrete	
	50	SS1	14							316.01 / 0.30	267 mm borehole Bentonite chip seal	0.6
1	54	SS2	46			Metals & Inorg. (10:40) (0.76-1.37)						
						PAHs (11:00) (1.68-2.13)	**SILTY SAND:** Dark brown, fine to coarse, moist, very dense, some gravel and cobbles.		314.79 / 1.52			
2	67	SS3	50+									
	79	SS4	50+/ 3cm			PHCs & BTEX (11:30) (2.29-2.57)						
3	4	~~SS5~~	50/ 3cm				- Sampler refusal at 3.07 mbgs, HSA refusal at 3.35 mbgs, set HW casing, HQ coring below 3.35 mbgs.		312.96 / 3.35	312.96 / 3.35	96 mm corehole	
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light to dark brown, vuggy, Fe staining, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 30 mm).					
					4		- Weak rock/possible fracture zone 3.53 to 3.61 mbgs.					
4	100	Run1		50	2							
					3							
					4		- Weak rock/possible fracture zone 4.67 to 4.72 mbgs.					
							- Water return loss observed below 4.70 mbgs, continues for remainder of corehole.					
5					7		- Shaley bed at 4.72 mbgs.					
					4		- Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 65 mm) below 5.31 mbgs.					
	100	Run2		47	10+		- Weak rock/possible fracture zone 5.33 to 5.36 mbgs.					
					3		- Weak rock/possible fracture zone at 5.72 mbgs.					
6					3							
					2				309.60 / 6.71			
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 65 mm).					
7					2							
	100	Run3		85	1					308.74 / 7.57	#3 silica sand filter pack	
					5		- Vug at 7.62 mbgs.					
										308.33		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-129D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 23, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 316.31 masl
TOP OF PIPE: 317.27 masl
WATER ELEVATION: 312.51 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822361.5
EASTING: 562369.0
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run4		85	2 2 2 2 3		- Coralloid stromatoporoid fossils at 8.89 mbgs. - Bioturbated bed at 9.14 mbgs. - Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1-20 mm) below 9.22 mbgs. Bottom of corehole at 9.50 mbgs		306.81 9.50	7.98 306.81 9.50	50 mm diameter SCH 40 PVC pipe #10-slot well screen	100 200 300 400
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-130D

CLIENT: City of Guelph
DATE DRILLED: Jul 19 to Jul 20, 2018
GROUND ELEVATION: 316.44 masl
NORTHING: 4822439.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.52 masl
EASTING: 562358.9

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.54 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
											1.08 m stick up	100 200 300 400
	71	SS1	4				**FILL:** Sand, dark brown, dry, fine, loose, trace gravel.		316.44 / 0.00	316.14 / 0.30	Monument casing secured in concrete	2.1
1	63	SS2	4								267 mm borehole Bentonite chip seal	2.4
									314.92			
	29	SS3	36				**SILTY SAND:** Dark brown, fine to coarse, moist, some gravel, medium dense.		1.52			2.8
2	63	SS4	50+				- Sampler refusal at 2.74 mbgs, HSA refusal at 2.90 mbgs, set HW casing, HQ coring below 2.90 mbgs.					2.0
									313.54	313.54		
3	100	Run1		44	2 5 3		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light to dark brown, vuggy, biostromal fossils, medium to coarse crystalline, medium vug intensity (1 to 10 mm). - Water return loss observed below 3.33 mbgs, continues for remainder of corehole.		2.90	2.90	96 mm corehole	
					6							
4	100	Run2		25	4 3		- Moderate hydrocarbon like odour at 3.84 mbgs. - 50 mm vug at 4.27 mbgs.					
					7		- Weak rock/possible fracture zone 4.57 to 4.65 mbgs.					
5					8 5		- Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 5.05 mbgs.					
	100	Run3		35	4 5							
										310.50		
6					2		- 50 mm vug at 5.99 mbgs.			5.94	#3 silica sand filter pack	
					2					310.04		
					2				309.95	6.40	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm).		6.49			
7	100	Run4		70	3 2		- Bioturbated, fragments of shells at 7.11 mbgs. - Stromatoporoid fossil at 7.19 mbgs.					
					4							
									308.52	308.52		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-130D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: Jul 19 to Jul 20, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 316.44 masl
TOP OF PIPE: 317.52 masl
WATER ELEVATION: 312.54 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822439.9
EASTING: 562358.9
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
							Bottom of corehole at 7.92 mbgs		7.92	7.92		
9												
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-131S

CLIENT: City of Guelph | DATE DRILLED: July 19, 2018 | GROUND ELEVATION: 315.47 masl | NORTHING: 4822441.8 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.49 masl | EASTING: 562323.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.80 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
							FILL: Sand and Gravel with Silt, dark brown to grey, dry, fine to coarse, medium dense.			315.47 / 0.00	Monument casing secured in concrete	
	63	SS1	23							315.17 / 0.30	267 mm borehole Bentonite chip seal	6.3
1	22	SS2	31									5.2
	13	SS3	30									3.2
2							- HSA refusal at 2.13 mbgs, set HW casing, HQ coring below at 2.13 mbgs.		313.34	313.34		
					4		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, vuggy, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 10 mm).		2.13	2.13	96 mm corehole	
					7							
	100	Run1		17	6		- Slight hydrocarbon like odour at 2.67 mbgs.			312.55 / 2.92	#3 silica sand filter pack	
3					3					312.27 / 3.20	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					5		- Vug on biostromal fossil at 3.30 mbgs.					
					6		- Manganese stylolite at 3.66 mbgs.					
					6							
4	100	Run2		15			- Vug partially infilled with carbonate mineral at 3.96 mbgs. - Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 50 mm) below 4.01 mbgs.					
					7							
					4							
									310.75	310.75		
							Bottom of corehole at 4.72 mbgs		4.72	4.72		
5												
6												
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-132D

CLIENT: City of Guelph
DATE DRILLED: July 20, 2018
GROUND ELEVATION: 316.44 masl
NORTHING: 4822427.9

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.49 masl
EASTING: 562362.5

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.52 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										316.44 / 0.00	1.05 m stick up	100 200 300 400
	42	SS1	13				**FILL:** Dark brown to black with light yellow, dry, loose, trace gravel.			316.14 / 0.30	Monument casing secured in concrete 267 mm borehole Bentonite chip seal	0.5
									315.68 / 0.76			
1	50	SS2	16				Sand, dark brown, fine to coarse, some clay and silt, moist, some slag.					0.7
									314.92 / 1.52			
	71	SS3	50+				**SILTY SAND:** Dark brown, fine to coarse, moist, some gravel, very dense.					1.6
2	25	SS4	50/ 8cm									1.1
							- Sampler refusal at 3.10 mbgs, set HW casing, HQ coring below 3.10 mbgs.					
3	8	SS5	50/ 5cm		3				313.39 / 3.05	313.34 / 3.10		1.0
	73	Run1		29	3		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light to dark brown, vuggy, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 50 mm).				96 mm corehole	
					4		- Weak rock/possible fracture zone 3.56 to 3.58 mbgs.					
4					5							
	100	Run2		40	2		- Slight odour at 4.06 mbgs.					
					5							
5					5							
					8		- Shaley layer at 5.33 mbgs. - Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 60 mm) below 5.36 mbgs.					
	100	Run3		7	7							
6					4							
					5							
					2							
					4							
7					2		- Weak rock/possible fracture zone 7.01 to 7.09 mbgs. - Infilled carbonate orange color [Ca, Mg]CO3 at 7.04 mbgs.		309.34 / 7.10			
	100	Run4		82	3		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Grey to light grey, sparse biostromal fossils, medium to fine crystalline, medium vug intensity (1 to 60 mm).			308.90 / 7.54	#3 silica sand filter pack	
					3							
										308.46		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-132D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: L. Ribeiro

DATE DRILLED: July 20, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 159 mm HSA, HQ water core

GROUND ELEVATION: 316.44 masl
TOP OF PIPE: 317.49 masl
WATER ELEVATION: 312.52 masl
WATER LEVEL DATE: August 20, 2018

NORTHING: 4822427.9
EASTING: 562362.5
MOE WELL TAG#: A243494

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					2					7.98	50 mm diameter SCH 40 PVC pipe #10-slot well screen	100 200 300 400
					3							
	100	Run5		90	2							
9					2		- Coralloid fossils at 8.97 mbgs. - Bioturbated bed at 9.04 mbgs - Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (1-20 mm) below 9.07 mbgs.					
					5				306.94	306.94		
							Bottom of corehole at 9.50 mbgs		9.50	9.50		
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-133D

CLIENT: City of Guelph | DATE DRILLED: Jun 25 to Jul 19, 2018 | GROUND ELEVATION: 315.41 masl | NORTHING: 4822436.2 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.50 masl | EASTING: 562331.5

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.57 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, PQ, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
										315.41 / 0.00	
							FILL: Sand and Gravel with Silt, dark brown to grey, dry, fine to coarse, medium dense.			315.11 / 0.30	
1											
2							- Lithology to 2.13 mbgs inferred from MW18-131S, HSA to 2.13 mbgs, set HW casing, HQ coring below 2.13 mbgs.		313.28	313.28	
					7		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Light brown, vuggy, Mn staining on fractures, vugs and bedding plane partings, biostromal fossils, medium to coarse crystalline, high vug intensity (1 to 20 mm).		2.13	2.13	
	70	Run1		0	5						
3					3						
	100	Run2		17	7		- Slight odour at 3.05 mbgs.				
					4						
					4						
4					1						
	100	Run3		50	2		- Weak rock/possible fracture zone 4.19 to 4.34 mbgs.				
					6		- Grey to light grey, vuggy, sparse biostromal fossils, medium to fine crystalline, low to medium vug intensity (1 to 50 mm) below 4.50 mbgs.				
5					2						
					2						
	97	Run4		63	3		- 50 mm vug with calcite/dolomite infilling at 5.59 mbgs.				
6					3						
					4						
					2						
					4						
7					3						
	100	Run5		73	2		- Coralloid fossil at 7.42 mbgs.		307.88		
					4		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Light to dark grey, brachiopods and shell fragments fossil assembly, bioturbated and traction layers, fine crystalline, low vug intensity (<1 mm).		7.53		

1.09 m stick up

Monument casing secured in concrete
100 mm diameter steel casing set with portland & bentonite grout
267 mm borehole
Bentonite grout seal

123 mm corehole

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-133D

CLIENT: City of Guelph
DATE DRILLED: Jun 25 to Jul 19, 2018
GROUND ELEVATION: 315.41 masl
NORTHING: 4822436.2

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.50 masl
EASTING: 562331.5

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.57 masl
MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro
DRILL METHOD: 159 mm HSA, PQ, HQ water core
WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9	100	Run6		87	2 3 2 2 3							
10	100	Run7		78	1 1 3 2 4		- Vugs nearly absent below 10.36 mbgs.					
11					2 2 2		- Fossil content decreasing with depth below 11.28 mbgs.					
12	100	Run8		42	4 2 4		- Weathered shale at 12.45 to 12.55 mbgs. - Fossils nearly absent below 12.57 mbgs. - PQ core to 12.62 mbgs, set 10 cm diameter steel casing with portland and bentonite grout seal, continue coring with HQ.			302.79 / 12.62	96 mm corehole	
13	100	Run9		90	1 2 3 1 2							
14					1 2 2 2 2							
15	100	Run 10		87	2 2 2 3		- Increased interbedded shale content below 14.96 mbgs. - Infilling minerals (sulfide, carbonate) at 15.39 mbgs. **ERAMOSA FORMATION / VINEMOUNT MEMBER** **SHALEY DOLOSTONE:** Dark to very dark grey, fossil and vugs nearly absent. fine crystalline. - Amigdala infilled with [Ca,Mg]CO3 below 15.62 mbgs.		299.94 / 15.47	299.87 / 15.54	Bentonite pellet seal	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-133D

CLIENT: City of Guelph | DATE DRILLED: Jun 25 to Jul 19, 2018 | GROUND ELEVATION: 315.41 masl | NORTHING: 4822436.2 |

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.50 masl | EASTING: 562331.5

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.57 masl | MOE WELL TAG#: A243494

LOGGED BY: L. Ribeiro | DRILL METHOD: 159 mm HSA, PQ, HQ water core | WATER LEVEL DATE: August 20, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
17	100	Run 11		85	0 3 0 6		- Dendritic pyrite infilling 16.84 to 16.87 mbgs. - Slight odour at 17.07 mbgs. - Increased shale content 17.09 to 17.12 mbgs. - Weak rock/possible fracture zone 17.15 to 17.22 mbgs.			298.95 16.46 298.24 17.17	#3 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	100 200 300 400
18	100	Run 12		100	10+ 1 1 0 2				296.72 18.69	296.72 18.69		
19							Bottom of corehole at 18.69 mbgs					
20												
21												
22												
23												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

JACOBS

RECORD OF MONITORING WELL: MW18-134D

CLIENT: City of Guelph
DATE DRILLED: Nov 21 to Nov 22, 2018
GROUND ELEVATION: 315.45 masl
NORTHING: 4822342.8

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.28 masl
EASTING: 562323.2

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.67 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
										315.45 / 0.00	0.80 m stick up	
							FILL: Silty Clay, brown, medium dense, dry, some sand, trace rootlets			315.15 / 0.30	Monument casing secured in concrete 210 mm borehole Bentonite chip seal	
									314.78 / 0.67			
1							**SAND:** Dark brown, medium dense, dry, coarse, some silty clay, trace gravel.					
									313.65 / 1.80			
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Buff, medium strong, slightly weathered, moderately fractured, vuggy (<10 mm).			312.88 / 2.57	Bentonite pellet seal 96 mm corehole	
					5		- Weathered fracture at 2.72 mbgs.					
3	100	Run1		0	4		- 25 mm vug at 3.05 mbgs.					
					2							
					3		- Greyish medium brown, vugs (<30 mm) less frequent with calcite crystallization below 3.30 mbgs.					
					4							
4	97	Run2		50	3		- Weak rock at 3.99 mbgs.					
					4							
					2		- 25 mm vug at 4.34 mbgs. - Calcite crystallization filled fracture at 4.42 mbgs.					
					2		- Weak rock and highly weathered at 4.60 mbgs.					
5					2		- No coring water return observed below 4.82 mbgs.					
					4							
	100	Run3		82	3							
					2							
6					2					309.35 / 6.10	#2 silica sand filter pack	
					2		- 8 cm vertical fracture at 6.27 mbgs.			309.05 / 6.40	50 mm diameter SCH 40 PVC pipe #10-slot well screen	
					4							
7					5		- 5 cm vertical fracture at 7.01 mbgs.					
	100	Run4		73	2							
					3				307.98 / 7.47			
					2		**ERAMOSA FORMATION / REFORMATORY QUARRY MEMBER DOLOSTONE:** Dark grey, low intensity of vugs (<2 mm), pyrite and sulfides infilling of vugs and fractures.			307.53		

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-134D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 21 to Nov 22, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.45 masl
TOP OF PIPE: 316.28 masl
WATER ELEVATION: 312.67 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822342.8
EASTING: 562323.2
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
					3					7.92 307.47 7.98	Bentonite chip seal	100 200 300 400
	100	Run5		65	3							
9					4		- 13 cm vertical fracture at 8.84 mbgs.					
					7				306.05 9.40	306.05 9.40		
							Bottom of corehole at 9.40 mbgs					
10												
11												
12												
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-134S

CLIENT: City of Guelph | DATE DRILLED: November 23, 2018 | GROUND ELEVATION: 315.41 masl | NORTHING: 4822340.9 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.24 masl | EASTING: 562322.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.78 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
										315.41 / 0.00	
	38	SS1	27				**FILL:** Silty Clay, brown, medium dense, dry, some sand, trace rootlets.			315.11 / 0.30	
									314.74 / 0.67		
1	67	SS2	28				**SAND:** Dark brown, medium dense, dry, coarse, some silty clay, trace gravel.				
	54	SS3	50/ 13cm						313.61 / 1.80		
2							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Buff, medium strong, slightly weathered, moderately fractured, vuggy (<10 mm).			312.82 / 2.59	
							- Weathered fracture at 2.72 mbgs.			312.51 / 2.90	
3							- 25 mm vug at 3.05 mbgs.				
							- Greyish medium brown, vugs less frequent (<30 mm) with calcite crystallization below 3.30 mbgs.				
4							- Weak rock at 3.99 mbgs.				
							- 25 mm vug at 4.34 mbgs. - Calcite crystallization filled fracture at 4.42 mbgs.		310.99 / 4.42	310.99 / 4.42	
							Bottom of corehole at 4.42 mbgs Lithology inferred from adjacent borehole MW18-134D.				
5											
6											
7											

0.83 m stick up

Monument casing secured in concrete

210 mm borehole Bentonite chip seal

#2 silica sand filter pack

50 mm diameter SCH 40 PVC pipe #10-slot well screen

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

JACOBS

RECORD OF MONITORING WELL: MW18-135D

CLIENT: City of Guelph
DATE DRILLED: Nov 16 to Nov 17, 2018
GROUND ELEVATION: 316.44 masl
NORTHING: 4822405.0

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 317.24 masl
EASTING: 562332.6

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.65 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
		SS1					**FILL:** Sandy Silt, dark brown, some gravel, organics.		316.44 / 0.00	316.14 / 0.30 Monument casing secured in concrete; 210 mm borehole Bentonite grout seal; 0.80 m stick up	0.5
1		SS2					**SILTY SAND:** Dark brown, coarse grained, trace gravel.		315.68 / 0.76		0.4
		SS3					**SAND:** Dark brown, coarse grained, some gravel.		314.92 / 1.52		0.2
2		SS4									0.0
3		SS5					**GUELPH FORMATION AND ERAMOSA FORMATION/STONE ROAD MEMBER DOLOSTONE:** Buff, slightly weathered, frequent vugs (<60 mm).		313.39 / 3.05		0.1
4	44	Run1		22	3 2 n/a					312.63 / 3.81 96 mm corehole	
5					3 4		- Weak rock at 5.13 mbgs.				
6	100	Run2		65	3 2 2		- 12 cm vertical fracture at 5.94 mbgs.		310.44 / 6.00		
7	100	Run3		67	3 3 2 1 3 4		**ERAMOSA/ REFORMATORY QUARRY MEMBER:** Light to medium grey, fresh, occasional vugs (<5 mm). - 95 mm fossil at 7.52 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-135D

CLIENT: City of Guelph | DATE DRILLED: Nov 16 to Nov 17, 2018 | GROUND ELEVATION: 316.44 masl | NORTHING: 4822405.0

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 317.24 masl | EASTING: 562332.6

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.65 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run4		23	3 2 2 2		- 70 mm vug with crystalline infilling and 80 mm fossil at 8.36 mbgs. - Pyrite at 8.69 mbgs.			307.60 / 8.84	Bentonite pellet seal	100 200 300 400
10	100	Run5		72	3 3 2 2 3 2		- Dark grey, trace vugs (<5 mm), frequent fossils (<5 mm) below 9.30 mbgs. - 25 cm healed vertical fracture at 9.53 mbgs. - 23 cm vertical fracture at 9.83 mbgs.			306.99 / 9.45 306.69 / 9.75	#2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
11	100	Run6		80	1 3 3 2 3		- Medium grey below 10.77 mbgs. - 25 mm fossil at 11.18 mbgs.			305.16 / 11.28 305.01 / 11.43	Bentonite chip seal	
12							Bottom of corehole at 12.34 mbgs		304.10 / 12.34	304.10 / 12.34		
13												
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-135S

CLIENT: City of Guelph | DATE DRILLED: November 20, 2018 | GROUND ELEVATION: 316.53 masl | NORTHING: 4822403.3 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 317.34 masl | EASTING: 562332.7

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.80 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
							FILL: Sandy Silt, dark brown, some gravel, organics.		316.53 / 0.00	316.23 / 0.30	0.81 m stick up; Monument casing secured in concrete; 210 mm borehole; Bentonite chip seal	100 200 300 400
									315.77			
1							**SILTY SAND:** Dark brown, coarse grained, trace gravel.		0.76			
									315.01			
2							**SAND:** Dark brown, coarse grained, some gravel.		1.52			
3									313.48			
							GUELPH FORMATION AND ERAMOSA FORMATION/STONE ROAD MEMBER DOLOSTONE: Buff, slightly weathered, frequent vugs <60 mm.		3.05	312.72 / 3.81	96 mm corehole	
4										312.42 / 4.11	#2 silica sand filter pack; 50 mm diameter SCH 40 PVC pipe; #10-slot well screen	
										312.26 / 4.27		
5							- Weak rock at 5.13 mbgs.					
									310.74	310.74		
6							Bottom of corehole at 5.79 mbgs Lithology inferred from adjacent borehole MW18-135D.		5.79	5.79		
7												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-136D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 23 to Nov 26, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.58 masl
TOP OF PIPE: 316.34 masl
WATER ELEVATION: 312.70 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822312.9
EASTING: 562288.1
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.58 / 0.00	0.76 m stick up	100 200 300 400
							FILL: Silty Sand, light brown, medium dense, dry, fine to medium grained, trace slag and gravel.			315.28 / 0.30	Monument casing secured in concrete 210 mm borehole Bentonite grout seal	
									314.97 / 0.61			
1							**CLAYEY SILT:** Light to dark brown, dry, very stiff, some gravel.					
2												
							- Sampler refusal at 1.73 mbgs, HSA refusal at 2.59 mbgs, set PW casing, PQ coring below 2.59 mbgs.		312.99 / 2.59	312.99 / 2.59	96 mm corehole	
							GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE: Buff, coarse crystalline, high vug intensity (<5 mm).					
3							- 8 cm vertical fracture at 3.00 mbgs.					
4												
5												
6							- Greyish light brown, vugs (<60 mm) below 5.84 mbgs.					
7												
							- 105 mm vug at 7.16 mbgs and 85 mm vug at 7.24 mbgs, calcite crystallization.		308.37 / 7.21			
							ERAMOSA/ REFORMATORY QUARRY MEMBER: Brownish medium grey, strong, fresh, undulating bedding, moderately fractured, fossiliferous, frequent vugs (<40 mm_.					
							- 18 cm weak rock at 7.77 mbgs.					

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF MONITORING WELL: MW18-136D

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 23 to Nov 26, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.58 masl
TOP OF PIPE: 316.34 masl
WATER ELEVATION: 312.70 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822312.9
EASTING: 562288.1
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400
9							- Low vug intensity (<15 mm) below 8.56 mbgs.					
10												
11										304.76 / 10.82	Bentonite pellet seal	
										304.15 / 11.43		
										304.00 / 11.58	#2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe #10-slot well screen	
12							- Trace vugs (<3 mm), frequent fossils (<10 mm) below 11.94 mbgs.					
13							Bottom of corehole at 13.11 mbgs Lithology inferred from adjacent borehole MW18-136G.		302.47 / 13.11	302.47 / 13.11		
14												
15												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF MONITORING WELL: MW18-136G

CLIENT: City of Guelph
DATE DRILLED: Nov 26 to Nov 27, 2018
GROUND ELEVATION: 315.56 masl
NORTHING: 4822312.6

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.36 masl
EASTING: 562286.3

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.89 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										315.56 / 0.00	0.80 m stick up	100 200 300 400
	42	SS1	12				**FILL:** Silty Sand, light brown, medium dense, dry, fine to medium grained, trace slag and gravel.			315.26 / 0.30	Monument casing secured in concrete 210 mm borehole Bentonite grout seal	
									314.95 / 0.61			
1	42	SS2	27				**CLAYEY SILT:** Light to dark brown, dry, very stiff, some gravel.					
	100	SS3	50/ 5cm									
2												
							- Sampler refusal at 1.73 mbgs, HSA refusal at 2.59 mbgs, set PW casing, PQ coring below 2.59 mbgs.		312.97 / 2.59	312.97 / 2.59	123 mm corehole	
	100	Run1		0	2		**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:** Buff, coarse crystalline, high vug intensity (<5 mm).					
3					7		- 8 cm vertical fracture at 3.00 mbgs.					
					7							
	100	Run2		35	3							
					3							
4					4							
					4							
					5							
5	100	Run3		50	4							
					2							
					3							
					2		- Greyish light brown, vugs (<60 mm) below 5.84 mbgs.					
6					3							
	100	Run4		85	2							
					3							
7					2							
					2		- 105 mm vug at 7.16 mbgs and 85 mm vug at 7.24 mbgs, calcite crystallization.		308.35 / 7.21			
					2		**ERAMOSA/ REFORMATORY QUARRY MEMBER:** Brownish medium grey, strong, fresh, undulating bedding, moderately fractured, fossiliferous, frequent vugs (<40 mm).					
					1		- 18 cm weak rock at 7.77 mbgs.					

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_MW_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF MONITORING WELL: MW18-136G

CLIENT: City of Guelph | DATE DRILLED: Nov 26 to Nov 27, 2018 | GROUND ELEVATION: 315.56 masl | NORTHING: 4822312.6

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 316.36 masl | EASTING: 562286.3

PROJECT NUMBER: 694757 | DRILL RIG: CME 75 Power Auger | WATER ELEVATION: 312.89 masl | MOE WELL TAG#: A252554

LOGGED BY: A. Casey | DRILL METHOD: 108 mm HSA, PQ, HQ water core | WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
9	100	Run5		95	2 2 1 1 2 1		- Low vug intensity (<15) mm below 8.56 mbgs.				100 200 300 400
10	100	Run6		100	2 2 4 2						
11	100	Run7		54	4 3 2						
12					2 2 2		- Trace vugs (<3 mm), frequent fossils (<10 mm) below 11.94 mbgs.				
13	100	Run8		95	1 0 3						
14	100	Run9		90	2 1 2 1						
15					2 1		**ERAMOSA/VINEMOUNT MEMBER:** Dark grey, strong, occasional fossils (<5 mm).		300.62 / 14.94		
	100	Run 10		55	1 3		- 64 cm weak rock at 15.57 mbgs.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF MONITORING WELL: MW18-136G

CLIENT: City of Guelph
DATE DRILLED: Nov 26 to Nov 27, 2018
GROUND ELEVATION: 315.56 masl
NORTHING: 4822312.6

LOCATION: 200 Beverley St., Guelph
DRILLER: Aardvark Drilling
TOP OF PIPE: 316.36 masl
EASTING: 562286.3

PROJECT NUMBER: 694757
DRILL RIG: CME 75 Power Auger
WATER ELEVATION: 312.89 masl
MOE WELL TAG#: A252554

LOGGED BY: A. Casey
DRILL METHOD: 108 mm HSA, PQ, HQ water core
WATER LEVEL DATE: December 18, 2018

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)		ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
												100 200 300 400
17	100	Run 11		82	0 1 1 2 2 1		- 35 mm vug with calcite crystalline at 16.59 mbgs. - Medium to dark grey, few fossils (<5 mm), vugs nearly absent below 16.64 mbgs. - 25 cm fracture at 17.55 mbgs.					
18	100	Run 12		75	1 1 2 2		- Ream HW casing, HQ coring below 18.03 mbgs.			297.52 18.04	96 mm corehole	
19	100	Run 13		88	1 0 2							
20	100	Run 14		93	2 2 2 1 0		- 10 cm vein at 19.86 mbgs. - 15 cm vein at 20.27 mbgs.					
21					0 0 1							
22	100	Run 15		100	0 0 0 0							
23	98	Run 16		93	1 2 2					292.57 22.99 291.96 23.60 291.76 23.80	Bentonite pellet seal #2 silica sand filter pack 50 mm diameter SCH 40 PVC pipe	

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW18-136G

CLIENT: City of Guelph
LOCATION: 200 Beverley St., Guelph
PROJECT NUMBER: 694757
LOGGED BY: A. Casey

DATE DRILLED: Nov 26 to Nov 27, 2018
DRILLER: Aardvark Drilling
DRILL RIG: CME 75 Power Auger
DRILL METHOD: 108 mm HSA, PQ, HQ water core

GROUND ELEVATION: 315.56 masl
TOP OF PIPE: 316.36 masl
WATER ELEVATION: 312.89 masl
WATER LEVEL DATE: December 18, 2018

NORTHING: 4822312.6
EASTING: 562286.3
MOE WELL TAG#: A252554

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: SPT (N-value)	SAMPLES: RQD (%)	SAMPLES: Fractures per 0.3 m	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
25	95	Run 17		95	0 1 2 1 0 1		**GOAT ISLAND/ANCASTER MEMBER:** Light to medium grey, strong, fresh, occasional fossils (<5 mm), trace vugs (<3 mm), fossiliferous. undulating stratification.		290.99 24.57	290.24 25.32	#10-slot well screen	100 200 300 400
							Bottom of corehole at 25.78 mbgs		289.78 25.78	289.78 25.78		
26												
27												
28												
29												
30												
31												

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF MONITORING WELL: MW19-137S

CLIENT: City of Guelph | DATE DRILLED: April 16, 2019 | GROUND ELEVATION: 316.44 masl | NORTHING: 4822376.7 | Page 1 of 1

LOCATION: 200 Beverley St., Guelph | DRILLER: Aardvark Drilling | TOP OF PIPE: 317.31 masl | EASTING: 562388.0

PROJECT NUMBER: 694757 | DRILL RIG: CME 45 Rotary Power | WATER ELEVATION: 313.27 masl | MOE WELL TAG#: A252527

LOGGED BY: J. Gowing | DRILL METHOD: 108 mm HSA, 98 mm tricone air core | WATER LEVEL DATE: April 17, 2019

DEPTH (mbgs)	SAMPLES: Recovery (%)	TYPE	SPT (N-value)	RQD (%)	Fractures per 0.3 m	Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	BOREHOLE/COREHOLE COMPLETION DETAILS: (masl) ELEV. / DEPTH (mbgs)	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
										316.44 / 0.00	100 200 300 400
	50	SS1	4				**FILL:** Sand and Gravel, dark brown, moist, loose, fine to coarse sand and gravel, trace silt, trace rootlets and organics, trace brick.			316.13 / 0.30	0.1
1	17	SS2	11				- Increasing gravel below 1.07 mbgs.				0.2
									314.91 / 1.52		
	67	SS3	50+				**SAND AND GRAVEL WITH COBBLES:** Light brown to grey, dry to moist, very dense, fine sand and gravel, trace silt.				1.4
2										314.45 / 1.98	
										314.23 / 2.21	
	72	SS4	50/ 13cm				- HSA to top of bedrock, tricone with air below 2.57 mbgs.		313.87 / 2.57	313.87 / 2.57	0.9
3							**GUELPH FORMATION AND ERAMOSA FORMATION / STONE ROAD MEMBER DOLOSTONE:**				
4											
5									311.18 / 5.26	311.18 / 5.26	
							Bottom of corehole at 5.26 mbgs				
6											
7											

BOREHOLE/COREHOLE COMPLETION DETAILS:
- 0.88 m stick up
- Monument casing secured in concrete
- 210 mm borehole Bentonite seal
- #3 silica sand filter pack
- 50 mm diameter SCH 40 PVC pipe #10-slot well screen
- 98 mm corehole

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP17-300

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822271.2

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562096.3

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.08 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
0		Grab	PCB Dioxins/Furans (14:15) (0.00-0.30) Metals & Inorg. SVOCs PHCs & BTEX VOCs (14:25) (0.20-0.46) PCB (14:20) (0.30-0.61) Metals & Inorg. SVOCs PHCs & BTEX VOCs (14:35) (0.91-1.22)	**FILL:** Sand and gravel, dark brown, dry to moist, fine to coarse, trace silt, trace rootlets at surface.		314.88 0.20	Backfilled with excavated soil	1.3
		Grab		Slag and foundry sand, black, dry, cemented.		314.62 0.46		1.0
		Grab		Silty sand, dark orange/brown, fine grained, cemented, trace rootlets, trace brick.		314.32 0.76		1.4
1		Grab		**SILTY SAND WITH COBBLES AND BOULDERS (TILL):** Brown, moist, fine grained sand, trace medium and coarse sand, trace rootlets.				1.4
				- Refusal on suspected bedrock. Bottom of Test Pit at 1.52 mbgs		313.56 1.52		
2								
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Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP17-301

CLIENT: City of Guelph | DATE EXCAVATED: October 4, 2017 | CONTRACTOR: GFEI | NORTHING: 4822345.4

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | EXCAVATOR: Kubota KX080-4 | EASTING: 562210.1

PROJECT NUMBER: 694757 | GROUND ELEVATION: 315.45 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
0		Grab		**FILL:** Sand and Gravel, light brown, fine to coarse sand and gravel, trace silt, trace rootlets.		315.15 / 0.30	Backfilled with excavated soil	2.6
		Grab	TOC Grain Size Metals & Inorg. SVOCs PHCs & BTEX (13:20) (0.30-0.91)	Silt and Sand, black to dark brown, moist, fine grained, trace slag, trace brick, trace medium to coarse sand, rail tie wood debris.				3.2
1		Grab		Sand and Gravel, brown, moist, fine to coarse sand and gravel.		314.54 / 0.91		5.1
		Grab		**PEAT:** Black, moist, trace rootlets, 5 cm seam grey clay, trace silt, moist, high plasticity at lower contact.		314.38 / 1.07		4.2
		Grab	TOC Grain Size Metals & Inorg. SVOCs PHCs & BTEX (13:40) (1.22-1.52)	**SANDY GRAVEL WITH SILT (TILL):** Grey, light brown, moist, fine to coarse sand, trace clay, trace cobbles and boulders.		314.23 / 1.22		3.2
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.52 mbgs		313.93 / 1.52		
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Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP17-302

CLIENT: City of Guelph | DATE EXCAVATED: October 4, 2017 | CONTRACTOR: GFEI | NORTHING: 4822396.2

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | EXCAVATOR: Kubota KX080-4 | EASTING: 562203.9

PROJECT NUMBER: 694757 | GROUND ELEVATION: 315.27 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
0		Grab	Metals & Inorg. PAHs PHCs & BTEX VOCs (11:50) (0.30-0.91)	**FILL:** Silty Sand, dark brown to black, dry to moist, fine grained, trace brick and slag, rootlets at surface.		314.36 / 0.91	Backfilled with excavated soil	2.9
1		Grab		Slag, black, dry.		314.05 / 1.22		2.8
		Grab		**PEAT:** Black, organic, dry to moist, some rootlets.		313.75 / 1.52		2.1
		Grab	Metals & Inorg. PAHs PHCs & BTEX VOCs (12:45) (1.52-2.01)	**SANDY SILT (TILL):** Greyish light brown, moist, medium plasticity, fine to coarse sand, some gravel and cobbles.		313.26 / 2.01		2.5
2				- Refusal on suspected bedrock. Bottom of Test Pit at 2.01 mbgs				
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ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

IMICO_TP_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 4/16/19

JACOBS

RECORD OF TEST PIT: TP17-303

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822214.7

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562165.0

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.36 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
0		Grab	Metals & Inorg. PAHs PHCs & BTEX VOCs (0.15-0.71)	**FILL:** Sand and Gravel, brown, moist to dry, fine to coarse sand, fine gravel, trace silt, rootlets.		315.21 / 0.15	Backfilled with excavated soil	4.3
		Grab		Silty Sand, dark brown with black seams, moist, trace brick.		314.65		2.9
		Grab		**SILT:** Dark grey, moist, medium plasticity, high organic content, rootlets and woody plant stalk.		0.71 / 314.45		5.2
1				**SILTY SAND (TILL):** Brown, moist, fine grained, some cobbles and boulders, trace gravel, trace silt and clay pockets with orange mottling.		0.91		
		Grab	Metals & Inorg. PAHs PHCs & BTEX VOCs (1.22-1.52)					3.7
2				- Grey medium sand, trace silt, increased grain size below 2.13 mbgs.				
		Grab						1.8
				- Refusal on suspected bedrock.		312.62 / 2.74		
3				Bottom of Test Pit at 2.74 mbgs				
4								
5								
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Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

IMICO_TP_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 4/16/19

RECORD OF TEST PIT: TP17-304

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822440.0

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562317.7

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.43 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
0		Grab		**FILL:** Sand and Gravel, grey, moist, fine to coarse.			Backfilled with excavated soil	2.9
1		Grab	Metals & Inorg. PHCs & BTEX VOCs (11:05) (1.00-1.30)	Sand, Gravel and Cobbles, brown, moist, fine to coarse, some silt, trace clay and clay clumps, upper contact orange with rootlets.		314.42 / 1.01		2.3
		Grab						2.9
2			Metals & Inorg. PHCs & BTEX VOCs (11:10) (1.80-2.00)	- Refusal on suspected bedrock. Bottom of Test Pit at 2.01 mbgs		313.42 / 2.01		
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ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP17-305

CLIENT: City of Guelph | DATE EXCAVATED: October 4, 2017 | CONTRACTOR: GFEI | NORTHING: 4822442.7

LOCATION: 200 Beverley St., Guelph | LOGGED BY: M. Shiry | EXCAVATOR: Kubota KX080-4 | EASTING: 562348.5

PROJECT NUMBER: 694757 | GROUND ELEVATION: 315.60 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 10.6 eV Bulb PID
		Grab		**FILL:** Silty Sand, brown, dry, rootlets.		315.50 / 0.10	Backfilled with excavated soil	2.7
		Grab		Sand and gravel, grey, dry, fine to coarse.		315.30 / 0.30		1.5
		Grab		Slag, dark brown to black, trace sand and silt, trace brick, trace glass.		314.99 / 0.61		1.6
1		Grab		Silt, Sand, Gravel and Cobbles, brown, dry, fine to coarse, trace brick and rootlet, boulders top 30 cm.				1.7
		Grab	Metals & Inorg. PHCs & BTEX VOCs (10:30) (1.52-1.80)	- Yellow below 1.50 mbgs.				1.5
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.80 mbgs		313.80 / 1.80		
3								
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5								
6								
7								

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP17-306

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822291.5

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562235.5

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.38 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab		**FILL:** Sand with Gravel and Cobbles, light brown, dry to moist, fine grained sand, trace silt, trace brick and concrete. Reinforced concrete wall at location of geophysical survey anomaly.			Backfilled with excavated soil	3.0
1		Grab	Metals & Inorg. PAHs PHCs & BTEX VOCs PCBs (17:05) (0.91-1.22)	- Dark brown below 0.76 mbgs.				2.5
		Grab	Metals & Inorg. PAHs (17:10) (1.52-1.83)					2.7
						313.55 / 1.83		
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.83 mbgs				
3								
4								
5								
6								
7								

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

IMICO_TP_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 4/16/19

RECORD OF TEST PIT: TP17-307

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822305.3

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562238.9

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.30 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0				**FILL:** Sand, Gravel and Cobbles, brown, moist, fine to coarse.			Backfilled with excavated soil	100 200 300 400
1								
2		Grab	PHCs & BTEX VOCs (17:50) (2.13-2.44)	- Increased moisture below 2.29 mbgs.				2.5
				- Refusal on suspected concrete floor. Bottom of Test Pit at 2.44 mbgs		312.86 / 2.44		
3								
4								
5								
6								
7								

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP17-308

CLIENT: City of Guelph
DATE EXCAVATED: October 4, 2017
CONTRACTOR: GFEI
NORTHING: 4822299.0

LOCATION: 200 Beverley St., Guelph
LOGGED BY: M. Shiry
EXCAVATOR: Kubota KX080-4
EASTING: 562257.5

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.38 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0				**FILL:** Sand, Gravel and Cobbles, brown, moist, fine to coarse.			Backfilled with excavated soil	100 200 300 400
2		Grab	Metals & Inorg. (16:35) (2.44-2.59)			312.79 / 2.59		2.6
				Bottom of Test Pit at 2.59 mbgs Notes: - Concrete ramp along foundation wall, location of geophysical anomaly, possibly reinforced concrete. Ramp ends at 2.29 mbgs then straight drop and refusal at 2.59 mbgs on suspected concrete floor.				

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: AB/MS

Reviewed by: DS

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP18-309

CLIENT: City of Guelph
DATE EXCAVATED: July 5, 2018
CONTRACTOR: GFEI
NORTHING: 4822392.5

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562365.7

PROJECT NUMBER: 694757
GROUND ELEVATION: 316.14 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab		**FILL:** Sand and gravel, brown, dry, loose, some large cobbles, trace concrete debris.			Backfilled with excavated soil	2.1
		Grab						2.0
		Grab						2.0
1		Grab		- 20 cm seam asphalt at 0.91 mbgs.				2.2
		Grab	Metals PHCs (11:20) (1.22-1.52)			314.92 / 1.22		2.2
		Grab		**FILL:** Sand and gravel, brown, some oxidation, some large cobbles.				1.9
2		Grab		**SAND AND GRAVEL:** Brown, moist, some oxidation, some large cobbles.		314.31 / 1.83		1.8
		Grab						4.3
		Grab		- Moist to wet below 2.44 mbgs.				3.2
		Grab	Metals (11:50) (2.74-2.90)	- Water seeping and present at 2.74 mbgs.		313.24 / 2.90		2.1
3				- Refusal on suspected bedrock. Bottom of Test Pit at 2.90 mbgs				
4								
5								
6								
7								

100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP18-310

CLIENT: City of Guelph
DATE EXCAVATED: July 5, 2018
CONTRACTOR: GFEI
NORTHING: 4822384.8

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562376.5

PROJECT NUMBER: 694757
GROUND ELEVATION: 316.34 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab		**FILL:** Sand and gravel, brown, dry, loose, some large cobbles, trace slag, some building debris (bricks etc.).			Backfilled with excavated soil	1.7
		Grab						1.9
		Grab						2.2
1		Grab	PHCs (09:10) (0.91-1.22)					2.4
		Grab	Metals (09:20) (1.22-1.52)	- Moist below 1.37 mbgs.				1.6
		Grab		- Some slag fragments, trace concrete pieces below 1.52 mbgs.		314.66 / 1.68		2.4
2		Grab		**SAND AND GRAVEL:** Moist, loose, some large cobbles, some boulders.				2.9
		Grab		- Some orange mottling, some oxidation below 2.29 mbgs.				3.1
		Grab				313.60 / 2.74		0.8
3			Metals (10:05) (2.44-2.74)	- Refusal on suspected bedrock. Bottom of Test Pit at 2.74 mbgs				
4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP18-311

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822239.3

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562150.9

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.50 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
		Grab		**FILL:** Sand and gravel, brown, dry, loose, some large cobbles, trace boulders.			Backfilled with excavated soil	0.8
		Grab	Metals (08:38) (0.30-0.61)					0.8
		Grab				314.89 / 0.61		0.5
1		Grab		**SAND AND GRAVEL:** Some sandy clay, some organics, dark brown, moist, loose, some cobbles, trace boulders.				0.4
		Grab						0.3
		Grab						0.3
		Grab	Metals (08:50) (1.83-1.98)					0.4
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.98 mbgs		313.52 / 1.98		
3								
4								
5								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

IMICO_TP_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF TEST PIT: TP18-312

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822243.3

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562134.4

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.29 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab		**FILL:** Sand, trace clay, dark brown to black, dry, loose, some cobbles, large slag pieces, gravel.			Backfilled with excavated soil	0.6
		Grab						0.4
		Grab	Metals (10:50) (0.61-0.91)					0.5
						314.38 / 0.91		
1		Grab		**SAND AND GRAVEL:** Some sandy clay, some organics, dark brown, moist, loose, some cobbles, trace boulders.				0.6
		Grab						0.6
		Grab	Metals (11:05) (1.52-1.83)					0.5
						313.46 / 1.83		
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.83 mbgs				
3								
4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP18-313

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822255.6

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562147.1

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.49 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab		**FILL:** Sand, trace clay, dark brown to black, dry, loose, some cobbles, large slag pieces, gravel.			Backfilled with excavated soil	0.6
		Grab	Metals (10:00) (0.30-0.61)					0.8
		Grab						0.8
						314.58		
1		Grab		**SAND AND GRAVEL:** Some sandy clay, some organics, dark brown, moist, loose, some cobbles, trace boulders.		0.91		0.3
		Grab						0.4
		Grab	Metals (10:20) (1.52-1.83)					0.4
						313.66		
2				- Refusal on suspected bedrock. 1.83 Bottom of Test Pit at 1.83 mbgs				
3								
4								
5								
6								
7								

100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP18-314

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822243.0

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562155.8

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.52 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
		Grab		**FILL:** Sand and gravel, brown, dry, loose, some large cobbles, trace boulders.			Backfilled with excavated soil	0.8
		Grab	Metals (09:00) (0.30-0.61)					0.7
		Grab				314.91 / 0.61		0.7
1		Grab		**SAND AND GRAVEL:** Some sandy clay, trace organics, dark brown, moist, loose, some cobbles, trace boulders.				0.6
		Grab						0.4
		Grab	Metals (09:30) (1.52-1.83)					0.5
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.83 mbgs		313.69 / 1.83		
3								
4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP18-315

CLIENT: City of Guelph
DATE EXCAVATED: July 5, 2018
CONTRACTOR: GFEI
NORTHING: 4822273.4

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562251.0

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.69 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab	PHCs & BTEX (15:50) (0.10-0.30)	**FILL:** Sand and gravel, brown to dark brown, dry, loose, cobbles, some boulders, some debris.			Backfilled with excavated soil	1.2
		Grab	PAHs (16:00) (0.30-0.61)					2.4
		Grab						1.4
1		Grab						1.5
		Grab	PAHs (15:20) (1.22-1.32)			314.47		1.4
				SAND AND GRAVEL: Brown to dark brown, moist, loose, some cobbles.		1.22 / 314.35		
				- Refusal on suspected bedrock. Bottom of Test Pit at 1.34 mbgs		1.34		
2								
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6								
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Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP18-316

CLIENT: City of Guelph
DATE EXCAVATED: July 5, 2018
CONTRACTOR: GFEI
NORTHING: 4822386.6

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562335.4

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.72 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab	PCBs (13:00) (0.20-0.30) PAHs PHCs PCBs (13:05) (0.30-0.61)	**CONCRETE:**		315.52	Backfilled with excavated soil	0.7
		Grab		**FILL:** Sand and gravel, dark brown, dry, loose, some debris (brick and wires).		0.20		2.2
		Grab		- 30 cm seam of dark brown to black soil at 0.38 mbgs.				3.1
1		Grab						2.5
		Grab						2.3
		Grab				314.04		1.4
		Grab		**SAND AND GRAVEL:** Some sandy clay, brown, moist, loose, some large cobbles.		1.68		1.3
2						313.74		
				- Refusal on suspected bedrock. Bottom of Test Pit at 1.98 mbgs		1.98		
3								
4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF TEST PIT: TP18-317

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822292.5

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562106.2

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.16 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
1		Grab		**FILL:** Sand and gravel, trace clay, brown to dark brown, dry to moist, loose, some large cobbles, some slag fragments, some debris (metal).			Backfilled with excavated soil	2.2
		Grab						2.3
		Grab						2.5
		Grab	PHCs & BTEX (12:30) (1.22-1.22)					2.6
						313.94 / 1.22		
				- Refusal on suspected bedrock. Bottom of Test Pit at 1.22 mbgs				
2								
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5								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP18-318

CLIENT: City of Guelph
DATE EXCAVATED: July 6, 2018
CONTRACTOR: GFEI
NORTHING: 4822265.3

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562112.7

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.37 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab	PAHs PHCs & BTEX PCBs Metals (11:28) (0.30-0.61)	**FILL:** Sand, trace clay, dark brown to black, dry, loose, some cobbles, trace slag, debris (brick, glass and metal fragments).			Backfilled with excavated soil	0.5
		Grab						0.8
		Grab				314.76 / 0.61		0.6
1		Grab		**SAND AND GRAVEL:** Some clay, trace to some organics, dark brown, moist, loose, some cobbles.				0.5
		Grab						0.6
		Grab						0.7
						313.54 / 1.83		
2				- Refusal on suspected bedrock. Bottom of Test Pit at 1.83 mbgs				
3								
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5								
6								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP18-319

CLIENT: City of Guelph
DATE EXCAVATED: July 5, 2018
CONTRACTOR: GFEI
NORTHING: 4822427.9

LOCATION: 200 Beverley St., Guelph
LOGGED BY: J. Gowing
EXCAVATOR: Kubota KX080-4
EASTING: 562268.6

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.52 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
		Grab		**FILL:** Sand, trace clay, brown to dark brown, moist, loose, some cobbles, some slag, trace debris.			Backfilled with excavated soil	2.6
		Grab	Metals (14:45) (0.30-0.61)					2.5
		Grab	PAHs (14:50) (0.61-0.91)					1.7
1		Grab		- 30 cm seam clayey fine sand at 0.91 mbgs.		314.30		2.5
		Grab		**SAND AND GRAVEL:** Trace clay, brown, moist, loose, some large cobbles.		1.22		2.7
		Grab	PAHs (15:10) (1.52-1.83)					2.5
2				- Wet, some large boulders below 1.80 mbgs.		313.54		
				- Refusal on suspected bedrock. Bottom of Test Pit at 1.98 mbgs		1.98		
3								
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6								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: MS
Reviewed by: ET

CH2M HILL Canada Limited

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RECORD OF TEST PIT: TP20-320

CLIENT: City of Guelph
DATE EXCAVATED: February 20, 2020
CONTRACTOR: Lewis Straus Construction
NORTHING: 4822435.6

LOCATION: 200 Beverley St., Guelph
LOGGED BY: V. Peters
EXCAVATOR: Doosan DX140LCR
EASTING: 562341.7

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.69 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
				FILL: Silty Sand, medium brown, rootlets & organics.		315.61 / 0.08	Backfilled with excavated soil	
				FILL: Sand and gravel, greyish brown, moist, fine to coarse, trace silt.				
1		Grab	Metals & Inorg. PAHs PHCs VOCs (13:00) (0.76-0.91)					1.1
		Grab		- Traces of reddish-brown soil below 1.52 mbgs.				0.1
				Bottom of Test Pit at 1.75 mbgs - Refusal on bedrock at 1.75 mbgs.		313.94 / 1.75		
2								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

JACOBS

RECORD OF TEST PIT: TP20-321

CLIENT: City of Guelph
DATE EXCAVATED: February 20, 2020
CONTRACTOR: Lewis Straus Construction
NORTHING: 4822412.2

LOCATION: 200 Beverley St., Guelph
LOGGED BY: V. Peters
EXCAVATOR: Doosan DX140LCR
EASTING: 562317.5

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.19 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
		Grab		**FILL:** Silty Sand, medium brown, rootlets & organics.		315.11 / 0.08	Backfilled with excavated soil	0.6
				FILL: Sand and Gravel, brown, moist, coarse, some cobbles, trace silt.		314.84 / 0.35		
				FILL: Gravel, grey, moist, some coarse sand, trace silt.				
1		Grab	Metals & Inorg. PAHs PHCs VOCs (12:00) (0.84-0.99)					1.3
		Grab	Metals & Inorg. PAHs PHCs VOCs (12:15) (1.37-1.52)	- Water seepage with slight sheen at 1.37 mbgs.		313.67 / 1.52		1.8
2				Bottom of Test Pit at 1.52 mbgs - Refusal on bedrock at 1.52 mbgs.				
3								
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ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

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JACOBS

RECORD OF TEST PIT: TP20-322

CLIENT: City of Guelph
DATE EXCAVATED: February 20, 2020
CONTRACTOR: Lewis Straus Construction
NORTHING: 4822414.0

LOCATION: 200 Beverley St., Guelph
LOGGED BY: V. Peters
EXCAVATOR: Doosan DX140LCR
EASTING: 562229.8

PROJECT NUMBER: 694757
GROUND ELEVATION: 315.56 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0				**FILL:** Silty Sand, black, rootlets & organics.		315.48 / 0.08	Backfilled with excavated soil	
				FILL: Gravel, light brown, dry, trace fine sand.				
		Grab						0.8
						315.10 / 0.46		
		Grab	Metals & Inorg. PAHs PHCs VOCs (11:10) (0.61-0.76)	**FILL:** Silty Sand and Gravel, black and dark brown, moist, trace brick, glass, coal, mortar and concrete..				0.4
1								
		Grab		**SILTY SAND:** Medium brown, moist, some coarse gravel and cobbles, light brown-grey pockets		314.19 / 1.37		0.3
						314.04 / 1.52		
				Bottom of Test Pit at 1.52 mbgs - Refusal on bedrock at 1.52 mbgs.				
2								
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4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

RECORD OF TEST PIT: TP20-323

CLIENT: City of Guelph | DATE EXCAVATED: February 20, 2020 | CONTRACTOR: Lewis Straus Construction | NORTHING: 4822366.2

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | EXCAVATOR: Doosan DX140LCR | EASTING: 562195.6

PROJECT NUMBER: 694757 | GROUND ELEVATION: 315.55 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0				**FILL:** Silty Sand, black, moist, rootlets & organics.		315.17 / 0.38	Backfilled with excavated soil	
				FILL: Silt, some sand, orange, moist.		315.04 / 0.51		
		Grab	Metals & Inorg. PAHs (10:07) (0.61-0.76)	**FILL:** Silty Sand and Gravel, black, trace brick, glass, coal, mortar and concrete, moist.				1.2
1						314.08 / 1.47		
		Grab		**SANDY SILT:** Light brown, moist, fine, some clay pockets, trace fine gravel, some cobbles.				0.6
		Grab				313.72 / 1.83		0.9
2				Bottom of Test Pit at 1.83 mbgs - Refusal on bedrock at 1.83 mbgs.				
3								
4								
5								
6								
7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

IMICO_TP_(FT); IMICO_UPLOAD (8).GPJ; LIBRARY.GLB; 431079 - WALLACE.GDT; 6/1/20

RECORD OF TEST PIT: TP20-324

CLIENT: City of Guelph | DATE EXCAVATED: February 20, 2020 | CONTRACTOR: Lewis Straus Construction | NORTHING: 4822230.9

LOCATION: 200 Beverley St., Guelph | LOGGED BY: V. Peters | EXCAVATOR: Doosan DX140LCR | EASTING: 562164.7

PROJECT NUMBER: 694757 | GROUND ELEVATION: 315.32 masl

DEPTH (mbgs)	SAMPLES: Recovery (%)	SAMPLES: TYPE	SAMPLES: Parameters Analyzed (time) (sample interval mbgs)	LITHOLOGY & REMARKS	STRATA PLOT	(masl) ELEV. / DEPTH (mbgs)	TEST PIT COMPLETION DETAILS	ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID
0		Grab	Metals & Inorg. PAHs PHCs VOCs (09:00) (0.30-0.46)	**FILL:** Sand and Gravel, light brown, moist, trace silt, some small cobbles.		314.53 / 0.79	Backfilled with excavated soil	0.6
1		Grab		**FILL:** Sand, dark brown and black, fine, some gravel, moist, trace organics, black plastic silty clay pockets, trace boulders, few cobbles.		314.02 / 1.30		0.5
		Grab		**SILTY SAND:** Brown, moist, fine grained, some cobbles, trace gravel, clay pockets.		313.70 / 1.62		0.9
2		Grab		**SAND AND GRAVEL:** Grey-brown, wet, fine to coarse, some cobbles and boulders, trace silt.		312.93 / 2.39		1.0
				Bottom of Test Pit at 2.39 mbgs - Refusal on bedrock at 2.39 mbgs.				
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7								

ORGANIC VAPOUR READING (ppm) 11.7 eV Bulb PID: 100 200 300 400

Notes:
1. Information to be used for interpretation of environmental conditions only

Prepared by: KJ

Reviewed by: ET

CH2M HILL Canada Limited

Laboratory Certificates of Approval

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 30-AUG-17
Report Date: 18-SEP-17 14:31 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1983964

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Comments: 18-SEPT-17:
PAH results included for -4.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-1 OW18-II Sampled By: CLIENT on 29-AUG-17 @ 14:20 Matrix: WATER							
Physical Tests							
Conductivity	0.849		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.34		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	11.2		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	9.91		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	226		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	125		10	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	1.27		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	0.26		0.20	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	0.209		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	1.65		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	4.81		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	9620		500	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	0.078		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	3.58		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	787		1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	2.44		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-1 OW18-II Sampled By: CLIENT on 29-AUG-17 @ 14:20 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	1.39		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	93.2		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	2.57		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	2.70		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	35.0		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	96.2		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		01-SEP-17	
F2 (C10-C16)	<100		100	ug/L	31-AUG-17	01-SEP-17	R3816822
F2-Naphth	<100		100	ug/L		01-SEP-17	
F3 (C16-C34)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
F3-PAH	<250		250	ug/L		01-SEP-17	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-1 OW18-II Sampled By: CLIENT on 29-AUG-17 @ 14:20 Matrix: WATER							
Hydrocarbons							
F4 (C34-C50)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-SEP-17	
Chrom. to baseline at nC50	YES				31-AUG-17	01-SEP-17	R3816822
Surrogate: 2-Bromobenzotrifluoride	100.1		60-140	%	31-AUG-17	01-SEP-17	R3816822
Surrogate: 3,4-Dichlorotoluene	109.3		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Acenaphthylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)pyrene	<0.010		0.010	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(b)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(k)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Chrysene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluorene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		01-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
2-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Naphthalene	<0.050		0.050	ug/L	31-AUG-17	01-SEP-17	R3816690
Phenanthrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Acenaphthene	93.1		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d12-Chrysene	106.2		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d8-Naphthalene	92.0		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Phenanthrene	109.4		60-140	%	31-AUG-17	01-SEP-17	R3816690
L1983964-2 OW18-I Sampled By: CLIENT on 29-AUG-17 @ 15:30 Matrix: WATER							
Physical Tests							
Conductivity	0.787		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.34		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	5.50		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-2 OW18-I Sampled By: CLIENT on 29-AUG-17 @ 15:30 Matrix: WATER							
Dissolved Metals							
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	52.8	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	140	DLHC	100	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	0.44	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	1.08	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	0.62	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	6900	DLHC	5000	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	0.58	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	1720	DLHC	10	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	4.20		0.50	ug/L		31-AUG-17	R3815523

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-2 OW18-I Sampled By: CLIENT on 29-AUG-17 @ 15:30 Matrix: WATER							
Volatile Organic Compounds							
trans-1,2-Dichloroethylene	1.06		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	13.0		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	<0.50		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	95.1		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		01-SEP-17	
F2 (C10-C16)	<100		100	ug/L	31-AUG-17	01-SEP-17	R3816822
F2-Naphth	<100		100	ug/L		01-SEP-17	
F3 (C16-C34)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
F3-PAH	<250		250	ug/L		01-SEP-17	
F4 (C34-C50)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-SEP-17	
Chrom. to baseline at nC50	YES				31-AUG-17	01-SEP-17	R3816822
Surrogate: 2-Bromobenzotrifluoride	97.6		60-140	%	31-AUG-17	01-SEP-17	R3816822
Surrogate: 3,4-Dichlorotoluene	107.5		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Acenaphthylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-2 OW18-I Sampled By: CLIENT on 29-AUG-17 @ 15:30 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)pyrene	<0.010		0.010	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(b)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(k)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Chrysene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluorene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		01-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
2-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Naphthalene	<0.050		0.050	ug/L	31-AUG-17	01-SEP-17	R3816690
Phenanthrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Acenaphthene	95.6		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d12-Chrysene	103.9		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d8-Naphthalene	94.6		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Phenanthrene	109.5		60-140	%	31-AUG-17	01-SEP-17	R3816690
L1983964-3 OW14 Sampled By: CLIENT on 30-AUG-17 @ 09:45 Matrix: WATER							
Physical Tests							
Conductivity	0.860		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.38		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	5.90		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	94.4	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	130	DLHC	100	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	<0.10	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-3 OW14 Sampled By: CLIENT on 30-AUG-17 @ 09:45 Matrix: WATER							
Dissolved Metals							
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	0.57	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	<5000	DLHC	5000	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	1.41	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	1300	DLHC	10	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	0.98		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
1,4-Dioxane	<20		20	ug/L		31-AUG-17	R3815523
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-3 OW14 Sampled By: CLIENT on 30-AUG-17 @ 09:45 Matrix: WATER							
Volatile Organic Compounds							
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	2.08		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	<0.50		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	94.3		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		01-SEP-17	
F2 (C10-C16)	<100		100	ug/L	31-AUG-17	01-SEP-17	R3816822
F2-Naphth	<100		100	ug/L		01-SEP-17	
F3 (C16-C34)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
F3-PAH	<250		250	ug/L		01-SEP-17	
F4 (C34-C50)	<250		250	ug/L	31-AUG-17	01-SEP-17	R3816822
Total Hydrocarbons (C6-C50)	<370		370	ug/L		01-SEP-17	
Chrom. to baseline at nC50	YES				31-AUG-17	01-SEP-17	R3816822
Surrogate: 2-Bromobenzotrifluoride	99.4		60-140	%	31-AUG-17	01-SEP-17	R3816822
Surrogate: 3,4-Dichlorotoluene	101.7		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Acenaphthylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(a)pyrene	<0.010		0.010	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(b)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Benzo(k)fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Chrysene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-3 OW14 Sampled By: CLIENT on 30-AUG-17 @ 09:45 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluoranthene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Fluorene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		01-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
2-Methylnaphthalene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Naphthalene	<0.050		0.050	ug/L	31-AUG-17	01-SEP-17	R3816690
Phenanthrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Pyrene	<0.020		0.020	ug/L	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Acenaphthene	96.2		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d12-Chrysene	101.5		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d8-Naphthalene	95.5		60-140	%	31-AUG-17	01-SEP-17	R3816690
Surrogate: d10-Phenanthrene	110.4		60-140	%	31-AUG-17	01-SEP-17	R3816690
L1983964-4 OW13 Sampled By: CLIENT on 30-AUG-17 @ 11:03 Matrix: WATER							
Physical Tests							
Conductivity	0.784		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.34		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	10.9		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	16.1	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	152	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	110	DLHC	100	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	<0.10	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	0.99	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-4 OW13 Sampled By: CLIENT on 30-AUG-17 @ 11:03 Matrix: WATER							
Dissolved Metals							
Sodium (Na)-Dissolved	9900	DLHC	5000	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	0.24	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	0.74	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	1010	DLHC	10	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	4.88		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-4 OW13 Sampled By: CLIENT on 30-AUG-17 @ 11:03 Matrix: WATER							
Volatile Organic Compounds							
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	0.76		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	1.20		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	01-SEP-17	01-SEP-17	R3818284
F3 (C16-C34)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
F3-PAH	<250		250	ug/L		08-SEP-17	
F4 (C34-C50)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
Total Hydrocarbons (C6-C50)	<370		370	ug/L		08-SEP-17	
Chrom. to baseline at nC50	YES				01-SEP-17	01-SEP-17	R3818284
Surrogate: 2-Bromobenzotrifluoride	96.0		60-140	%	01-SEP-17	01-SEP-17	R3818284
Surrogate: 3,4-Dichlorotoluene	104.1		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Acenaphthylene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Anthracene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Benzo(a)anthracene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Benzo(a)pyrene	<0.010		0.010	ug/L	05-SEP-17	18-SEP-17	R3820716
Benzo(b)fluoranthene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Benzo(k)fluoranthene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Chrysene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Fluoranthene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Fluorene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
1+2-Methylnaphthalenes	<0.57		0.57	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
2-Methylnaphthalene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Naphthalene	<0.050		0.050	ug/L	05-SEP-17	18-SEP-17	R3820716
Phenanthrene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-4 OW13 Sampled By: CLIENT on 30-AUG-17 @ 11:03 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Pyrene	<0.020		0.020	ug/L	05-SEP-17	18-SEP-17	R3820716
Surrogate: 2-Fluorobiphenyl	83.7		60-140	%	05-SEP-17	18-SEP-17	R3820716
Surrogate: d14-Terphenyl	107.5		60-140	%	05-SEP-17	18-SEP-17	R3820716
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
4-Chloroaniline	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
2-Chlorophenol	<0.30		0.30	ug/L	05-SEP-17	08-SEP-17	R3820445
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4-Dichlorophenol	<0.30		0.30	ug/L	05-SEP-17	08-SEP-17	R3820445
Diethylphthalate	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
Dimethylphthalate	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4-Dimethylphenol	<0.50		0.50	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4-Dinitrophenol	<1.0		1.0	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4-Dinitrotoluene	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
2,6-Dinitrotoluene	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		08-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	05-SEP-17	08-SEP-17	R3820445
Pentachlorophenol	<0.50		0.50	ug/L	05-SEP-17	08-SEP-17	R3820445
Phenanthrene	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
Phenol	<0.50		0.50	ug/L	05-SEP-17	08-SEP-17	R3820445
Pyrene	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	05-SEP-17	08-SEP-17	R3820445
Surrogate: 2-Fluorobiphenyl	90.4		50-140	%	05-SEP-17	08-SEP-17	R3820445
Surrogate: Nitrobenzene d5	86.9		50-140	%	05-SEP-17	08-SEP-17	R3820445
Surrogate: Phenol d5	43.8		30-130	%	05-SEP-17	08-SEP-17	R3820445
Surrogate: p-Terphenyl d14	95.7		60-140	%	05-SEP-17	08-SEP-17	R3820445
Surrogate: 2,4,6-Tribromophenol	121.4		50-140	%	05-SEP-17	08-SEP-17	R3820445
L1983964-5 OW9-I Sampled By: CLIENT on 30-AUG-17 @ 12:10 Matrix: WATER							
Physical Tests							
Conductivity	0.784		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.35		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	11.5		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-5 OW9-I Sampled By: CLIENT on 30-AUG-17 @ 12:10 Matrix: WATER							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	101	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	110	DLHC	100	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	0.21	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	1.7	DLHC	1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	0.54	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	7500	DLHC	5000	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	0.46	DLHC	0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	1180	DLHC	10	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-5 OW9-I Sampled By: CLIENT on 30-AUG-17 @ 12:10 Matrix: WATER							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	2.29		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	0.74		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	0.55		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	94.0		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F2-Naphth	<100		100	ug/L		06-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F3-PAH	<250		250	ug/L		06-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	92.6		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	103.6		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-5 OW9-I Sampled By: CLIENT on 30-AUG-17 @ 12:10 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Acenaphthylene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)pyrene	<0.010		0.010	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(b)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(k)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Chrysene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluorene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		06-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
2-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Naphthalene	<0.050		0.050	ug/L	01-SEP-17	06-SEP-17	R3816955
Phenanthrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Acenaphthene	90.9		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d12-Chrysene	80.8		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d8-Naphthalene	88.7		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Phenanthrene	98.3		60-140	%	01-SEP-17	06-SEP-17	R3816955
L1983964-6 OW9-II Sampled By: CLIENT on 30-AUG-17 @ 13:50 Matrix: WATER							
Physical Tests							
Conductivity	0.877		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.36		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	33.0		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	24.3		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	152		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	83		10	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-6 OW9-II Sampled By: CLIENT on 30-AUG-17 @ 13:50 Matrix: WATER							
Dissolved Metals							
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	0.48		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	9.41		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	2.23		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	5.10		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	0.059		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	15300		500	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	0.130		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	1.46		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	639		1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	3.27		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	<1.0		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	6.54		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-6 OW9-II Sampled By: CLIENT on 30-AUG-17 @ 13:50 Matrix: WATER							
Volatile Organic Compounds							
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	7.48		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	94.8		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	01-SEP-17	01-SEP-17	R3818284
F2-Naphth	<100		100	ug/L		06-SEP-17	
F3 (C16-C34)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
F3-PAH	<250		250	ug/L		06-SEP-17	
F4 (C34-C50)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				01-SEP-17	01-SEP-17	R3818284
Surrogate: 2-Bromobenzotrifluoride	98.2		60-140	%	01-SEP-17	01-SEP-17	R3818284
Surrogate: 3,4-Dichlorotoluene	105.6		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Acenaphthylene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)pyrene	<0.010		0.010	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(b)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(k)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-6 OW9-II Sampled By: CLIENT on 30-AUG-17 @ 13:50 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Chrysene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluorene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		06-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
2-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Naphthalene	<0.050		0.050	ug/L	01-SEP-17	06-SEP-17	R3816955
Phenanthrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Acenaphthene	93.5		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d12-Chrysene	83.4		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d8-Naphthalene	89.2		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Phenanthrene	100.2		60-140	%	01-SEP-17	06-SEP-17	R3816955
L1983964-7 OW10 Sampled By: CLIENT on 30-AUG-17 @ 15:30 Matrix: WATER							
Physical Tests							
Conductivity	0.703		0.0030	mS/cm		31-AUG-17	R3816056
pH	7.58		0.10	pH units		31-AUG-17	R3816056
Anions and Nutrients							
Chloride (Cl)	6.62		0.50	mg/L		31-AUG-17	R3816951
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		07-SEP-17	R3822218
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					31-AUG-17	R3815538
Dissolved Metals Filtration Location	FIELD					31-AUG-17	R3815440
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Arsenic (As)-Dissolved	1.29		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Barium (Ba)-Dissolved	40.1		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Boron (B)-Dissolved	55		10	ug/L	31-AUG-17	31-AUG-17	R3815794
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Cobalt (Co)-Dissolved	0.28		0.10	ug/L	31-AUG-17	31-AUG-17	R3815794
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	31-AUG-17	31-AUG-17	R3815794
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815778
Molybdenum (Mo)-Dissolved	0.267		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Selenium (Se)-Dissolved	0.190		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-7 OW10 Sampled By: CLIENT on 30-AUG-17 @ 15:30 Matrix: WATER							
Dissolved Metals							
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	31-AUG-17	31-AUG-17	R3815794
Sodium (Na)-Dissolved	6230		500	ug/L	31-AUG-17	31-AUG-17	R3815794
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Uranium (U)-Dissolved	0.714		0.010	ug/L	31-AUG-17	31-AUG-17	R3815794
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	31-AUG-17	31-AUG-17	R3815794
Zinc (Zn)-Dissolved	39.4		1.0	ug/L	31-AUG-17	31-AUG-17	R3815794
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		31-AUG-17	R3815523
Benzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Bromodichloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Bromoform	<5.0		5.0	ug/L		31-AUG-17	R3815523
Bromomethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Carbon tetrachloride	<0.20		0.20	ug/L		31-AUG-17	R3815523
Chlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dibromochloromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
Chloroform	1.6		1.0	ug/L		31-AUG-17	R3815523
1,2-Dibromoethane	<0.20		0.20	ug/L		31-AUG-17	R3815523
1,2-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,3-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,4-Dichlorobenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Dichlorodifluoromethane	<2.0		2.0	ug/L		31-AUG-17	R3815523
1,1-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,2-Dichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methylene Chloride	<5.0		5.0	ug/L		31-AUG-17	R3815523
1,2-Dichloropropane	<0.50		0.50	ug/L		31-AUG-17	R3815523
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		31-AUG-17	R3815523
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		31-AUG-17	
Ethylbenzene	<0.50		0.50	ug/L		31-AUG-17	R3815523
n-Hexane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Methyl Ethyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
Methyl Isobutyl Ketone	<20		20	ug/L		31-AUG-17	R3815523
MTBE	<2.0		2.0	ug/L		31-AUG-17	R3815523
Styrene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-7 OW10 Sampled By: CLIENT on 30-AUG-17 @ 15:30 Matrix: WATER							
Volatile Organic Compounds							
Tetrachloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Toluene	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,1-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
1,1,2-Trichloroethane	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichloroethylene	<0.50		0.50	ug/L		31-AUG-17	R3815523
Trichlorofluoromethane	<5.0		5.0	ug/L		31-AUG-17	R3815523
Vinyl chloride	<0.50		0.50	ug/L		31-AUG-17	R3815523
o-Xylene	<0.30		0.30	ug/L		31-AUG-17	R3815523
m+p-Xylenes	<0.40		0.40	ug/L		31-AUG-17	R3815523
Xylenes (Total)	<0.50		0.50	ug/L		31-AUG-17	
Surrogate: 4-Bromofluorobenzene	93.8		70-130	%		31-AUG-17	R3815523
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%		31-AUG-17	R3815523
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		31-AUG-17	R3815523
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	01-SEP-17	01-SEP-17	R3818284
F2-Naphth	<100		100	ug/L		06-SEP-17	
F3 (C16-C34)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
F3-PAH	<250		250	ug/L		06-SEP-17	
F4 (C34-C50)	<250		250	ug/L	01-SEP-17	01-SEP-17	R3818284
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				01-SEP-17	01-SEP-17	R3818284
Surrogate: 2-Bromobenzotrifluoride	101.2		60-140	%	01-SEP-17	01-SEP-17	R3818284
Surrogate: 3,4-Dichlorotoluene	108.9		60-140	%		31-AUG-17	R3815523
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.196		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Acenaphthylene	0.032		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Anthracene	0.030	R	0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(a)pyrene	<0.010		0.010	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(b)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Benzo(k)fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Chrysene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluoranthene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Fluorene	0.084		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		06-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
2-Methylnaphthalene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-7 OW10 Sampled By: CLIENT on 30-AUG-17 @ 15:30 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Naphthalene	<0.050		0.050	ug/L	01-SEP-17	06-SEP-17	R3816955
Phenanthrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Pyrene	<0.020		0.020	ug/L	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Acenaphthene	95.2		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d12-Chrysene	98.5		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d8-Naphthalene	90.9		60-140	%	01-SEP-17	06-SEP-17	R3816955
Surrogate: d10-Phenanthrene	104.7		60-140	%	01-SEP-17	06-SEP-17	R3816955
L1983964-8 TRIP BLANK-1 Sampled By: CLIENT on 29-AUG-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		01-SEP-17	R3816635
Benzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Bromodichloromethane	<2.0		2.0	ug/L		01-SEP-17	R3816635
Bromoform	<5.0		5.0	ug/L		01-SEP-17	R3816635
Bromomethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
Carbon tetrachloride	<0.20		0.20	ug/L		01-SEP-17	R3816635
Chlorobenzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Dibromochloromethane	<2.0		2.0	ug/L		01-SEP-17	R3816635
Chloroform	<1.0		1.0	ug/L		01-SEP-17	R3816635
1,2-Dibromoethane	<0.20		0.20	ug/L		01-SEP-17	R3816635
1,2-Dichlorobenzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,3-Dichlorobenzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,4-Dichlorobenzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Dichlorodifluoromethane	<2.0		2.0	ug/L		01-SEP-17	R3816635
1,1-Dichloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,2-Dichloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,1-Dichloroethylene	<0.50		0.50	ug/L		01-SEP-17	R3816635
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		01-SEP-17	R3816635
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Methylene Chloride	<5.0		5.0	ug/L		01-SEP-17	R3816635
1,2-Dichloropropane	<0.50		0.50	ug/L		01-SEP-17	R3816635
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		01-SEP-17	R3816635
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		01-SEP-17	R3816635
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		01-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		01-SEP-17	R3816635
n-Hexane	<0.50		0.50	ug/L		01-SEP-17	R3816635
Methyl Ethyl Ketone	<20		20	ug/L		01-SEP-17	R3816635
Methyl Isobutyl Ketone	<20		20	ug/L		01-SEP-17	R3816635
MTBE	<2.0		2.0	ug/L		01-SEP-17	R3816635
Styrene	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1983964-8 TRIP BLANK-1 Sampled By: CLIENT on 29-AUG-17 Matrix: WATER							
Volatile Organic Compounds							
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
Tetrachloroethylene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Toluene	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,1,1-Trichloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
1,1,2-Trichloroethane	<0.50		0.50	ug/L		01-SEP-17	R3816635
Trichloroethylene	<0.50		0.50	ug/L		01-SEP-17	R3816635
Trichlorofluoromethane	<5.0		5.0	ug/L		01-SEP-17	R3816635
Vinyl chloride	<0.50		0.50	ug/L		01-SEP-17	R3816635
o-Xylene	<0.30		0.30	ug/L		01-SEP-17	R3816635
m+p-Xylenes	<0.40		0.40	ug/L		01-SEP-17	R3816635
Xylenes (Total)	<0.50		0.50	ug/L		01-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.4		70-130	%		01-SEP-17	R3816635
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		01-SEP-17	R3816635
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		01-SEP-17	R3816635
Surrogate: 3,4-Dichlorotoluene	131.5		60-140	%		01-SEP-17	R3816635

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Pentachlorophenol	LCS-H	L1983964-4
Matrix Spike	Chloride (Cl)	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Boron (B)-Dissolved	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L1983964-1, -2, -3, -4, -5, -6, -7

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-511-WT	Water	F1-O.Reg 153/04 (July 2011)	MOE DECPH-E3421/CCME TIER 1

Fraction F1 is determined by purging a volume of a ground water sample followed by GC/FID analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Reference Information

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS
Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Water F2-F4-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1
Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8
The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270
Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PH-WT Water pH APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260

Reference Information

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1983964 Report Date: 18-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3815523								
WG2603485-4 DUP		**WG2603485-3**						
1,4-Dioxane		30	30		ug/L	0.1	30	31-AUG-17
WG2603485-1 LCS								
1,4-Dioxane			105.2		%		60-140	31-AUG-17
WG2603485-2 MB								
1,4-Dioxane			<20		ug/L		20	31-AUG-17
WG2603485-5 MS		**WG2603485-3**						
1,4-Dioxane			98.4		%		50-140	31-AUG-17
625-511-WT	**Water**							
Batch R3820445								
WG2608322-2 LCS								
1,2,4-Trichlorobenzene			84.0		%		50-140	06-SEP-17
2-Chlorophenol			97.1		%		50-140	06-SEP-17
2,4-Dichlorophenol			113.6		%		50-140	06-SEP-17
2,4-Dimethylphenol			102.5		%		30-130	06-SEP-17
2,4-Dinitrophenol			115.5		%		50-140	06-SEP-17
2,4-Dinitrotoluene			108.4		%		50-140	06-SEP-17
2,4,5-Trichlorophenol			124.5		%		50-140	06-SEP-17
2,4,6-Trichlorophenol			116.9		%		50-140	06-SEP-17
2,6-Dinitrotoluene			104.0		%		50-140	06-SEP-17
3,3'-Dichlorobenzidine			88.2		%		30-130	06-SEP-17
4-Chloroaniline			64.2		%		30-130	06-SEP-17
Biphenyl			87.8		%		50-140	06-SEP-17
Bis(2-chloroethyl)ether			88.5		%		50-140	06-SEP-17
Bis(2-chloroisopropyl)ether			85.2		%		50-140	06-SEP-17
Bis(2-ethylhexyl)phthalate			118.5		%		50-140	06-SEP-17
Diethylphthalate			88.3		%		50-140	06-SEP-17
Dimethylphthalate			83.7		%		50-140	06-SEP-17
Pentachlorophenol			148.6	LCS-H	%		50-140	08-SEP-17
Phenanthrene			88.1		%		50-140	06-SEP-17
Phenol			59.8		%		30-130	06-SEP-17
Pyrene			95.0		%		50-140	06-SEP-17
WG2608322-3 LCSD		**WG2608322-2**						
1,2,4-Trichlorobenzene		84.0	86.1		%	2.4	50	06-SEP-17
2-Chlorophenol		97.1	100.4		%	3.4	50	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3820445								
WG2608322-3 LCSD		**WG2608322-2**						
2,4-Dichlorophenol		113.6	115.0		%	1.2	50	06-SEP-17
2,4-Dimethylphenol		102.5	114.5		%	11	50	06-SEP-17
2,4-Dinitrophenol		115.5	119.0		%	3.0	50	06-SEP-17
2,4-Dinitrotoluene		108.4	114.0		%	5.1	50	06-SEP-17
2,4,5-Trichlorophenol		124.5	131.7		%	5.6	50	06-SEP-17
2,4,6-Trichlorophenol		116.9	124.5		%	6.3	50	06-SEP-17
2,6-Dinitrotoluene		104.0	110.7		%	6.2	50	06-SEP-17
3,3'-Dichlorobenzidine		88.2	87.4		%	0.9	50	06-SEP-17
4-Chloroaniline		64.2	83.7		%	26	50	06-SEP-17
Biphenyl		87.8	91.9		%	4.6	50	06-SEP-17
Bis(2-chloroethyl)ether		88.5	90.5		%	2.3	50	06-SEP-17
Bis(2-chloroisopropyl)ether		85.2	88.3		%	3.6	50	06-SEP-17
Bis(2-ethylhexyl)phthalate		118.5	123.9		%	4.4	50	06-SEP-17
Diethylphthalate		88.3	93.5		%	5.7	50	06-SEP-17
Dimethylphthalate		83.7	87.6		%	4.5	50	06-SEP-17
Pentachlorophenol		148.6	149.0		%	0.3	50	08-SEP-17
Phenanthrene		88.1	91.7		%	4.0	50	06-SEP-17
Phenol		59.8	64.6		%	7.6	50	06-SEP-17
Pyrene		95.0	106.6		%	12	50	06-SEP-17
WG2608322-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	06-SEP-17
2-Chlorophenol			<0.30		ug/L		0.3	06-SEP-17
2,4-Dichlorophenol			<0.30		ug/L		0.3	06-SEP-17
2,4-Dimethylphenol			<0.50		ug/L		0.5	06-SEP-17
2,4-Dinitrophenol			<1.0		ug/L		1	06-SEP-17
2,4-Dinitrotoluene			<0.40		ug/L		0.4	06-SEP-17
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	06-SEP-17
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	06-SEP-17
2,6-Dinitrotoluene			<0.40		ug/L		0.4	06-SEP-17
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	06-SEP-17
4-Chloroaniline			<0.40		ug/L		0.4	06-SEP-17
Biphenyl			<0.40		ug/L		0.4	06-SEP-17
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3820445								
WG2608322-1 MB								
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	06-SEP-17
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	06-SEP-17
Diethylphthalate			<0.20		ug/L		0.2	06-SEP-17
Dimethylphthalate			<0.20		ug/L		0.2	06-SEP-17
Pentachlorophenol			<0.50		ug/L		0.5	06-SEP-17
Phenanthrene			<0.20		ug/L		0.2	06-SEP-17
Phenol			<0.50		ug/L		0.5	06-SEP-17
Pyrene			<0.20		ug/L		0.2	06-SEP-17
Surrogate: 2-Fluorobiphenyl			94.5		%		50-140	06-SEP-17
Surrogate: 2,4,6-Tribromophenol			101.3		%		50-140	06-SEP-17
Surrogate: Nitrobenzene d5			92.5		%		50-140	06-SEP-17
Surrogate: p-Terphenyl d14			122.2		%		60-140	06-SEP-17
Surrogate: Phenol d5			44.4		%		30-130	06-SEP-17
CL-IC-N-WT	**Water**							
Batch R3816951								
WG2606002-4 DUP		**WG2606002-3**						
Chloride (Cl)		155	158		mg/L	1.3	20	31-AUG-17
WG2606002-9 DUP		**L1983964-2**						
Chloride (Cl)		5.50	5.42		mg/L	1.5	20	31-AUG-17
WG2606002-2 LCS								
Chloride (Cl)			99.3		%		90-110	31-AUG-17
WG2606002-7 LCS								
Chloride (Cl)			99.5		%		90-110	31-AUG-17
WG2606002-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	31-AUG-17
WG2606002-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	31-AUG-17
WG2606002-10 MS		**L1983964-2**						
Chloride (Cl)			99.6		%		75-125	31-AUG-17
WG2606002-5 MS		**WG2606002-3**						
Chloride (Cl)			N/A	MS-B	%		-	31-AUG-17
CN-WAD-R511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-WAD-R511-WT	**Water**							
Batch R3822218								
WG2610880-3 DUP		**L1983964-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	07-SEP-17
WG2610880-2 LCS								
Cyanide, Weak Acid Diss			112.6		%		80-120	07-SEP-17
WG2610880-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	07-SEP-17
WG2610880-4 MS		**L1983964-1**						
Cyanide, Weak Acid Diss			102.3		%		70-130	07-SEP-17
CR-CR6-IC-R511-WT	**Water**							
Batch R3820294								
WG2605936-4 DUP		**WG2605936-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	05-SEP-17
WG2605936-2 LCS								
Chromium, Hexavalent			101.5		%		80-120	05-SEP-17
WG2605936-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	05-SEP-17
WG2605936-5 MS		**WG2605936-3**						
Chromium, Hexavalent			100.5		%		70-130	05-SEP-17
EC-R511-WT	**Water**							
Batch R3816056								
WG2605713-4 DUP		**WG2605713-3**						
Conductivity		0.283	0.285		mS/cm	0.7	10	31-AUG-17
WG2605713-8 DUP		**WG2605713-7**						
Conductivity		0.783	0.784		mS/cm	0.1	10	31-AUG-17
WG2605713-2 LCS								
Conductivity			101.2		%		90-110	31-AUG-17
WG2605713-6 LCS								
Conductivity			101.9		%		90-110	31-AUG-17
WG2605713-1 MB								
Conductivity			<0.0030		mS/cm		0.003	31-AUG-17
WG2605713-5 MB								
Conductivity			<0.0030		mS/cm		0.003	31-AUG-17
F1-511-WT	**Water**							
Batch R3816635								
WG2603487-4 DUP		**WG2603487-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	01-SEP-17
WG2603487-1 LCS								

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-511-WT	**Water**							
Batch R3816635								
WG2603487-1 LCS								
F1 (C6-C10)			93.1		%		80-120	01-SEP-17
WG2603487-2 MB								
F1 (C6-C10)			<25		ug/L		25	01-SEP-17
Surrogate: 3,4-Dichlorotoluene			116.9		%		60-140	01-SEP-17
WG2603487-5 MS		**WG2603487-3**						
F1 (C6-C10)			84.5		%		60-140	01-SEP-17
F1-HS-511-WT	**Water**							
Batch R3815523								
WG2603485-4 DUP		**WG2603485-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	31-AUG-17
WG2603485-1 LCS								
F1 (C6-C10)			94.6		%		80-120	31-AUG-17
WG2603485-2 MB								
F1 (C6-C10)			<25		ug/L		25	31-AUG-17
Surrogate: 3,4-Dichlorotoluene			117.9		%		60-140	31-AUG-17
WG2603485-5 MS		**WG2603485-3**						
F1 (C6-C10)			84.8		%		60-140	31-AUG-17
F2-F4-511-WT	**Water**							
Batch R3816822								
WG2605575-2 LCS								
F2 (C10-C16)			90.0		%		70-130	01-SEP-17
F3 (C16-C34)			95.1		%		70-130	01-SEP-17
F4 (C34-C50)			102.6		%		70-130	01-SEP-17
WG2605575-3 LCSD		**WG2605575-2**						
F2 (C10-C16)		90.0	99.3		%	9.9	50	01-SEP-17
F3 (C16-C34)		95.1	102.5		%	7.5	50	01-SEP-17
F4 (C34-C50)		102.6	110.7		%	7.6	50	01-SEP-17
WG2605575-1 MB								
F2 (C10-C16)			<100		ug/L		100	01-SEP-17
F3 (C16-C34)			<250		ug/L		250	01-SEP-17
F4 (C34-C50)			<250		ug/L		250	01-SEP-17
Surrogate: 2-Bromobenzotrifluoride			100.0		%		60-140	01-SEP-17
Batch R3818284								
WG2606707-2 LCS								
F2 (C10-C16)			104.0		%		70-130	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R3818284								
WG2606707-2 LCS								
F3 (C16-C34)			108.7		%		70-130	01-SEP-17
F4 (C34-C50)			112.7		%		70-130	01-SEP-17
WG2606707-3 LCSD		**WG2606707-2**						
F2 (C10-C16)		104.0	101.5		%	2.5	50	01-SEP-17
F3 (C16-C34)		108.7	106.0		%	2.6	50	01-SEP-17
F4 (C34-C50)		112.7	110.1		%	2.3	50	01-SEP-17
WG2606707-1 MB								
F2 (C10-C16)			<100		ug/L		100	01-SEP-17
F3 (C16-C34)			<250		ug/L		250	01-SEP-17
F4 (C34-C50)			<250		ug/L		250	01-SEP-17
Surrogate: 2-Bromobenzotrifluoride			87.3		%		60-140	01-SEP-17
Batch R3820710								
WG2609119-2 LCS								
F2 (C10-C16)			110.5		%		70-130	06-SEP-17
F3 (C16-C34)			108.0		%		70-130	06-SEP-17
F4 (C34-C50)			118.0		%		70-130	06-SEP-17
WG2609119-3 LCSD		**WG2609119-2**						
F2 (C10-C16)		110.5	97.0		%	13	50	06-SEP-17
F3 (C16-C34)		108.0	101.8		%	6.0	50	06-SEP-17
F4 (C34-C50)		118.0	107.4		%	9.4	50	06-SEP-17
WG2609119-1 MB								
F2 (C10-C16)			<100		ug/L		100	06-SEP-17
F3 (C16-C34)			<250		ug/L		250	06-SEP-17
F4 (C34-C50)			<250		ug/L		250	06-SEP-17
Surrogate: 2-Bromobenzotrifluoride			94.1		%		60-140	06-SEP-17
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3815778								
WG2605761-4 DUP		**WG2605761-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	31-AUG-17
WG2605761-2 LCS								
Mercury (Hg)-Dissolved			100.0		%		80-120	31-AUG-17
WG2605761-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	31-AUG-17
WG2605761-6 MS		**WG2605761-5**						
Mercury (Hg)-Dissolved			91.7		%		70-130	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3815794								
WG2605597-14 DUP		**WG2605597-13**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	31-AUG-17
Arsenic (As)-Dissolved		9.91	10.1		ug/L	1.6	20	31-AUG-17
Barium (Ba)-Dissolved		226	216		ug/L	4.6	20	31-AUG-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	31-AUG-17
Boron (B)-Dissolved		125	125		ug/L	0.0	20	31-AUG-17
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	31-AUG-17
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	31-AUG-17
Cobalt (Co)-Dissolved		1.27	1.28		ug/L	0.8	20	31-AUG-17
Copper (Cu)-Dissolved		0.26	0.26		ug/L	2.1	20	31-AUG-17
Lead (Pb)-Dissolved		0.209	0.208		ug/L	0.9	20	31-AUG-17
Molybdenum (Mo)-Dissolved		1.65	1.66		ug/L	0.8	20	31-AUG-17
Nickel (Ni)-Dissolved		4.81	4.84		ug/L	0.7	20	31-AUG-17
Selenium (Se)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	31-AUG-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	31-AUG-17
Sodium (Na)-Dissolved		9620	9640		ug/L	0.2	20	31-AUG-17
Thallium (Tl)-Dissolved		0.078	0.078		ug/L	0.5	20	31-AUG-17
Uranium (U)-Dissolved		3.58	3.58		ug/L	0.1	20	31-AUG-17
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	31-AUG-17
Zinc (Zn)-Dissolved		787	785		ug/L	0.3	20	31-AUG-17
WG2605597-12 LCS								
Antimony (Sb)-Dissolved			98.0		%		80-120	31-AUG-17
Arsenic (As)-Dissolved			100.4		%		80-120	31-AUG-17
Barium (Ba)-Dissolved			99.0		%		80-120	31-AUG-17
Beryllium (Be)-Dissolved			98.2		%		80-120	31-AUG-17
Boron (B)-Dissolved			97.8		%		80-120	31-AUG-17
Cadmium (Cd)-Dissolved			97.8		%		80-120	31-AUG-17
Chromium (Cr)-Dissolved			99.2		%		80-120	31-AUG-17
Cobalt (Co)-Dissolved			98.4		%		80-120	31-AUG-17
Copper (Cu)-Dissolved			96.7		%		80-120	31-AUG-17
Lead (Pb)-Dissolved			102.4		%		80-120	31-AUG-17
Molybdenum (Mo)-Dissolved			97.3		%		80-120	31-AUG-17
Nickel (Ni)-Dissolved			97.8		%		80-120	31-AUG-17
Selenium (Se)-Dissolved			96.7		%		80-120	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3815794								
WG2605597-12 LCS								
Silver (Ag)-Dissolved			99.1		%		80-120	31-AUG-17
Sodium (Na)-Dissolved			99.6		%		80-120	31-AUG-17
Thallium (Tl)-Dissolved			97.1		%		80-120	31-AUG-17
Uranium (U)-Dissolved			100.3		%		80-120	31-AUG-17
Vanadium (V)-Dissolved			100.1		%		80-120	31-AUG-17
Zinc (Zn)-Dissolved			94.3		%		80-120	31-AUG-17
WG2605597-11 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	31-AUG-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	31-AUG-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	31-AUG-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	31-AUG-17
Boron (B)-Dissolved			<10		ug/L		10	31-AUG-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	31-AUG-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	31-AUG-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	31-AUG-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	31-AUG-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	31-AUG-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	31-AUG-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	31-AUG-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	31-AUG-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	31-AUG-17
Sodium (Na)-Dissolved			<500		ug/L		500	31-AUG-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	31-AUG-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	31-AUG-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	31-AUG-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	31-AUG-17
WG2605597-15 MS		**WG2605597-13**						
Antimony (Sb)-Dissolved			93.9		%		70-130	31-AUG-17
Arsenic (As)-Dissolved			78.8		%		70-130	31-AUG-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	31-AUG-17
Beryllium (Be)-Dissolved			92.6		%		70-130	31-AUG-17
Boron (B)-Dissolved			N/A	MS-B	%		-	31-AUG-17
Cadmium (Cd)-Dissolved			94.6		%		70-130	31-AUG-17
Chromium (Cr)-Dissolved			94.3		%		70-130	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3815794								
WG2605597-15 MS		**WG2605597-13**						
Cobalt (Co)-Dissolved			83.1		%		70-130	31-AUG-17
Copper (Cu)-Dissolved			90.0		%		70-130	31-AUG-17
Lead (Pb)-Dissolved			95.7		%		70-130	31-AUG-17
Molybdenum (Mo)-Dissolved			82.9		%		70-130	31-AUG-17
Nickel (Ni)-Dissolved			74.5		%		70-130	31-AUG-17
Selenium (Se)-Dissolved			95.9		%		70-130	31-AUG-17
Silver (Ag)-Dissolved			95.3		%		70-130	31-AUG-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	31-AUG-17
Thallium (Tl)-Dissolved			93.3		%		70-130	31-AUG-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	31-AUG-17
Vanadium (V)-Dissolved			95.6		%		70-130	31-AUG-17
Zinc (Zn)-Dissolved			N/A	MS-B	%		-	31-AUG-17
PAH-511-WT	**Water**							
Batch R3816690								
WG2605575-2 LCS								
1-Methylnaphthalene			80.4		%		50-140	01-SEP-17
2-Methylnaphthalene			83.2		%		50-140	01-SEP-17
Acenaphthene			84.5		%		50-140	01-SEP-17
Acenaphthylene			89.5		%		50-140	01-SEP-17
Anthracene			94.0		%		50-140	01-SEP-17
Benzo(a)anthracene			114.9		%		50-140	01-SEP-17
Benzo(a)pyrene			104.9		%		50-140	01-SEP-17
Benzo(b)fluoranthene			101.4		%		50-140	01-SEP-17
Benzo(g,h,i)perylene			98.6		%		50-140	01-SEP-17
Benzo(k)fluoranthene			105.5		%		50-140	01-SEP-17
Chrysene			107.6		%		50-140	01-SEP-17
Dibenzo(ah)anthracene			111.0		%		50-140	01-SEP-17
Fluoranthene			94.9		%		50-140	01-SEP-17
Fluorene			93.9		%		50-140	01-SEP-17
Indeno(1,2,3-cd)pyrene			99.7		%		50-140	01-SEP-17
Naphthalene			87.4		%		50-140	01-SEP-17
Phenanthrene			96.1		%		50-140	01-SEP-17
Pyrene			101.9		%		50-140	01-SEP-17
WG2605575-3 LCSD		**WG2605575-2**						

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3816690								
WG2605575-3 LCSD		**WG2605575-2**						
1-Methylnaphthalene		80.4	84.2		%	4.6	50	01-SEP-17
2-Methylnaphthalene		83.2	86.0		%	3.3	50	01-SEP-17
Acenaphthene		84.5	88.2		%	4.3	50	01-SEP-17
Acenaphthylene		89.5	93.2		%	4.0	50	01-SEP-17
Anthracene		94.0	97.7		%	3.8	50	01-SEP-17
Benzo(a)anthracene		114.9	118.0		%	2.7	50	01-SEP-17
Benzo(a)pyrene		104.9	111.6		%	6.2	50	01-SEP-17
Benzo(b)fluoranthene		101.4	105.9		%	4.3	50	01-SEP-17
Benzo(g,h,i)perylene		98.6	102.2		%	3.7	50	01-SEP-17
Benzo(k)fluoranthene		105.5	109.1		%	3.4	50	01-SEP-17
Chrysene		107.6	113.8		%	5.6	50	01-SEP-17
Dibenzo(ah)anthracene		111.0	113.4		%	2.1	50	01-SEP-17
Fluoranthene		94.9	98.9		%	4.1	50	01-SEP-17
Fluorene		93.9	98.7		%	5.0	50	01-SEP-17
Indeno(1,2,3-cd)pyrene		99.7	103.9		%	4.2	50	01-SEP-17
Naphthalene		87.4	90.1		%	3.1	50	01-SEP-17
Phenanthrene		96.1	99.6		%	3.6	50	01-SEP-17
Pyrene		101.9	106.5		%	4.4	50	01-SEP-17
WG2605575-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	01-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	01-SEP-17
Acenaphthene			<0.020		ug/L		0.02	01-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	01-SEP-17
Anthracene			<0.020		ug/L		0.02	01-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	01-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	01-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	01-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Chrysene			<0.020		ug/L		0.02	01-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	01-SEP-17
Fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Fluorene			<0.020		ug/L		0.02	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3816690								
WG2605575-1 MB								
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	01-SEP-17
Naphthalene			<0.050		ug/L		0.05	01-SEP-17
Phenanthrene			<0.020		ug/L		0.02	01-SEP-17
Pyrene			<0.020		ug/L		0.02	01-SEP-17
Surrogate: d8-Naphthalene			93.2		%		60-140	01-SEP-17
Surrogate: d10-Phenanthrene			105.7		%		60-140	01-SEP-17
Surrogate: d12-Chrysene			108.9		%		60-140	01-SEP-17
Surrogate: d10-Acenaphthene			93.0		%		60-140	01-SEP-17
Batch R3816955								
WG2606707-2 LCS								
1-Methylnaphthalene			89.1		%		50-140	01-SEP-17
2-Methylnaphthalene			91.9		%		50-140	01-SEP-17
Acenaphthene			93.5		%		50-140	01-SEP-17
Acenaphthylene			99.3		%		50-140	01-SEP-17
Anthracene			101.0		%		50-140	01-SEP-17
Benzo(a)anthracene			118.0		%		50-140	01-SEP-17
Benzo(a)pyrene			114.6		%		50-140	01-SEP-17
Benzo(b)fluoranthene			108.7		%		50-140	01-SEP-17
Benzo(g,h,i)perylene			106.6		%		50-140	01-SEP-17
Benzo(k)fluoranthene			116.9		%		50-140	01-SEP-17
Chrysene			117.2		%		50-140	01-SEP-17
Dibenzo(ah)anthracene			116.2		%		50-140	01-SEP-17
Fluoranthene			104.9		%		50-140	01-SEP-17
Fluorene			102.8		%		50-140	01-SEP-17
Indeno(1,2,3-cd)pyrene			101.8		%		50-140	01-SEP-17
Naphthalene			96.4		%		50-140	01-SEP-17
Phenanthrene			105.1		%		50-140	01-SEP-17
Pyrene			112.0		%		50-140	01-SEP-17
WG2606707-3 LCSD		**WG2606707-2**						
1-Methylnaphthalene		89.1	76.0		%	16	50	01-SEP-17
2-Methylnaphthalene		91.9	78.6		%	16	50	01-SEP-17
Acenaphthene		93.5	80.6		%	15	50	01-SEP-17
Acenaphthylene		99.3	85.8		%	15	50	01-SEP-17
Anthracene		101.0	88.1		%	14	50	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3816955								
WG2606707-3 LCSD		**WG2606707-2**						
Benzo(a)anthracene		118.0	102.3		%	14	50	01-SEP-17
Benzo(a)pyrene		114.6	99.8		%	14	50	01-SEP-17
Benzo(b)fluoranthene		108.7	94.4		%	14	50	01-SEP-17
Benzo(g,h,i)perylene		106.6	94.0		%	13	50	01-SEP-17
Benzo(k)fluoranthene		116.9	103.4		%	12	50	01-SEP-17
Chrysene		117.2	97.8		%	18	50	01-SEP-17
Dibenzo(ah)anthracene		116.2	105.1		%	10	50	01-SEP-17
Fluoranthene		104.9	91.0		%	14	50	01-SEP-17
Fluorene		102.8	89.4		%	14	50	01-SEP-17
Indeno(1,2,3-cd)pyrene		101.8	89.8		%	13	50	01-SEP-17
Naphthalene		96.4	83.5		%	14	50	01-SEP-17
Phenanthrene		105.1	91.7		%	14	50	01-SEP-17
Pyrene		112.0	96.4		%	15	50	01-SEP-17
WG2606707-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	01-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	01-SEP-17
Acenaphthene			<0.020		ug/L		0.02	01-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	01-SEP-17
Anthracene			<0.020		ug/L		0.02	01-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	01-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	01-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	01-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Chrysene			<0.020		ug/L		0.02	01-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	01-SEP-17
Fluoranthene			<0.020		ug/L		0.02	01-SEP-17
Fluorene			<0.020		ug/L		0.02	01-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	01-SEP-17
Naphthalene			<0.050		ug/L		0.05	01-SEP-17
Phenanthrene			<0.020		ug/L		0.02	01-SEP-17
Pyrene			<0.020		ug/L		0.02	01-SEP-17
Surrogate: d8-Naphthalene			87.8		%		60-140	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3816955								
WG2606707-1 MB								
Surrogate: d10-Phenanthrene			96.9		%		60-140	01-SEP-17
Surrogate: d12-Chrysene			97.6		%		60-140	01-SEP-17
Surrogate: d10-Acenaphthene			86.2		%		60-140	01-SEP-17
Batch R3820716								
WG2608322-2 LCS								
1-Methylnaphthalene			82.2		%		50-140	06-SEP-17
2-Methylnaphthalene			79.3		%		50-140	06-SEP-17
Acenaphthene			76.3		%		50-140	06-SEP-17
Acenaphthylene			78.4		%		50-140	06-SEP-17
Anthracene			78.7		%		50-140	06-SEP-17
Benzo(a)anthracene			83.4		%		50-140	06-SEP-17
Benzo(a)pyrene			83.1		%		50-140	06-SEP-17
Benzo(b)fluoranthene			87.9		%		50-140	06-SEP-17
Benzo(g,h,i)perylene			68.6		%		50-140	06-SEP-17
Benzo(k)fluoranthene			85.3		%		50-140	06-SEP-17
Chrysene			92.6		%		50-140	06-SEP-17
Dibenzo(ah)anthracene			73.3		%		50-140	06-SEP-17
Fluoranthene			81.6		%		50-140	06-SEP-17
Fluorene			83.0		%		50-140	06-SEP-17
Indeno(1,2,3-cd)pyrene			70.4		%		50-140	06-SEP-17
Naphthalene			79.4		%		50-140	06-SEP-17
Phenanthrene			76.4		%		50-140	06-SEP-17
Pyrene			80.1		%		50-140	06-SEP-17
WG2608322-3 LCSD		**WG2608322-2**						
1-Methylnaphthalene		82.2	84.0		%	2.2	50	06-SEP-17
2-Methylnaphthalene		79.3	82.1		%	3.5	50	06-SEP-17
Acenaphthene		76.3	78.9		%	3.4	50	06-SEP-17
Acenaphthylene		78.4	80.8		%	3.0	50	06-SEP-17
Anthracene		78.7	80.3		%	1.9	50	06-SEP-17
Benzo(a)anthracene		83.4	85.5		%	2.5	50	06-SEP-17
Benzo(a)pyrene		83.1	85.1		%	2.4	50	06-SEP-17
Benzo(b)fluoranthene		87.9	88.9		%	1.2	50	06-SEP-17
Benzo(g,h,i)perylene		68.6	67.7		%	1.3	50	06-SEP-17
Benzo(k)fluoranthene		85.3	89.8		%	5.2	50	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3820716								
WG2608322-3 LCSD		**WG2608322-2**						
Chrysene		92.6	95.6		%	3.2	50	06-SEP-17
Dibenzo(ah)anthracene		73.3	73.5		%	0.2	50	06-SEP-17
Fluoranthene		81.6	84.1		%	3.0	50	06-SEP-17
Fluorene		83.0	85.5		%	3.0	50	06-SEP-17
Indeno(1,2,3-cd)pyrene		70.4	69.9		%	0.8	50	06-SEP-17
Naphthalene		79.4	82.2		%	3.5	50	06-SEP-17
Phenanthrene		76.4	79.0		%	3.4	50	06-SEP-17
Pyrene		80.1	81.4		%	1.7	50	06-SEP-17
WG2608322-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	06-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	06-SEP-17
Acenaphthene			<0.020		ug/L		0.02	06-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	06-SEP-17
Anthracene			<0.020		ug/L		0.02	06-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	06-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	06-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	06-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	06-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	06-SEP-17
Chrysene			<0.020		ug/L		0.02	06-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	06-SEP-17
Fluoranthene			<0.020		ug/L		0.02	06-SEP-17
Fluorene			<0.020		ug/L		0.02	06-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	06-SEP-17
Naphthalene			<0.050		ug/L		0.05	06-SEP-17
Phenanthrene			<0.020		ug/L		0.02	06-SEP-17
Pyrene			<0.020		ug/L		0.02	06-SEP-17
Surrogate: 2-Fluorobiphenyl			83.2		%		60-140	06-SEP-17
Surrogate: d14-Terphenyl			101.5		%		60-140	06-SEP-17
PH-WT	**Water**							
Batch R3816056								
WG2605713-4 DUP		**WG2605713-3**						
pH		7.75	7.72	J	pH units	0.03	0.2	31-AUG-17
WG2605713-8 DUP		**WG2605713-7**						

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R3816056								
WG2605713-8 DUP		**WG2605713-7**						
pH		7.34	7.35	J	pH units	0.00	0.2	31-AUG-17
WG2605713-2 LCS								
pH			6.99		pH units		6.9-7.1	31-AUG-17
WG2605713-6 LCS								
pH			6.98		pH units		6.9-7.1	31-AUG-17
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-4 DUP		**WG2603485-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	31-AUG-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	31-AUG-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	31-AUG-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	31-AUG-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	31-AUG-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	31-AUG-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	31-AUG-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	31-AUG-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	31-AUG-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-4 DUP		**WG2603485-3**						
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	31-AUG-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	31-AUG-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	31-AUG-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	31-AUG-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	31-AUG-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	31-AUG-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	31-AUG-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	31-AUG-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	31-AUG-17
WG2603485-1 LCS								
1,1,1,2-Tetrachloroethane			89.1		%		70-130	31-AUG-17
1,1,2,2-Tetrachloroethane			92.0		%		70-130	31-AUG-17
1,1,1-Trichloroethane			94.5		%		70-130	31-AUG-17
1,1,2-Trichloroethane			91.4		%		70-130	31-AUG-17
1,1-Dichloroethane			98.4		%		70-130	31-AUG-17
1,1-Dichloroethylene			90.4		%		70-130	31-AUG-17
1,2-Dibromoethane			91.5		%		70-130	31-AUG-17
1,2-Dichlorobenzene			94.3		%		70-130	31-AUG-17
1,2-Dichloroethane			99.4		%		70-130	31-AUG-17
1,2-Dichloropropane			98.8		%		70-130	31-AUG-17
1,3-Dichlorobenzene			93.5		%		70-130	31-AUG-17
1,4-Dichlorobenzene			98.2		%		70-130	31-AUG-17
Acetone			115.5		%		60-140	31-AUG-17
Benzene			99.9		%		70-130	31-AUG-17
Bromodichloromethane			94.2		%		70-130	31-AUG-17
Bromoform			85.8		%		70-130	31-AUG-17
Bromomethane			93.2		%		60-140	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-1 LCS								
Carbon tetrachloride			94.9		%		70-130	31-AUG-17
Chlorobenzene			93.9		%		70-130	31-AUG-17
Chloroform			98.8		%		70-130	31-AUG-17
cis-1,2-Dichloroethylene			96.1		%		70-130	31-AUG-17
cis-1,3-Dichloropropene			90.9		%		70-130	31-AUG-17
Dibromochloromethane			96.0		%		70-130	31-AUG-17
Dichlorodifluoromethane			68.6		%		50-140	31-AUG-17
Ethylbenzene			85.1		%		70-130	31-AUG-17
n-Hexane			108.3		%		70-130	31-AUG-17
m+p-Xylenes			89.2		%		70-130	31-AUG-17
Methyl Ethyl Ketone			98.1		%		60-140	31-AUG-17
Methyl Isobutyl Ketone			88.5		%		60-140	31-AUG-17
Methylene Chloride			103.4		%		70-130	31-AUG-17
MTBE			92.8		%		70-130	31-AUG-17
o-Xylene			86.2		%		70-130	31-AUG-17
Styrene			83.9		%		70-130	31-AUG-17
Tetrachloroethylene			89.6		%		70-130	31-AUG-17
Toluene			86.9		%		70-130	31-AUG-17
trans-1,2-Dichloroethylene			99.2		%		70-130	31-AUG-17
trans-1,3-Dichloropropene			81.7		%		70-130	31-AUG-17
Trichloroethylene			96.4		%		70-130	31-AUG-17
Trichlorofluoromethane			94.8		%		60-140	31-AUG-17
Vinyl chloride			85.9		%		60-140	31-AUG-17
WG2603485-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	31-AUG-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	31-AUG-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	31-AUG-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	31-AUG-17
1,1-Dichloroethane			<0.50		ug/L		0.5	31-AUG-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	31-AUG-17
1,2-Dibromoethane			<0.20		ug/L		0.2	31-AUG-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	31-AUG-17
1,2-Dichloroethane			<0.50		ug/L		0.5	31-AUG-17
1,2-Dichloropropane			<0.50		ug/L		0.5	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-2 MB								
1,3-Dichlorobenzene			<0.50		ug/L		0.5	31-AUG-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	31-AUG-17
Acetone			<30		ug/L		30	31-AUG-17
Benzene			<0.50		ug/L		0.5	31-AUG-17
Bromodichloromethane			<2.0		ug/L		2	31-AUG-17
Bromoform			<5.0		ug/L		5	31-AUG-17
Bromomethane			<0.50		ug/L		0.5	31-AUG-17
Carbon tetrachloride			<0.20		ug/L		0.2	31-AUG-17
Chlorobenzene			<0.50		ug/L		0.5	31-AUG-17
Chloroform			<1.0		ug/L		1	31-AUG-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	31-AUG-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	31-AUG-17
Dibromochloromethane			<2.0		ug/L		2	31-AUG-17
Dichlorodifluoromethane			<2.0		ug/L		2	31-AUG-17
Ethylbenzene			<0.50		ug/L		0.5	31-AUG-17
n-Hexane			<0.50		ug/L		0.5	31-AUG-17
m+p-Xylenes			<0.40		ug/L		0.4	31-AUG-17
Methyl Ethyl Ketone			<20		ug/L		20	31-AUG-17
Methyl Isobutyl Ketone			<20		ug/L		20	31-AUG-17
Methylene Chloride			<5.0		ug/L		5	31-AUG-17
MTBE			<2.0		ug/L		2	31-AUG-17
o-Xylene			<0.30		ug/L		0.3	31-AUG-17
Styrene			<0.50		ug/L		0.5	31-AUG-17
Tetrachloroethylene			<0.50		ug/L		0.5	31-AUG-17
Toluene			<0.50		ug/L		0.5	31-AUG-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	31-AUG-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	31-AUG-17
Trichloroethylene			<0.50		ug/L		0.5	31-AUG-17
Trichlorofluoromethane			<5.0		ug/L		5	31-AUG-17
Vinyl chloride			<0.50		ug/L		0.5	31-AUG-17
Surrogate: 1,4-Difluorobenzene			100.5		%		70-130	31-AUG-17
Surrogate: 4-Bromofluorobenzene			91.9		%		70-130	31-AUG-17
WG2603485-5 MS		**WG2603485-3**						
1,1,1,2-Tetrachloroethane			89.0		%		50-140	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-5 MS		**WG2603485-3**						
1,1,2,2-Tetrachloroethane			98.0		%		50-140	31-AUG-17
1,1,1-Trichloroethane			90.9		%		50-140	31-AUG-17
1,1,2-Trichloroethane			94.2		%		50-140	31-AUG-17
1,1-Dichloroethane			97.5		%		50-140	31-AUG-17
1,1-Dichloroethylene			84.5		%		50-140	31-AUG-17
1,2-Dibromoethane			95.2		%		50-140	31-AUG-17
1,2-Dichlorobenzene			94.1		%		50-140	31-AUG-17
1,2-Dichloroethane			103.8		%		50-140	31-AUG-17
1,2-Dichloropropane			100.2		%		50-140	31-AUG-17
1,3-Dichlorobenzene			91.7		%		50-140	31-AUG-17
1,4-Dichlorobenzene			97.3		%		50-140	31-AUG-17
Acetone			121.9		%		50-140	31-AUG-17
Benzene			99.1		%		50-140	31-AUG-17
Bromodichloromethane			96.8		%		50-140	31-AUG-17
Bromoform			89.9		%		50-140	31-AUG-17
Bromomethane			90.5		%		50-140	31-AUG-17
Carbon tetrachloride			89.3		%		50-140	31-AUG-17
Chlorobenzene			93.3		%		50-140	31-AUG-17
Chloroform			99.2		%		50-140	31-AUG-17
cis-1,2-Dichloroethylene			96.4		%		50-140	31-AUG-17
cis-1,3-Dichloropropene			96.7		%		50-140	31-AUG-17
Dibromochloromethane			98.5		%		50-140	31-AUG-17
Dichlorodifluoromethane			54.4		%		50-140	31-AUG-17
Ethylbenzene			81.6		%		50-140	31-AUG-17
n-Hexane			94.1		%		50-140	31-AUG-17
m+p-Xylenes			86.9		%		50-140	31-AUG-17
Methyl Ethyl Ketone			104.1		%		50-140	31-AUG-17
Methyl Isobutyl Ketone			97.2		%		50-140	31-AUG-17
Methylene Chloride			104.2		%		50-140	31-AUG-17
MTBE			93.2		%		50-140	31-AUG-17
o-Xylene			84.0		%		50-140	31-AUG-17
Styrene			83.7		%		50-140	31-AUG-17
Tetrachloroethylene			85.5		%		50-140	31-AUG-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3815523								
WG2603485-5 MS		**WG2603485-3**						
Toluene			84.0		%		50-140	31-AUG-17
trans-1,2-Dichloroethylene			96.8		%		50-140	31-AUG-17
trans-1,3-Dichloropropene			87.0		%		50-140	31-AUG-17
Trichloroethylene			95.0		%		50-140	31-AUG-17
Trichlorofluoromethane			84.3		%		50-140	31-AUG-17
Vinyl chloride			77.7		%		50-140	31-AUG-17
Batch R3816635								
WG2603487-4 DUP		**WG2603487-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	01-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	01-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	01-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	01-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3816635								
WG2603487-4 DUP		**WG2603487-3**						
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	01-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	01-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	01-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	01-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	01-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	01-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-SEP-17
WG2603487-1 LCS								
1,1,1,2-Tetrachloroethane			87.9		%		70-130	01-SEP-17
1,1,2,2-Tetrachloroethane			86.5		%		70-130	01-SEP-17
1,1,1-Trichloroethane			96.0		%		70-130	01-SEP-17
1,1,2-Trichloroethane			86.1		%		70-130	01-SEP-17
1,1-Dichloroethane			97.4		%		70-130	01-SEP-17
1,1-Dichloroethylene			92.7		%		70-130	01-SEP-17
1,2-Dibromoethane			84.9		%		70-130	01-SEP-17
1,2-Dichlorobenzene			93.7		%		70-130	01-SEP-17
1,2-Dichloroethane			92.5		%		70-130	01-SEP-17
1,2-Dichloropropane			95.0		%		70-130	01-SEP-17
1,3-Dichlorobenzene			96.6		%		70-130	01-SEP-17
1,4-Dichlorobenzene			98.6		%		70-130	01-SEP-17
Acetone			105.1		%		60-140	01-SEP-17
Benzene			99.0		%		70-130	01-SEP-17
Bromodichloromethane			90.3		%		70-130	01-SEP-17
Bromoform			81.0		%		70-130	01-SEP-17
Bromomethane			92.0		%		60-140	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3816635								
WG2603487-1 LCS								
Carbon tetrachloride			96.7		%		70-130	01-SEP-17
Chlorobenzene			94.1		%		70-130	01-SEP-17
Chloroform			97.3		%		70-130	01-SEP-17
cis-1,2-Dichloroethylene			94.6		%		70-130	01-SEP-17
cis-1,3-Dichloropropene			87.6		%		70-130	01-SEP-17
Dibromochloromethane			91.4		%		70-130	01-SEP-17
Dichlorodifluoromethane			69.2		%		50-140	01-SEP-17
Ethylbenzene			87.1		%		70-130	01-SEP-17
n-Hexane			111.9		%		70-130	01-SEP-17
m+p-Xylenes			92.0		%		70-130	01-SEP-17
Methyl Ethyl Ketone			86.1		%		60-140	01-SEP-17
Methyl Isobutyl Ketone			77.8		%		60-140	01-SEP-17
Methylene Chloride			99.5		%		70-130	01-SEP-17
MTBE			93.1		%		70-130	01-SEP-17
o-Xylene			87.5		%		70-130	01-SEP-17
Styrene			83.4		%		70-130	01-SEP-17
Tetrachloroethylene			94.1		%		70-130	01-SEP-17
Toluene			88.7		%		70-130	01-SEP-17
trans-1,2-Dichloroethylene			100.9		%		70-130	01-SEP-17
trans-1,3-Dichloropropene			78.5		%		70-130	01-SEP-17
Trichloroethylene			97.8		%		70-130	01-SEP-17
Trichlorofluoromethane			97.2		%		60-140	01-SEP-17
Vinyl chloride			87.7		%		60-140	01-SEP-17
WG2603487-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	01-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	01-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	01-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	01-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	01-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	01-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	01-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	01-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	01-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3816635								
WG2603487-2 MB								
1,3-Dichlorobenzene			<0.50		ug/L		0.5	01-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	01-SEP-17
Acetone			<30		ug/L		30	01-SEP-17
Benzene			<0.50		ug/L		0.5	01-SEP-17
Bromodichloromethane			<2.0		ug/L		2	01-SEP-17
Bromoform			<5.0		ug/L		5	01-SEP-17
Bromomethane			<0.50		ug/L		0.5	01-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	01-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	01-SEP-17
Chloroform			<1.0		ug/L		1	01-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	01-SEP-17
Dibromochloromethane			<2.0		ug/L		2	01-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	01-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	01-SEP-17
n-Hexane			<0.50		ug/L		0.5	01-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	01-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	01-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	01-SEP-17
Methylene Chloride			<5.0		ug/L		5	01-SEP-17
MTBE			<2.0		ug/L		2	01-SEP-17
o-Xylene			<0.30		ug/L		0.3	01-SEP-17
Styrene			<0.50		ug/L		0.5	01-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	01-SEP-17
Toluene			<0.50		ug/L		0.5	01-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	01-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	01-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	01-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	01-SEP-17
Surrogate: 1,4-Difluorobenzene			101.0		%		70-130	01-SEP-17
Surrogate: 4-Bromofluorobenzene			91.1		%		70-130	01-SEP-17
WG2603487-5 MS		**WG2603487-3**						
1,1,1,2-Tetrachloroethane			88.7		%		50-140	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3816635								
WG2603487-5 MS		**WG2603487-3**						
1,1,2,2-Tetrachloroethane			101.5		%		50-140	01-SEP-17
1,1,1-Trichloroethane			92.6		%		50-140	01-SEP-17
1,1,2-Trichloroethane			95.4		%		50-140	01-SEP-17
1,1-Dichloroethane			100.9		%		50-140	01-SEP-17
1,1-Dichloroethylene			86.6		%		50-140	01-SEP-17
1,2-Dibromoethane			96.5		%		50-140	01-SEP-17
1,2-Dichlorobenzene			95.0		%		50-140	01-SEP-17
1,2-Dichloroethane			108.5		%		50-140	01-SEP-17
1,2-Dichloropropane			103.6		%		50-140	01-SEP-17
1,3-Dichlorobenzene			93.3		%		50-140	01-SEP-17
1,4-Dichlorobenzene			97.2		%		50-140	01-SEP-17
Acetone			127.4		%		50-140	01-SEP-17
Benzene			101.6		%		50-140	01-SEP-17
Bromodichloromethane			100.4		%		50-140	01-SEP-17
Bromoform			91.1		%		50-140	01-SEP-17
Bromomethane			91.9		%		50-140	01-SEP-17
Carbon tetrachloride			91.6		%		50-140	01-SEP-17
Chlorobenzene			93.5		%		50-140	01-SEP-17
Chloroform			102.7		%		50-140	01-SEP-17
cis-1,2-Dichloroethylene			98.9		%		50-140	01-SEP-17
cis-1,3-Dichloropropene			97.9		%		50-140	01-SEP-17
Dibromochloromethane			99.3		%		50-140	01-SEP-17
Dichlorodifluoromethane			56.4		%		50-140	01-SEP-17
Ethylbenzene			78.9		%		50-140	01-SEP-17
n-Hexane			97.5		%		50-140	01-SEP-17
m+p-Xylenes			85.2		%		50-140	01-SEP-17
Methyl Ethyl Ketone			109.2		%		50-140	01-SEP-17
Methyl Isobutyl Ketone			99.3		%		50-140	01-SEP-17
Methylene Chloride			108.6		%		50-140	01-SEP-17
MTBE			93.0		%		50-140	01-SEP-17
o-Xylene			81.7		%		50-140	01-SEP-17
Styrene			81.7		%		50-140	01-SEP-17
Tetrachloroethylene			83.1		%		50-140	01-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3816635								
WG2603487-5 MS		**WG2603487-3**						
Toluene			82.3		%		50-140	01-SEP-17
trans-1,2-Dichloroethylene			99.2		%		50-140	01-SEP-17
trans-1,3-Dichloropropene			84.4		%		50-140	01-SEP-17
Trichloroethylene			95.5		%		50-140	01-SEP-17
Trichlorofluoromethane			86.8		%		50-140	01-SEP-17
Vinyl chloride			78.8		%		50-140	01-SEP-17

Quality Control Report

Workorder: L1983964 Report Date: 18-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

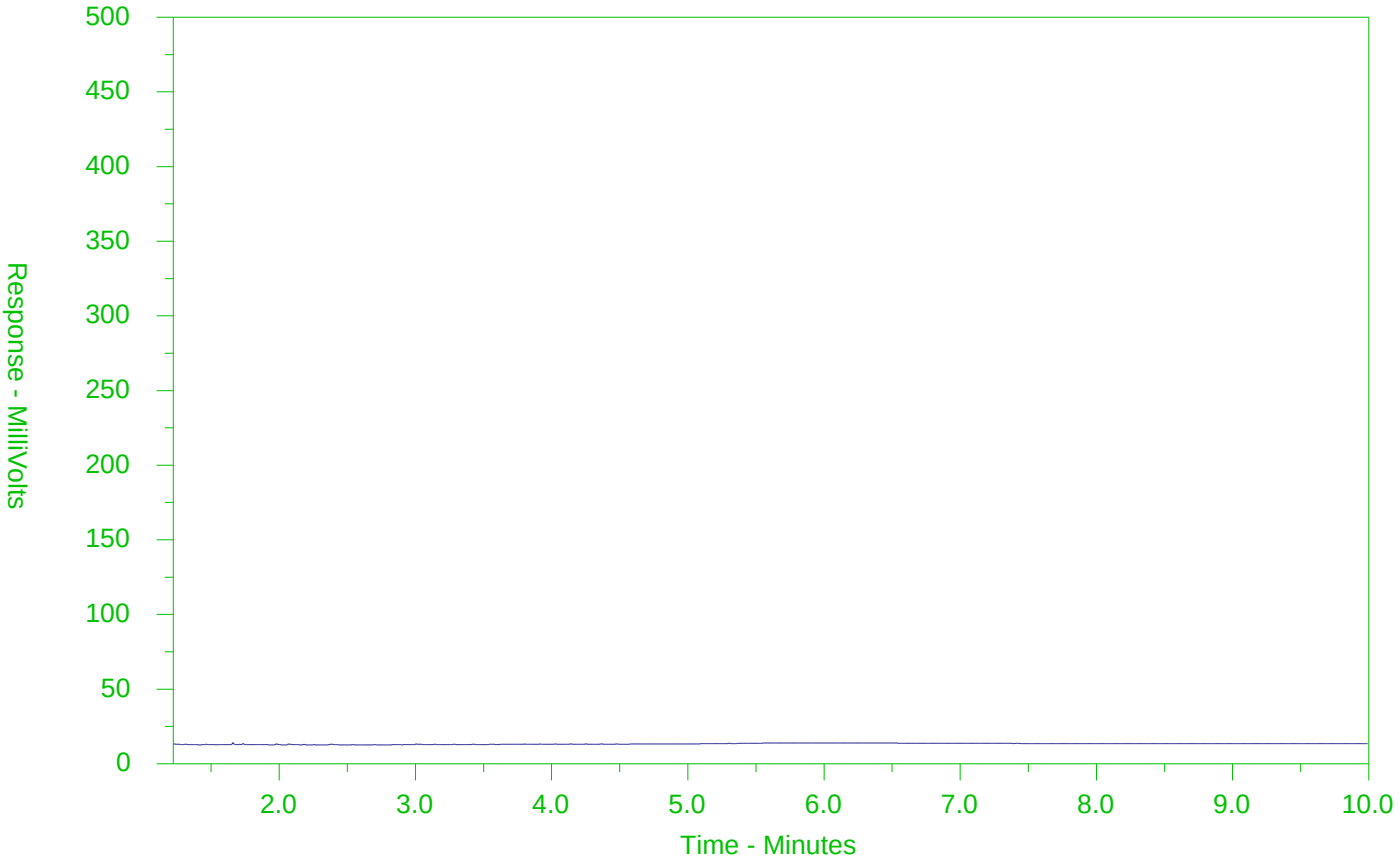
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-1
Client Sample ID: OW18-11



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

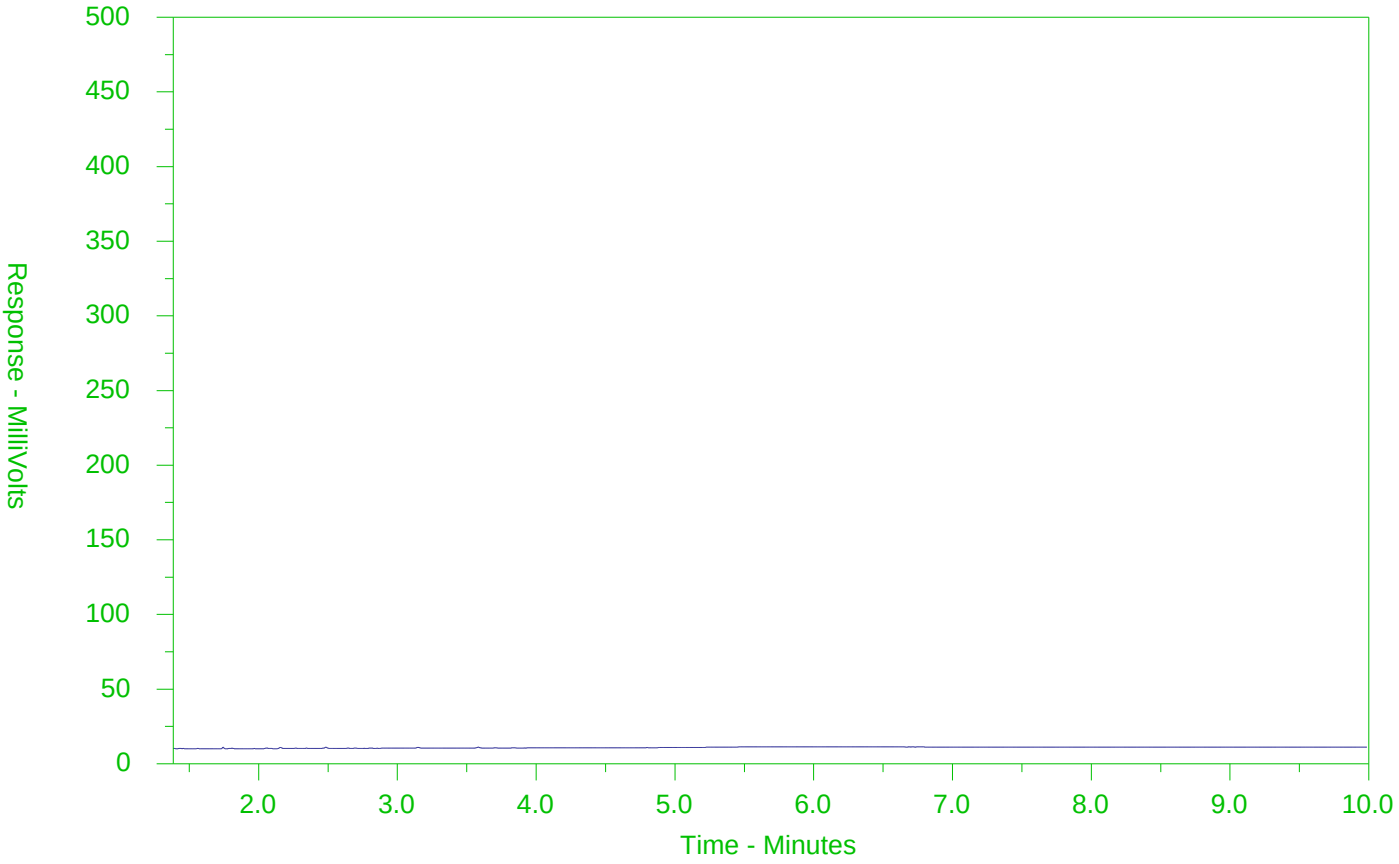
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-2
Client Sample ID: OW18-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

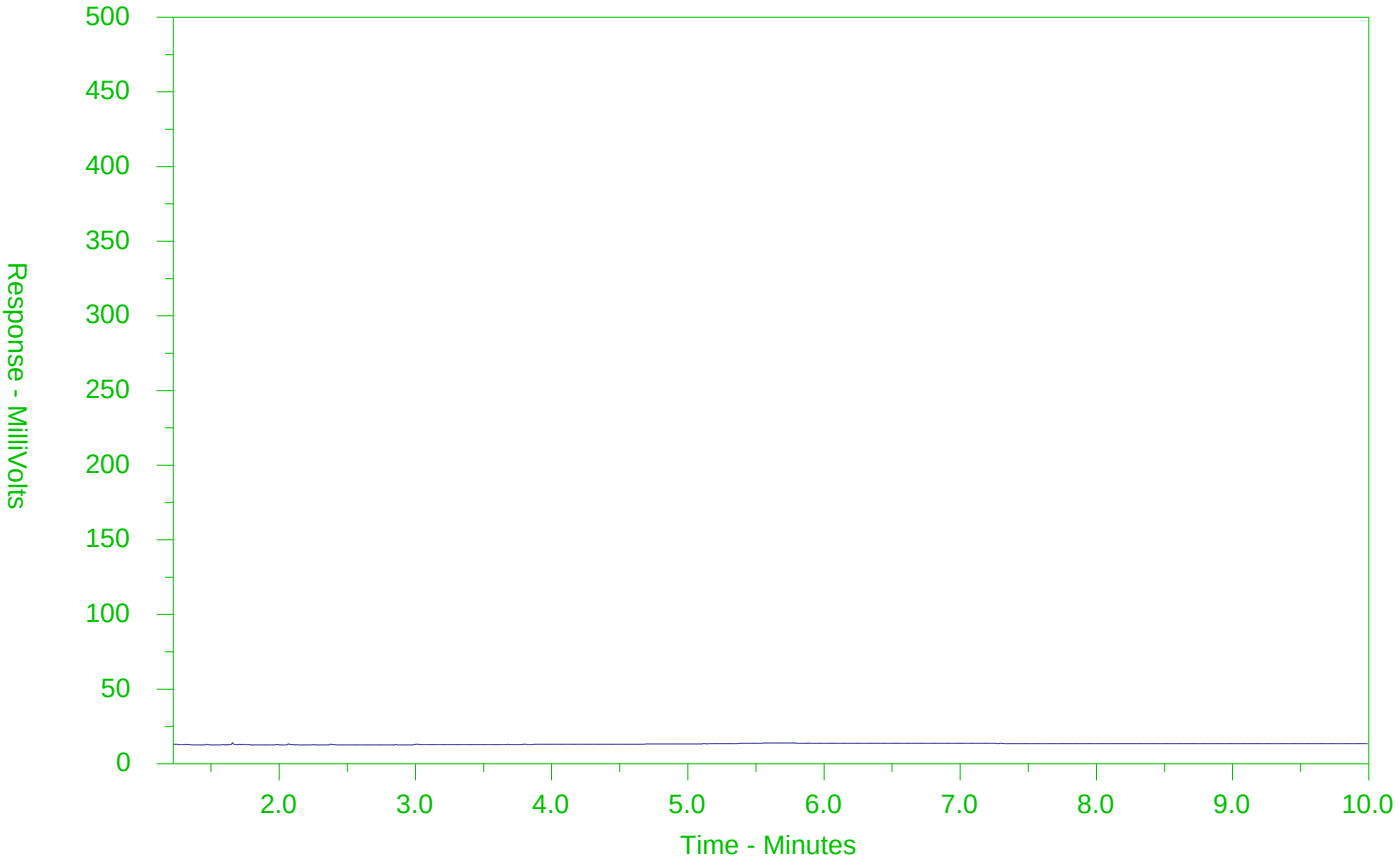
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-3
Client Sample ID: OW14



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

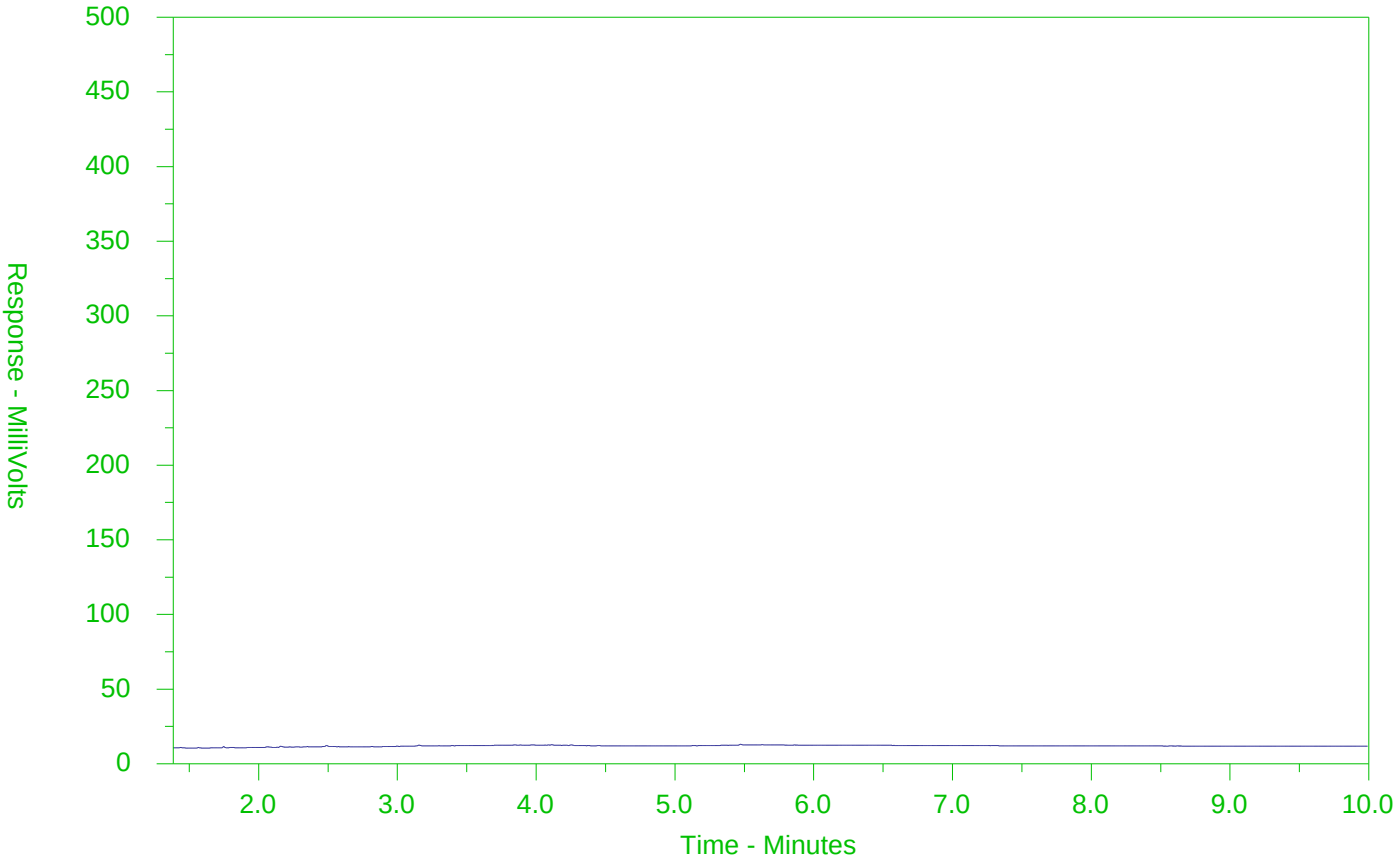
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-4
Client Sample ID: OW13



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

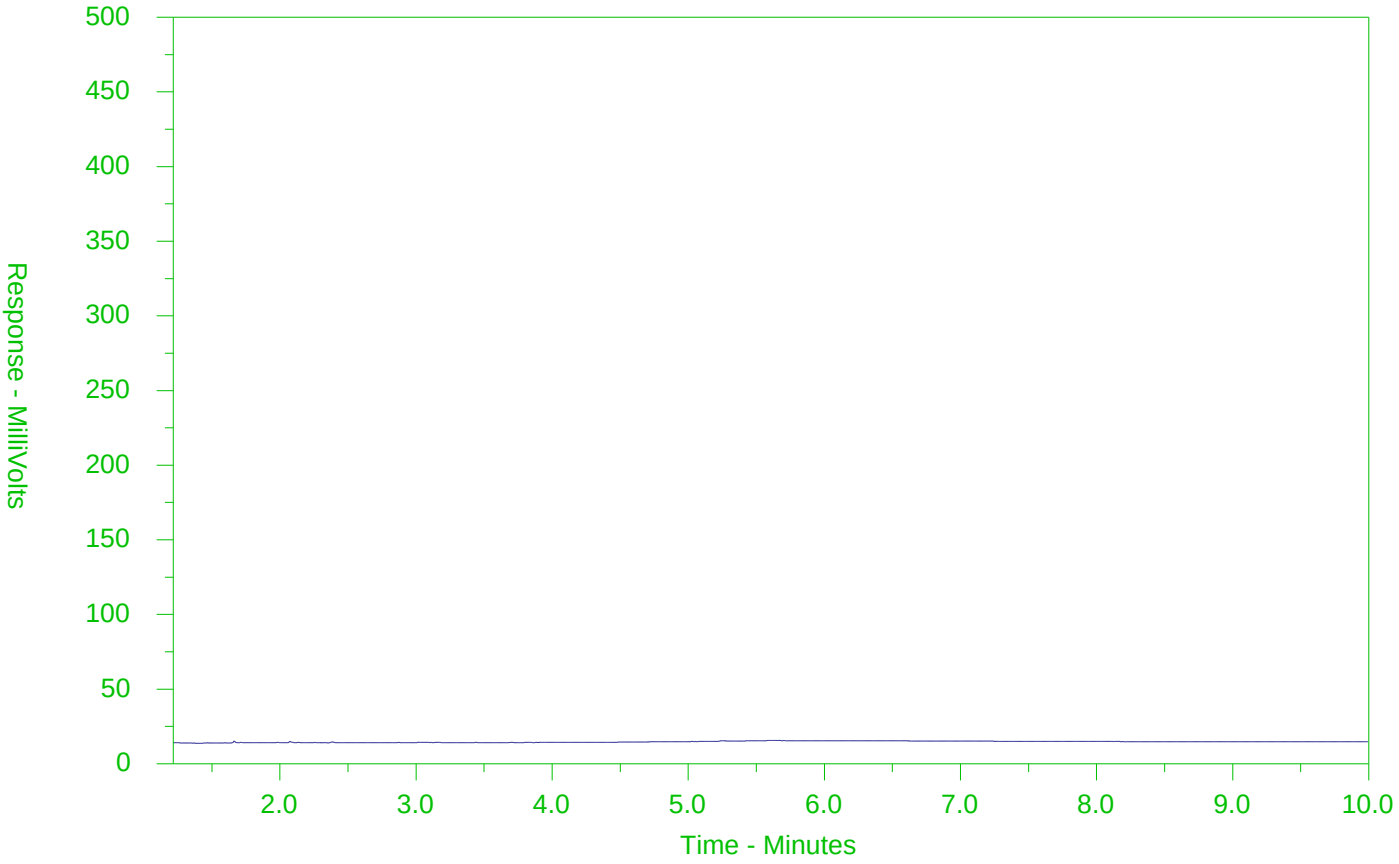
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-5
Client Sample ID: OW9-I



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

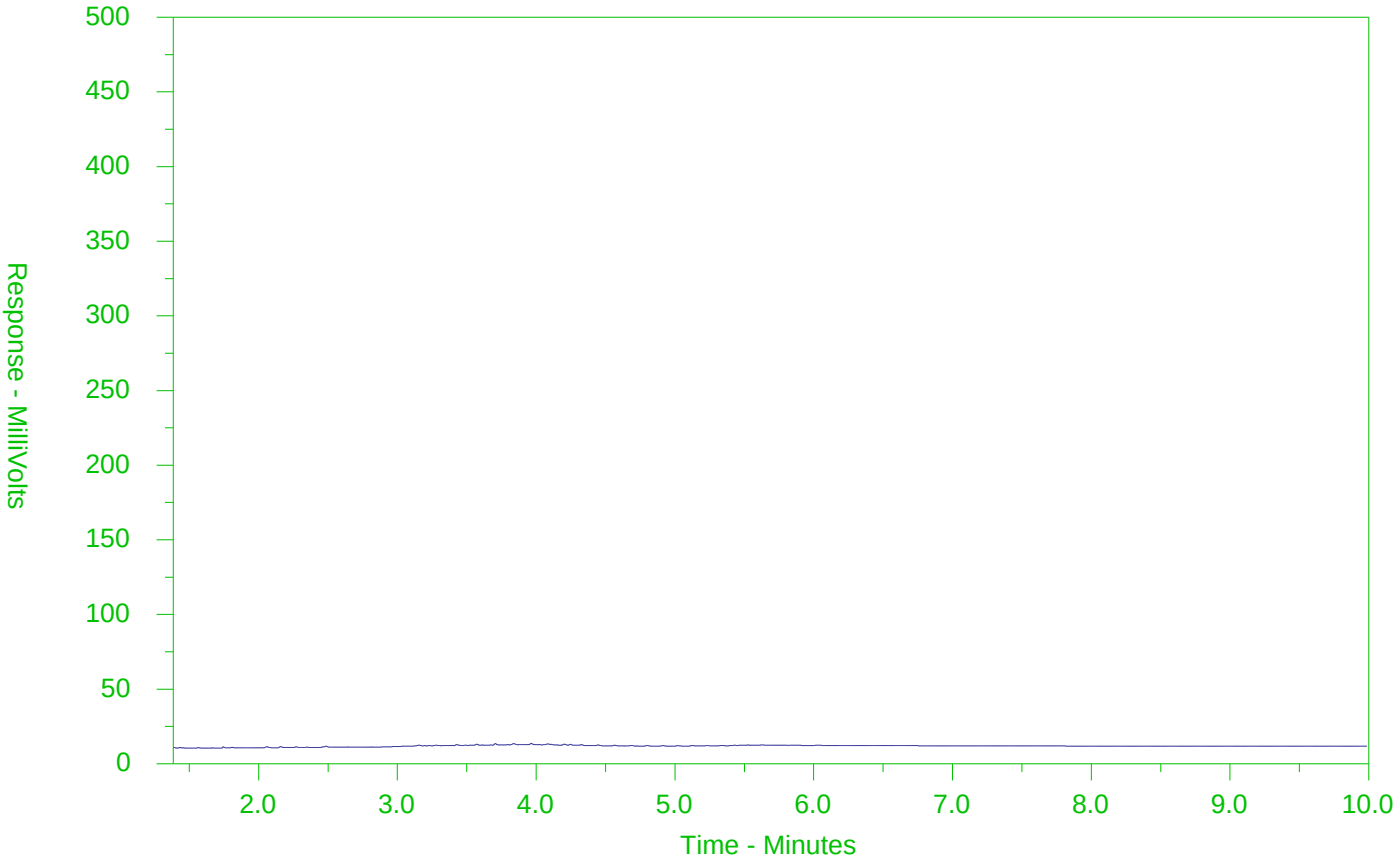
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-6
Client Sample ID: OW9-11



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

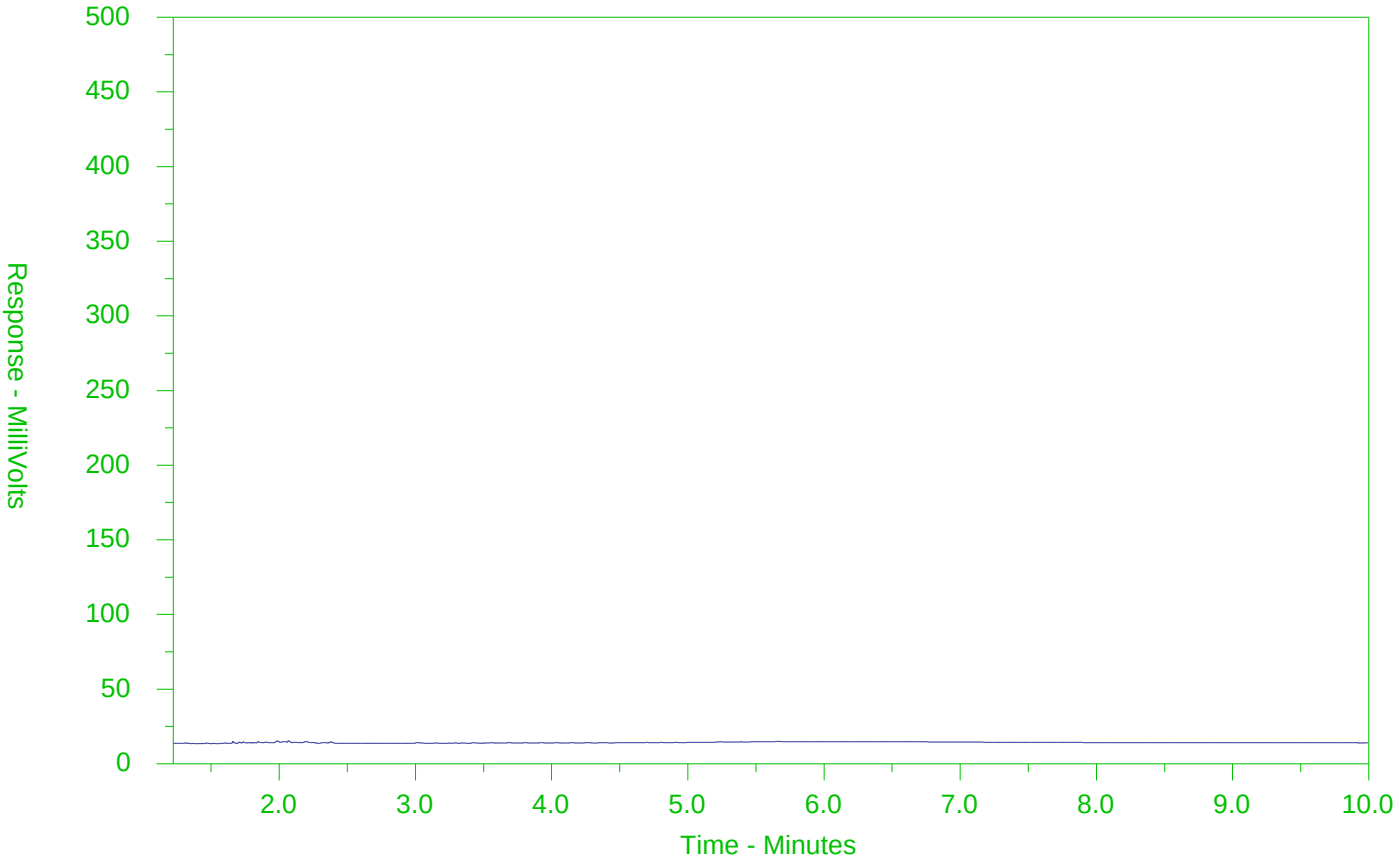
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1983964-7
Client Sample ID: OW10



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1983964 COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill Kitchener	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	300-72 Victoria St. South	Email 1 or Fax: Michael.Shiry@ch2m.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Kitchener, ON	Email 2: Peter.Mamo@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M Hill Kitchener	Email 1 or Fax:	
Contact:	Accounts Payable	Email 2:	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62158	AFE/Cost Center:	PO#:
Job #:	684757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L1983964	ALS Contact: Mathy	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4	1,4 Dioxane	PCB	VOC, F1 (Trip Blank)	Number of Containers
	OW18-11	29-Aug-17	14:20	Water	✓		✓	✓	✓				12
	OW18-1	29-Aug-17	15:30		✓		✓	✓	✓				12
	OW14	30-Aug-17	09:45		✓		✓	✓	✓	✓			15
	OW13		11:03		✓	✓		✓	✓				13
	OW9-1		12:10		✓		✓	✓	✓				12
	OW9-11		13:50		✓		✓	✓	✓				12
	OW10	30-Aug-17	15:30	Water	✓		✓	✓	✓				13
	Trip Blank-1	29-Aug-17	—	Water								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2.6		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Mamo	Date: 30/08/2017	Time: 1705	Received by:	Date:	Time:	Received by: RW	Date: Aug 30 2017	Time: 17:05

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 01-SEP-17
Report Date: 12-SEP-17 13:48 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1985429

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-1 OW26S Sampled By: CLIENT on 31-AUG-17 @ 15:30 Matrix: WATER							
Physical Tests							
Conductivity	0.891		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.38		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	80.6		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.39		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.49		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	64.1		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	76		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.783		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	0.55		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.83		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	9.68		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	0.204		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	2.64		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	5.39		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.264		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	48300		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.128		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	3.53		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	722		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	1.4		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-1 OW26S Sampled By: CLIENT on 31-AUG-17 @ 15:30 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	3.37		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	0.52	AIN	0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
1,4-Dioxane	<20		20	ug/L		06-SEP-17	R3820370
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	1.44		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.1		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-1 OW26S Sampled By: CLIENT on 31-AUG-17 @ 15:30 Matrix: WATER							
Hydrocarbons							
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	98.7		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	93.2		60-140	%		06-SEP-17	R3820370
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	75.1		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1985429-2 OW26D Sampled By: CLIENT on 31-AUG-17 @ 16:38 Matrix: WATER							
Physical Tests							
Conductivity	1.13		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.43	PEHT	0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	162		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.12		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	8.32		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	80.0		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	67		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	0.120		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	5.05		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.22		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.173		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	99200		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	3.76		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-2 OW26D Sampled By: CLIENT on 31-AUG-17 @ 16:38 Matrix: WATER							
Dissolved Metals							
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	239		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	1.35		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	2.39		0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
1,4-Dioxane	<20		20	ug/L		06-SEP-17	R3820370
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-2 OW26D Sampled By: CLIENT on 31-AUG-17 @ 16:38 Matrix: WATER							
Volatile Organic Compounds							
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.7		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	97.8		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	92.6		60-140	%		06-SEP-17	R3820370
L1985429-3 OW07-34D Sampled By: CLIENT on 01-SEP-17 @ 09:00 Matrix: WATER							
Physical Tests							
Conductivity	1.10		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.34	PEHT	0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	161		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.13		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	3.62		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	52.2		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	59		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.021		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	0.25		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	8.26		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-3 OW07-34D Sampled By: CLIENT on 01-SEP-17 @ 09:00 Matrix: WATER							
Dissolved Metals							
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	4.19		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	3.96		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.211		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	90600		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.012		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	5.96		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	626		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	0.85		0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
1,4-Dioxane	<20		20	ug/L		06-SEP-17	R3820370
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-3 OW07-34D Sampled By: CLIENT on 01-SEP-17 @ 09:00 Matrix: WATER							
Volatile Organic Compounds							
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	96.0		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		06-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
Total Hydrocarbons (C6-C50)	<370		370	ug/L		06-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	94.9		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	91.7		60-140	%		06-SEP-17	R3820370
L1985429-4 OW07-34S Sampled By: CLIENT on 01-SEP-17 @ 10:07 Matrix: WATER							
Physical Tests							
Conductivity	0.966		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.36		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	112		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.48		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.81		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-4 OW07-34S Sampled By: CLIENT on 01-SEP-17 @ 10:07 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	58.7		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	81		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.537		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.35		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	4.36		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	0.112		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	2.73		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	5.53		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.218		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	62000		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.178		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	3.59		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	552		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	2.11		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-4 OW07-34S Sampled By: CLIENT on 01-SEP-17 @ 10:07 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	1.19		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.4		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F2-Naphth	<100		100	ug/L		08-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F3-PAH	<250		250	ug/L		08-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
Total Hydrocarbons (C6-C50)	<370		370	ug/L		08-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	105.9		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	90.6		60-140	%		06-SEP-17	R3820370
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-4 OW07-34S Sampled By: CLIENT on 01-SEP-17 @ 10:07 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3822028
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Surrogate: d10-Acenaphthene	94.6		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d12-Chrysene	102.2		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d8-Naphthalene	89.1		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d10-Phenanthrene	108.3		60-140	%	06-SEP-17	08-SEP-17	R3822028
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	74.3		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1985429-5 OW25 Sampled By: CLIENT on 01-SEP-17 @ 11:03 Matrix: WATER							
Physical Tests							
Conductivity	0.757		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.44		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	24.1		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.12		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	1.96		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	36.4		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-5 OW25 Sampled By: CLIENT on 01-SEP-17 @ 11:03 Matrix: WATER							
Dissolved Metals							
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	65		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	0.26		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	0.735		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.51		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.092		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	16600		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.43		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	48.5		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	2.43		0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-5 OW25 Sampled By: CLIENT on 01-SEP-17 @ 11:03 Matrix: WATER							
Volatile Organic Compounds							
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	2.57		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	0.67		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.2		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3820710
F2-Naphth	<100		100	ug/L		08-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
F3-PAH	<250		250	ug/L		08-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3820710
Total Hydrocarbons (C6-C50)	<370		370	ug/L		08-SEP-17	
Chrom. to baseline at nC50	YES				06-SEP-17	06-SEP-17	R3820710
Surrogate: 2-Bromobenzotrifluoride	98.3		60-140	%	06-SEP-17	06-SEP-17	R3820710
Surrogate: 3,4-Dichlorotoluene	89.5		60-140	%		06-SEP-17	R3820370
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3822028

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-5 OW25 Sampled By: CLIENT on 01-SEP-17 @ 11:03 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3822028
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3822028
Surrogate: d10-Acenaphthene	87.9		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d12-Chrysene	98.6		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d8-Naphthalene	81.9		60-140	%	06-SEP-17	08-SEP-17	R3822028
Surrogate: d10-Phenanthrene	102.8		60-140	%	06-SEP-17	08-SEP-17	R3822028
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	64.7		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1985429-6 OW07-33 Sampled By: CLIENT on 31-AUG-17 @ 12:13 Matrix: WATER							
Physical Tests							
Conductivity	1.16		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.34	PEHT	0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	181		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.38		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.67		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	51.3		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-6 OW07-33 Sampled By: CLIENT on 31-AUG-17 @ 12:13 Matrix: WATER							
Dissolved Metals							
Boron (B)-Dissolved	64		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.673		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	1.08		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	5.70		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	15.0		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	3.20		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	5.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.506		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	99800		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.111		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	5.05		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	637		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	1.71		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	0.60	AIN	0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-6 OW07-33 Sampled By: CLIENT on 31-AUG-17 @ 12:13 Matrix: WATER							
Volatile Organic Compounds							
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
1,4-Dioxane	<20		20	ug/L		06-SEP-17	R3820370
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	1.92		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	0.89		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.1		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		12-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		12-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	99.3		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	90.5		60-140	%		06-SEP-17	R3820370
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-6 OW07-33 Sampled By: CLIENT on 31-AUG-17 @ 12:13 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	93.2		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	97.7		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	88.0		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	107.8		60-140	%	06-SEP-17	11-SEP-17	R3823800
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
4-Chloroaniline	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2-Chlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dichlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
Diethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Dimethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dimethylphenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrophenol	<1.0		1.0	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,6-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		12-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	08-SEP-17	12-SEP-17	R3823758
Pentachlorophenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenanthrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Pyrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-6 OW07-33 Sampled By: CLIENT on 31-AUG-17 @ 12:13 Matrix: WATER							
Semi-Volatile Organics							
Surrogate: 2-Fluorobiphenyl	103.0		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Nitrobenzene d5	100.3		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Phenol d5	52.9		30-130	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: p-Terphenyl d14	92.2		60-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2,4,6-Tribromophenol	132.7		50-140	%	08-SEP-17	12-SEP-17	R3823758
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	67.4		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1985429-7 DUP1 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Physical Tests							
Conductivity	1.16		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.34		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	182		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.39		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.70		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	51.9		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	65		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.691		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	1.07		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	5.73		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	15.6		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	3.16		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	5.48		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.509		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	99800		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.114		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-7 DUP1 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Dissolved Metals							
Uranium (U)-Dissolved	5.18		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	639		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	1.55		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	0.57	AIN	0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
1,4-Dioxane	<20		20	ug/L		06-SEP-17	R3820370
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-7 DUP1 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
1,1,1-Trichloroethane	1.82		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	0.86		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.4		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		12-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		12-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		12-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	92.2		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	94.0		60-140	%		06-SEP-17	R3820370
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-7 DUP1 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	94.1		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	99.9		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	88.4		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	109.0		60-140	%	06-SEP-17	11-SEP-17	R3823800
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
4-Chloroaniline	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2-Chlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dichlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
Diethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Dimethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dimethylphenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrophenol	<1.0		1.0	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,6-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		12-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	08-SEP-17	12-SEP-17	R3823758
Pentachlorophenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenanthrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Pyrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2-Fluorobiphenyl	99.4		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Nitrobenzene d5	96.4		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Phenol d5	49.0		30-130	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: p-Terphenyl d14	87.7		60-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2,4,6-Tribromophenol	123.2		50-140	%	08-SEP-17	12-SEP-17	R3823758
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	75.6		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1985429-8 OW11-I CLIENT on 01-SEP-17 @ 13:55							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-8 OW11-I Sampled By: CLIENT on 01-SEP-17 @ 13:55 Matrix: WATER							
Physical Tests							
Conductivity	0.594		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.61		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	3.03		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	0.13		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.18		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	46.4		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	80		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.099		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	1.52		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	8.09		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	0.165		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	2.26		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	3000		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.062		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.25		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	56.9		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3820370
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3820370
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3820370
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3820370
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3820370

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-8 OW11-I Sampled By: CLIENT on 01-SEP-17 @ 13:55 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3820370
1,1-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3820370
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3820370
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3820370
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3820370
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3820370
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3820370
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,1-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3820370
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3820370
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3820370
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3820370
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3820370
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.5		70-130	%		06-SEP-17	R3820370
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%		06-SEP-17	R3820370
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3820370
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		11-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		11-SEP-17	

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-8 OW11-I Sampled By: CLIENT on 01-SEP-17 @ 13:55 Matrix: WATER							
Hydrocarbons							
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		11-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	110.1		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	94.1		60-140	%		06-SEP-17	R3820370
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		11-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	92.1		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	103.9		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	88.0		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	106.1		60-140	%	06-SEP-17	11-SEP-17	R3823800
L1985429-9 DUP2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Physical Tests							
Conductivity	0.591		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.60		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	2.92		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-9 DUP2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Dissolved Metals							
Antimony (Sb)-Dissolved	0.13		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.19		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	46.5		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	80		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.100		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	1.53		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	7.69		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	0.172		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	2.14		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	2900		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.065		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.38		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	55.8		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		05-SEP-17	R3820294
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3818645
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3818645
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3818645
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3818645
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3818645
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
1,1-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-9 DUP2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3818645
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3818645
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3818645
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,1-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3818645
Vinyl chloride	<0.50		0.50	ug/L		06-SEP-17	R3818645
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3818645
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3818645
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.9		70-130	%		06-SEP-17	R3818645
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%		06-SEP-17	R3818645
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3818645
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		11-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		11-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		11-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	99.6		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	96.2		60-140	%		06-SEP-17	R3818645
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-9 DUP2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		11-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	96.5		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	102.0		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	93.4		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	109.1		60-140	%	06-SEP-17	11-SEP-17	R3823800
L1985429-10 OW11-II Sampled By: CLIENT on 01-SEP-17 @ 16:00 Matrix: WATER							
Physical Tests							
Conductivity	0.819		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.57		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	65.6		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	1.78		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	137		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	143		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.363		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	5.74		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-10 OW11-II Sampled By: CLIENT on 01-SEP-17 @ 16:00 Matrix: WATER							
Dissolved Metals							
Copper (Cu)-Dissolved	0.73		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	1.60		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	1.41		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	2.74		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.086		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	48400		500	ug/L	05-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.265		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.06		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	435		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3818645
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3818645
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3818645
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3818645
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3818645
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
1,1-Dichloroethane	29.5		0.50	ug/L		06-SEP-17	R3818645
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1-Dichloroethylene	0.74		0.50	ug/L		06-SEP-17	R3818645
cis-1,2-Dichloroethylene	1.01		0.50	ug/L		06-SEP-17	R3818645
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3818645
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3818645
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3818645

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-10 OW11-II Sampled By: CLIENT on 01-SEP-17 @ 16:00 Matrix: WATER							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3818645
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,1-Trichloroethane	37.1		0.50	ug/L		06-SEP-17	R3818645
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3818645
Vinyl chloride	0.87		0.50	ug/L		06-SEP-17	R3818645
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3818645
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3818645
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	96.1		70-130	%		06-SEP-17	R3818645
Surrogate: 1,4-Difluorobenzene	99.8		70-130	%		06-SEP-17	R3818645
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3818645
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		11-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		11-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		11-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	100.4		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	97.1		60-140	%		06-SEP-17	R3818645
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-10 OW11-II Sampled By: CLIENT on 01-SEP-17 @ 16:00 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		11-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	90.8		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	95.7		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	85.8		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	104.5		60-140	%	06-SEP-17	11-SEP-17	R3823800
L1985429-11 DUP3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Physical Tests							
Conductivity	0.822		0.0030	mS/cm		05-SEP-17	R3819367
pH	7.60		0.10	pH units		05-SEP-17	R3819367
Anions and Nutrients							
Chloride (Cl)	66.1		0.50	mg/L		07-SEP-17	R3822437
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		11-SEP-17	R3824290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					05-SEP-17	R3818464
Dissolved Metals Filtration Location	FIELD					05-SEP-17	R3818131
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	1.91		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	140		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	135		10	ug/L	05-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.354		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	5.79		0.10	ug/L	05-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	0.64		0.20	ug/L	05-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	1.68		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	05-SEP-17	05-SEP-17	R3819124
Molybdenum (Mo)-Dissolved	1.34		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	2.70		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.078		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	05-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	50200		500	ug/L	05-SEP-17	06-SEP-17	R3821118

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-11 DUP3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Dissolved Metals							
Thallium (Tl)-Dissolved	0.282		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.07		0.010	ug/L	05-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	05-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	435		1.0	ug/L	05-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		06-SEP-17	R3818645
Benzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Bromodichloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Bromoform	<5.0		5.0	ug/L		06-SEP-17	R3818645
Bromomethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Carbon tetrachloride	<0.20		0.20	ug/L		06-SEP-17	R3818645
Chlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dibromochloromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
Chloroform	<1.0		1.0	ug/L		06-SEP-17	R3818645
1,2-Dibromoethane	<0.20		0.20	ug/L		06-SEP-17	R3818645
1,2-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,3-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,4-Dichlorobenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Dichlorodifluoromethane	<2.0		2.0	ug/L		06-SEP-17	R3818645
1,1-Dichloroethane	28.1		0.50	ug/L		06-SEP-17	R3818645
1,2-Dichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1-Dichloroethylene	0.67		0.50	ug/L		06-SEP-17	R3818645
cis-1,2-Dichloroethylene	0.96		0.50	ug/L		06-SEP-17	R3818645
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Methylene Chloride	<5.0		5.0	ug/L		06-SEP-17	R3818645
1,2-Dichloropropane	<0.50		0.50	ug/L		06-SEP-17	R3818645
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		06-SEP-17	R3818645
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		06-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		06-SEP-17	R3818645
n-Hexane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Methyl Ethyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
Methyl Isobutyl Ketone	<20		20	ug/L		06-SEP-17	R3818645
MTBE	<2.0		2.0	ug/L		06-SEP-17	R3818645
Styrene	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Tetrachloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Toluene	<0.50		0.50	ug/L		06-SEP-17	R3818645

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-11 DUP3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
1,1,1-Trichloroethane	34.5		0.50	ug/L		06-SEP-17	R3818645
1,1,2-Trichloroethane	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichloroethylene	<0.50		0.50	ug/L		06-SEP-17	R3818645
Trichlorofluoromethane	<5.0		5.0	ug/L		06-SEP-17	R3818645
Vinyl chloride	0.77		0.50	ug/L		06-SEP-17	R3818645
o-Xylene	<0.30		0.30	ug/L		06-SEP-17	R3818645
m+p-Xylenes	<0.40		0.40	ug/L		06-SEP-17	R3818645
Xylenes (Total)	<0.50		0.50	ug/L		06-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.8		70-130	%		06-SEP-17	R3818645
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		06-SEP-17	R3818645
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		06-SEP-17	R3818645
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	06-SEP-17	06-SEP-17	R3821126
F2-Naphth	<100		100	ug/L		11-SEP-17	
F3 (C16-C34)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
F3-PAH	<250		250	ug/L		11-SEP-17	
F4 (C34-C50)	<250		250	ug/L	06-SEP-17	06-SEP-17	R3821126
Total Hydrocarbons (C6-C50)	<370		370	ug/L		11-SEP-17	
Chrom. to baseline at nC50	YES			ppm	06-SEP-17	06-SEP-17	R3821126
Surrogate: 2-Bromobenzotrifluoride	96.0		60-140	%	06-SEP-17	06-SEP-17	R3821126
Surrogate: 3,4-Dichlorotoluene	101.7		60-140	%		06-SEP-17	R3818645
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Chrysene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Fluorene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		11-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	11-SEP-17	R3823800
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-11 DUP3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Pyrene	<0.020		0.020	ug/L	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Acenaphthene	91.3		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d12-Chrysene	99.6		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d8-Naphthalene	84.6		60-140	%	06-SEP-17	11-SEP-17	R3823800
Surrogate: d10-Phenanthrene	106.5		60-140	%	06-SEP-17	11-SEP-17	R3823800
L1985429-12 TRIP BLANK 2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-12 TRIP BLANK 2 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.1		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	99.8		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		07-SEP-17	
Surrogate: 3,4-Dichlorotoluene	92.7		60-140	%		07-SEP-17	R3821109
L1985429-13 TRIP BLANK 3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1985429-13 TRIP BLANK 3 Sampled By: CLIENT on 01-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	92.6		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		07-SEP-17	
Surrogate: 3,4-Dichlorotoluene	99.3		60-140	%		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Pentachlorophenol	LCS-H	L1985429-6, -7
Matrix Spike	Chloride (Cl)	MS-B	L1985429-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1985429-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1985429-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1985429-1, -10, -11, -2, -3, -4, -5, -6, -7, -8, -9

Sample Parameter Qualifier key listed:

Qualifier	Description
AIN	Approximate Result: Interference Suspected
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH

Reference Information

represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Water F2-F4-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT Water pH APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1985429 Report Date: 12-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3820370								
WG2603492-4 DUP		**WG2603492-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	06-SEP-17
WG2603492-1 LCS								
1,4-Dioxane			103.8		%		60-140	06-SEP-17
WG2603492-2 MB								
1,4-Dioxane			<20		ug/L		20	06-SEP-17
WG2603492-5 MS		**WG2603492-3**						
1,4-Dioxane			91.1		%		50-140	06-SEP-17
625-511-WT	**Water**							
Batch R3823758								
WG2611207-2 LCS								
1,2,4-Trichlorobenzene			81.9		%		50-140	11-SEP-17
2-Chlorophenol			84.8		%		50-140	11-SEP-17
2,4-Dichlorophenol			97.8		%		50-140	11-SEP-17
2,4-Dimethylphenol			95.1		%		30-130	11-SEP-17
2,4-Dinitrophenol			138.2		%		50-140	11-SEP-17
2,4-Dinitrotoluene			105.3		%		50-140	11-SEP-17
2,4,5-Trichlorophenol			109.6		%		50-140	11-SEP-17
2,4,6-Trichlorophenol			103.4		%		50-140	11-SEP-17
2,6-Dinitrotoluene			97.5		%		50-140	11-SEP-17
3,3'-Dichlorobenzidine			81.4		%		30-130	11-SEP-17
4-Chloroaniline			49.1		%		30-130	11-SEP-17
Biphenyl			91.9		%		50-140	11-SEP-17
Bis(2-chloroethyl)ether			90.0		%		50-140	11-SEP-17
Bis(2-chloroisopropyl)ether			88.9		%		50-140	11-SEP-17
Bis(2-ethylhexyl)phthalate			73.1		%		50-140	11-SEP-17
Diethylphthalate			86.5		%		50-140	11-SEP-17
Dimethylphthalate			84.8		%		50-140	11-SEP-17
Pentachlorophenol			140.1	LCS-H	%		50-140	11-SEP-17
Phenanthrene			94.4		%		50-140	11-SEP-17
Phenol			48.7		%		30-130	11-SEP-17
Pyrene			77.1		%		50-140	11-SEP-17
WG2611207-3 LCSD		**WG2611207-2**						
1,2,4-Trichlorobenzene		81.9	83.6		%	2.0	50	11-SEP-17
2-Chlorophenol		84.8	91.2		%	7.3	50	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3823758								
WG2611207-3 LCSD		**WG2611207-2**						
2,4-Dichlorophenol		97.8	103.9		%	6.0	50	11-SEP-17
2,4-Dimethylphenol		95.1	112.5		%	17	50	11-SEP-17
2,4-Dinitrophenol		138.2	130.5		%	5.7	50	11-SEP-17
2,4-Dinitrotoluene		105.3	109.1		%	3.5	50	11-SEP-17
2,4,5-Trichlorophenol		109.6	117.8		%	7.2	50	11-SEP-17
2,4,6-Trichlorophenol		103.4	109.4		%	5.6	50	11-SEP-17
2,6-Dinitrotoluene		97.5	104.3		%	6.7	50	11-SEP-17
3,3'-Dichlorobenzidine		81.4	76.1		%	6.8	50	11-SEP-17
4-Chloroaniline		49.1	72.5		%	38	50	11-SEP-17
Biphenyl		91.9	95.2		%	3.5	50	11-SEP-17
Bis(2-chloroethyl)ether		90.0	93.2		%	3.5	50	11-SEP-17
Bis(2-chloroisopropyl)ether		88.9	90.8		%	2.2	50	11-SEP-17
Bis(2-ethylhexyl)phthalate		73.1	78.5		%	7.2	50	11-SEP-17
Diethylphthalate		86.5	91.5		%	5.7	50	11-SEP-17
Dimethylphthalate		84.8	89.1		%	4.9	50	11-SEP-17
Pentachlorophenol		140.1	142.1		%	1.4	50	11-SEP-17
Phenanthrene		94.4	99.0		%	4.7	50	11-SEP-17
Phenol		48.7	51.6		%	5.9	50	11-SEP-17
Pyrene		77.1	86.2		%	11	50	11-SEP-17
WG2611207-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	11-SEP-17
2-Chlorophenol			<0.30		ug/L		0.3	11-SEP-17
2,4-Dichlorophenol			<0.30		ug/L		0.3	11-SEP-17
2,4-Dimethylphenol			<0.50		ug/L		0.5	11-SEP-17
2,4-Dinitrophenol			<1.0		ug/L		1	11-SEP-17
2,4-Dinitrotoluene			<0.40		ug/L		0.4	11-SEP-17
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	11-SEP-17
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	11-SEP-17
2,6-Dinitrotoluene			<0.40		ug/L		0.4	11-SEP-17
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	11-SEP-17
4-Chloroaniline			<0.40		ug/L		0.4	11-SEP-17
Biphenyl			<0.40		ug/L		0.4	11-SEP-17
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3823758								
WG2611207-1 MB								
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	11-SEP-17
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	11-SEP-17
Diethylphthalate			<0.20		ug/L		0.2	11-SEP-17
Dimethylphthalate			<0.20		ug/L		0.2	11-SEP-17
Pentachlorophenol			<0.50		ug/L		0.5	11-SEP-17
Phenanthrene			<0.20		ug/L		0.2	11-SEP-17
Phenol			<0.50		ug/L		0.5	11-SEP-17
Pyrene			<0.20		ug/L		0.2	11-SEP-17
Surrogate: 2-Fluorobiphenyl			98.5		%		50-140	11-SEP-17
Surrogate: 2,4,6-Tribromophenol			99.9		%		50-140	11-SEP-17
Surrogate: Nitrobenzene d5			99.0		%		50-140	11-SEP-17
Surrogate: p-Terphenyl d14			91.2		%		60-140	11-SEP-17
Surrogate: Phenol d5			46.1		%		30-130	11-SEP-17
CL-IC-N-WT	**Water**							
Batch R3822437								
WG2610799-4 DUP		**L1985429-2**						
Chloride (Cl)		162	162		mg/L	0.1	20	07-SEP-17
WG2610799-2 LCS								
Chloride (Cl)			103.1		%		90-110	07-SEP-17
WG2610799-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-SEP-17
WG2610799-5 MS		**L1985429-2**						
Chloride (Cl)			N/A	MS-B	%		-	07-SEP-17
CN-WAD-R511-WT	**Water**							
Batch R3824290								
WG2612840-3 DUP		**L1985429-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	11-SEP-17
WG2612840-2 LCS								
Cyanide, Weak Acid Diss			105.9		%		80-120	11-SEP-17
WG2612840-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	11-SEP-17
WG2612840-4 MS		**L1985429-1**						
Cyanide, Weak Acid Diss			100.7		%		70-130	11-SEP-17
CR-CR6-IC-R511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	**Water**							
Batch R3820294								
WG2605936-9 DUP		**WG2605936-8**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	05-SEP-17
WG2605936-7 LCS								
Chromium, Hexavalent			101.5		%		80-120	05-SEP-17
WG2605936-6 MB								
Chromium, Hexavalent			<1.0		ug/L		1	05-SEP-17
WG2605936-10 MS		**WG2605936-8**						
Chromium, Hexavalent			98.0		%		70-130	05-SEP-17
Batch R3821991								
WG2610623-4 DUP		**WG2610623-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	07-SEP-17
WG2610623-2 LCS								
Chromium, Hexavalent			101.6		%		80-120	07-SEP-17
WG2610623-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	07-SEP-17
WG2610623-5 MS		**WG2610623-3**						
Chromium, Hexavalent			98.1		%		70-130	07-SEP-17
EC-R511-WT	**Water**							
Batch R3819367								
WG2608464-4 DUP		**WG2608464-3**						
Conductivity		1.28	1.28		mS/cm	0.0	10	05-SEP-17
WG2608464-8 DUP		**WG2608464-7**						
Conductivity		2.96	2.95		mS/cm	0.3	10	05-SEP-17
WG2608464-2 LCS								
Conductivity			101.6		%		90-110	05-SEP-17
WG2608464-6 LCS								
Conductivity			101.3		%		90-110	05-SEP-17
WG2608464-1 MB								
Conductivity			<0.0030		mS/cm		0.003	05-SEP-17
WG2608464-5 MB								
Conductivity			<0.0030		mS/cm		0.003	05-SEP-17
F1-HS-511-WT	**Water**							
Batch R3818645								
WG2604829-4 DUP		**WG2604829-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	06-SEP-17
WG2604829-1 LCS								
F1 (C6-C10)			101.5		%		80-120	05-SEP-17
WG2604829-2 MB								

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R3818645								
WG2604829-2 MB								
F1 (C6-C10)			<25		ug/L		25	05-SEP-17
Surrogate: 3,4-Dichlorotoluene			107.4		%		60-140	05-SEP-17
WG2604829-5 MS		**WG2604829-3**						
F1 (C6-C10)			89.3		%		60-140	06-SEP-17
Batch R3820370								
WG2603492-4 DUP		**WG2603492-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	06-SEP-17
WG2603492-1 LCS								
F1 (C6-C10)			106.3		%		80-120	06-SEP-17
WG2603492-2 MB								
F1 (C6-C10)			<25		ug/L		25	06-SEP-17
Surrogate: 3,4-Dichlorotoluene			83.2		%		60-140	06-SEP-17
WG2603492-5 MS		**WG2603492-3**						
F1 (C6-C10)			83.7		%		60-140	06-SEP-17
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2594557-1 LCS								
F1 (C6-C10)			104.7		%		80-120	07-SEP-17
WG2594557-2 MB								
F1 (C6-C10)			<25		ug/L		25	07-SEP-17
Surrogate: 3,4-Dichlorotoluene			77.9		%		60-140	07-SEP-17
WG2594557-5 MS		**WG2594557-3**						
F1 (C6-C10)			94.8		%		60-140	07-SEP-17
F2-F4-511-WT	**Water**							
Batch R3820710								
WG2609119-2 LCS								
F2 (C10-C16)			110.5		%		70-130	06-SEP-17
F3 (C16-C34)			108.0		%		70-130	06-SEP-17
F4 (C34-C50)			118.0		%		70-130	06-SEP-17
WG2609119-3 LCSD		**WG2609119-2**						
F2 (C10-C16)		110.5	97.0		%	13	50	06-SEP-17
F3 (C16-C34)		108.0	101.8		%	6.0	50	06-SEP-17
F4 (C34-C50)		118.0	107.4		%	9.4	50	06-SEP-17
WG2609119-1 MB								
F2 (C10-C16)			<100		ug/L		100	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R3820710								
WG2609119-1 MB								
F3 (C16-C34)			<250		ug/L		250	06-SEP-17
F4 (C34-C50)			<250		ug/L		250	06-SEP-17
Surrogate: 2-Bromobenzotrifluoride			94.1		%		60-140	06-SEP-17
Batch R3821126								
WG2609122-2 LCS								
F2 (C10-C16)			113.5		%		70-130	06-SEP-17
F3 (C16-C34)			113.8		%		70-130	06-SEP-17
F4 (C34-C50)			120.2		%		70-130	06-SEP-17
WG2609122-3 LCSD		**WG2609122-2**						
F2 (C10-C16)		113.5	104.2		%	8.6	50	06-SEP-17
F3 (C16-C34)		113.8	106.5		%	6.5	50	06-SEP-17
F4 (C34-C50)		120.2	111.8		%	7.2	50	06-SEP-17
WG2609122-1 MB								
F2 (C10-C16)			<100		ug/L		100	06-SEP-17
F3 (C16-C34)			<250		ug/L		250	06-SEP-17
F4 (C34-C50)			<250		ug/L		250	06-SEP-17
Surrogate: 2-Bromobenzotrifluoride			101.5		%		60-140	06-SEP-17
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3819124								
WG2608450-4 DUP		**WG2608450-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	05-SEP-17
WG2608450-2 LCS								
Mercury (Hg)-Dissolved			97.9		%		80-120	05-SEP-17
WG2608450-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	05-SEP-17
WG2608450-6 MS		**WG2608450-5**						
Mercury (Hg)-Dissolved			93.0		%		70-130	05-SEP-17
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2608295-4 DUP		**WG2608295-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	06-SEP-17
Arsenic (As)-Dissolved		2.45	2.54		ug/L	3.6	20	06-SEP-17
Barium (Ba)-Dissolved		636	687		ug/L	7.7	20	06-SEP-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	06-SEP-17
Boron (B)-Dissolved		280	277		ug/L	1.0	20	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2608295-4 DUP		**WG2608295-3**						
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	06-SEP-17
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	06-SEP-17
Cobalt (Co)-Dissolved		1.88	2.01		ug/L	6.6	20	06-SEP-17
Copper (Cu)-Dissolved		0.58	0.59		ug/L	1.8	20	06-SEP-17
Lead (Pb)-Dissolved		0.316	0.311		ug/L	1.5	20	06-SEP-17
Molybdenum (Mo)-Dissolved		0.198	0.200		ug/L	1.3	20	06-SEP-17
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	06-SEP-17
Selenium (Se)-Dissolved		0.160	0.136		ug/L	16	20	06-SEP-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	06-SEP-17
Sodium (Na)-Dissolved		111000	109000		ug/L	1.0	20	06-SEP-17
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	06-SEP-17
Uranium (U)-Dissolved		0.194	0.196		ug/L	1.1	20	06-SEP-17
Vanadium (V)-Dissolved		0.68	0.72		ug/L	5.3	20	06-SEP-17
Zinc (Zn)-Dissolved		2.9	3.0		ug/L	2.4	20	06-SEP-17
WG2608295-2 LCS								
Antimony (Sb)-Dissolved			94.0		%		80-120	06-SEP-17
Arsenic (As)-Dissolved			101.2		%		80-120	06-SEP-17
Barium (Ba)-Dissolved			105.1		%		80-120	06-SEP-17
Beryllium (Be)-Dissolved			100.9		%		80-120	06-SEP-17
Boron (B)-Dissolved			101.7		%		80-120	06-SEP-17
Cadmium (Cd)-Dissolved			98.5		%		80-120	06-SEP-17
Chromium (Cr)-Dissolved			101.9		%		80-120	06-SEP-17
Cobalt (Co)-Dissolved			100.4		%		80-120	06-SEP-17
Copper (Cu)-Dissolved			98.8		%		80-120	06-SEP-17
Lead (Pb)-Dissolved			102.4		%		80-120	06-SEP-17
Molybdenum (Mo)-Dissolved			99.8		%		80-120	06-SEP-17
Nickel (Ni)-Dissolved			99.98		%		80-120	06-SEP-17
Selenium (Se)-Dissolved			97.1		%		80-120	06-SEP-17
Silver (Ag)-Dissolved			96.5		%		80-120	06-SEP-17
Sodium (Na)-Dissolved			102.1		%		80-120	06-SEP-17
Thallium (Tl)-Dissolved			101.4		%		80-120	06-SEP-17
Uranium (U)-Dissolved			101.6		%		80-120	06-SEP-17
Vanadium (V)-Dissolved			102.9		%		80-120	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2608295-2 LCS								
Zinc (Zn)-Dissolved			95.2		%		80-120	06-SEP-17
WG2608295-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Boron (B)-Dissolved			<10		ug/L		10	06-SEP-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	06-SEP-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Sodium (Na)-Dissolved			<500		ug/L		500	06-SEP-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	06-SEP-17
WG2608295-5 MS		**WG2608295-3**						
Antimony (Sb)-Dissolved			97.5		%		70-130	06-SEP-17
Arsenic (As)-Dissolved			97.2		%		70-130	06-SEP-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Beryllium (Be)-Dissolved			99.0		%		70-130	06-SEP-17
Boron (B)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Cadmium (Cd)-Dissolved			90.2		%		70-130	06-SEP-17
Chromium (Cr)-Dissolved			94.8		%		70-130	06-SEP-17
Cobalt (Co)-Dissolved			89.0		%		70-130	06-SEP-17
Copper (Cu)-Dissolved			86.2		%		70-130	06-SEP-17
Lead (Pb)-Dissolved			94.7		%		70-130	06-SEP-17
Molybdenum (Mo)-Dissolved			96.8		%		70-130	06-SEP-17
Nickel (Ni)-Dissolved			88.2		%		70-130	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2608295-5 MS		**WG2608295-3**						
Selenium (Se)-Dissolved			98.5		%		70-130	06-SEP-17
Silver (Ag)-Dissolved			73.2		%		70-130	07-SEP-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Thallium (Tl)-Dissolved			95.9		%		70-130	06-SEP-17
Uranium (U)-Dissolved			96.0		%		70-130	06-SEP-17
Vanadium (V)-Dissolved			98.4		%		70-130	06-SEP-17
Zinc (Zn)-Dissolved			85.6		%		70-130	06-SEP-17
PAH-511-WT	**Water**							
Batch R3822028								
WG2609119-2 LCS								
1-Methylnaphthalene			85.1		%		50-140	08-SEP-17
2-Methylnaphthalene			85.1		%		50-140	08-SEP-17
Acenaphthene			92.6		%		50-140	08-SEP-17
Acenaphthylene			92.6		%		50-140	08-SEP-17
Anthracene			89.8		%		50-140	08-SEP-17
Benzo(a)anthracene			85.8		%		50-140	08-SEP-17
Benzo(a)pyrene			87.0		%		50-140	08-SEP-17
Benzo(b)fluoranthene			79.1		%		50-140	08-SEP-17
Benzo(g,h,i)perylene			105.9		%		50-140	08-SEP-17
Benzo(k)fluoranthene			91.3		%		50-140	08-SEP-17
Chrysene			93.3		%		50-140	08-SEP-17
Dibenzo(ah)anthracene			98.3		%		50-140	08-SEP-17
Fluoranthene			97.9		%		50-140	08-SEP-17
Fluorene			94.3		%		50-140	08-SEP-17
Indeno(1,2,3-cd)pyrene			81.0		%		50-140	08-SEP-17
Naphthalene			90.2		%		50-140	08-SEP-17
Phenanthrene			92.7		%		50-140	08-SEP-17
Pyrene			99.3		%		50-140	08-SEP-17
WG2609119-3 LCSD		**WG2609119-2**						
1-Methylnaphthalene		85.1	85.6		%	0.6	50	08-SEP-17
2-Methylnaphthalene		85.1	86.2		%	1.2	50	08-SEP-17
Acenaphthene		92.6	94.6		%	2.1	50	08-SEP-17
Acenaphthylene		92.6	94.2		%	1.7	50	08-SEP-17
Anthracene		89.8	84.5		%	6.1	50	08-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3822028								
WG2609119-3 LCSD		**WG2609119-2**						
Benzo(a)anthracene		85.8	82.4		%	4.1	50	08-SEP-17
Benzo(a)pyrene		87.0	94.6		%	8.3	50	08-SEP-17
Benzo(b)fluoranthene		79.1	77.9		%	1.5	50	08-SEP-17
Benzo(g,h,i)perylene		105.9	84.9		%	22	50	08-SEP-17
Benzo(k)fluoranthene		91.3	109.8		%	18	50	08-SEP-17
Chrysene		93.3	110.7		%	17	50	08-SEP-17
Dibenzo(ah)anthracene		98.3	95.1		%	3.3	50	08-SEP-17
Fluoranthene		97.9	100.3		%	2.4	50	08-SEP-17
Fluorene		94.3	94.2		%	0.2	50	08-SEP-17
Indeno(1,2,3-cd)pyrene		81.0	95.3		%	16	50	08-SEP-17
Naphthalene		90.2	92.3		%	2.3	50	08-SEP-17
Phenanthrene		92.7	93.2		%	0.5	50	08-SEP-17
Pyrene		99.3	99.3		%	0.0	50	08-SEP-17
WG2609119-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	08-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	08-SEP-17
Acenaphthene			<0.020		ug/L		0.02	08-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	08-SEP-17
Anthracene			<0.020		ug/L		0.02	08-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	08-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	08-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	08-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	08-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	08-SEP-17
Chrysene			<0.020		ug/L		0.02	08-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	08-SEP-17
Fluoranthene			<0.020		ug/L		0.02	08-SEP-17
Fluorene			<0.020		ug/L		0.02	08-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	08-SEP-17
Naphthalene			<0.050		ug/L		0.05	08-SEP-17
Phenanthrene			<0.020		ug/L		0.02	08-SEP-17
Pyrene			<0.020		ug/L		0.02	08-SEP-17
Surrogate: d8-Naphthalene			94.6		%		60-140	08-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3822028								
WG2609119-1 MB								
Surrogate: d10-Phenanthrene			95.2		%		60-140	08-SEP-17
Surrogate: d12-Chrysene			90.2		%		60-140	08-SEP-17
Surrogate: d10-Acenaphthene			95.7		%		60-140	08-SEP-17
Batch R3823800								
WG2609122-2 LCS								
1-Methylnaphthalene			87.9		%		50-140	11-SEP-17
2-Methylnaphthalene			87.5		%		50-140	11-SEP-17
Acenaphthene			93.3		%		50-140	11-SEP-17
Acenaphthylene			101.3		%		50-140	11-SEP-17
Anthracene			102.1		%		50-140	11-SEP-17
Benzo(a)anthracene			109.3		%		50-140	11-SEP-17
Benzo(a)pyrene			106.7		%		50-140	11-SEP-17
Benzo(b)fluoranthene			109.4		%		50-140	11-SEP-17
Benzo(g,h,i)perylene			113.8		%		50-140	11-SEP-17
Benzo(k)fluoranthene			113.7		%		50-140	11-SEP-17
Chrysene			108.1		%		50-140	11-SEP-17
Dibenzo(ah)anthracene			120.6		%		50-140	11-SEP-17
Fluoranthene			108.4		%		50-140	11-SEP-17
Fluorene			101.5		%		50-140	11-SEP-17
Indeno(1,2,3-cd)pyrene			116.5		%		50-140	11-SEP-17
Naphthalene			92.1		%		50-140	11-SEP-17
Phenanthrene			107.3		%		50-140	11-SEP-17
Pyrene			109.8		%		50-140	11-SEP-17
WG2609122-3 LCSD		**WG2609122-2**						
1-Methylnaphthalene		87.9	90.9		%	3.3	50	11-SEP-17
2-Methylnaphthalene		87.5	90.8		%	3.7	50	11-SEP-17
Acenaphthene		93.3	97.0		%	3.9	50	11-SEP-17
Acenaphthylene		101.3	105.5		%	4.1	50	11-SEP-17
Anthracene		102.1	107.9		%	5.6	50	11-SEP-17
Benzo(a)anthracene		109.3	104.6		%	4.3	50	11-SEP-17
Benzo(a)pyrene		106.7	113.8		%	6.5	50	11-SEP-17
Benzo(b)fluoranthene		109.4	117.6		%	7.2	50	11-SEP-17
Benzo(g,h,i)perylene		113.8	113.8		%	0.0	50	11-SEP-17
Benzo(k)fluoranthene		113.7	117.6		%	3.4	50	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3823800								
WG2609122-3 LCSD		**WG2609122-2**						
Chrysene		108.1	99.6		%	8.2	50	11-SEP-17
Dibenzo(ah)anthracene		120.6	118.7		%	1.5	50	11-SEP-17
Fluoranthene		108.4	114.2		%	5.2	50	11-SEP-17
Fluorene		101.5	105.3		%	3.6	50	11-SEP-17
Indeno(1,2,3-cd)pyrene		116.5	116.6		%	0.1	50	11-SEP-17
Naphthalene		92.1	95.3		%	3.4	50	11-SEP-17
Phenanthrene		107.3	112.3		%	4.6	50	11-SEP-17
Pyrene		109.8	117.9		%	7.1	50	11-SEP-17
WG2609122-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	11-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	11-SEP-17
Acenaphthene			<0.020		ug/L		0.02	11-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	11-SEP-17
Anthracene			<0.020		ug/L		0.02	11-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	11-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	11-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	11-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	11-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	11-SEP-17
Chrysene			<0.020		ug/L		0.02	11-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	11-SEP-17
Fluoranthene			<0.020		ug/L		0.02	11-SEP-17
Fluorene			<0.020		ug/L		0.02	11-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	11-SEP-17
Naphthalene			<0.050		ug/L		0.05	11-SEP-17
Phenanthrene			<0.020		ug/L		0.02	11-SEP-17
Pyrene			<0.020		ug/L		0.02	11-SEP-17
Surrogate: d8-Naphthalene			92.6		%		60-140	11-SEP-17
Surrogate: d10-Phenanthrene			106.5		%		60-140	11-SEP-17
Surrogate: d12-Chrysene			102.6		%		60-140	11-SEP-17
Surrogate: d10-Acenaphthene			95.1		%		60-140	11-SEP-17
PCB-511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Water**							
Batch R3824408								
WG2611650-2 LCS								
Aroclor 1242			81.7		%		60-140	12-SEP-17
Aroclor 1248			81.9		%		60-140	12-SEP-17
Aroclor 1254			85.9		%		60-140	12-SEP-17
Aroclor 1260			86.1		%		60-140	12-SEP-17
WG2611650-3 LCSD		**WG2611650-2**						
Aroclor 1242		81.7	78.9		%	3.4	50	12-SEP-17
Aroclor 1248		81.9	81.9		%	0.0	50	12-SEP-17
Aroclor 1254		85.9	97.7		%	13	50	12-SEP-17
Aroclor 1260		86.1	99.7		%	15	50	12-SEP-17
WG2611650-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1248			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1254			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1260			<0.020		ug/L		0.02	12-SEP-17
Surrogate: 2-fluorobiphenyl			69.1		%		50-150	12-SEP-17
PH-WT	**Water**							
Batch R3819367								
WG2608464-4 DUP		**WG2608464-3**						
pH		7.85	7.83	J	pH units	0.02	0.2	05-SEP-17
WG2608464-8 DUP		**WG2608464-7**						
pH		8.33	8.35	J	pH units	0.01	0.2	05-SEP-17
WG2608464-2 LCS								
pH			6.99		pH units		6.9-7.1	05-SEP-17
WG2608464-6 LCS								
pH			6.98		pH units		6.9-7.1	05-SEP-17
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-4 DUP		**WG2604829-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-4 DUP		**WG2604829-3**						
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	06-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	06-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Trichlorofluoromethane		<5.0	<5.0		ug/L			06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-4 DUP		**WG2604829-3**						
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
WG2604829-1 LCS								
1,1,1,2-Tetrachloroethane			89.2		%		70-130	05-SEP-17
1,1,2,2-Tetrachloroethane			85.3		%		70-130	05-SEP-17
1,1,1-Trichloroethane			93.0		%		70-130	05-SEP-17
1,1,2-Trichloroethane			92.0		%		70-130	05-SEP-17
1,1-Dichloroethane			95.5		%		70-130	05-SEP-17
1,1-Dichloroethylene			88.4		%		70-130	05-SEP-17
1,2-Dibromoethane			89.4		%		70-130	05-SEP-17
1,2-Dichlorobenzene			91.1		%		70-130	05-SEP-17
1,2-Dichloroethane			95.2		%		70-130	05-SEP-17
1,2-Dichloropropane			94.5		%		70-130	05-SEP-17
1,3-Dichlorobenzene			90.3		%		70-130	05-SEP-17
1,4-Dichlorobenzene			92.8		%		70-130	05-SEP-17
Acetone			108.7		%		60-140	05-SEP-17
Benzene			96.2		%		70-130	05-SEP-17
Bromodichloromethane			89.8		%		70-130	05-SEP-17
Bromoform			85.0		%		70-130	05-SEP-17
Bromomethane			98.9		%		60-140	05-SEP-17
Carbon tetrachloride			92.5		%		70-130	05-SEP-17
Chlorobenzene			92.8		%		70-130	05-SEP-17
Chloroform			95.3		%		70-130	05-SEP-17
cis-1,2-Dichloroethylene			93.0		%		70-130	05-SEP-17
cis-1,3-Dichloropropene			93.3		%		70-130	05-SEP-17
Dibromochloromethane			91.8		%		70-130	05-SEP-17
Dichlorodifluoromethane			85.5		%		50-140	05-SEP-17
Ethylbenzene			87.9		%		70-130	05-SEP-17
n-Hexane			107.2		%		70-130	05-SEP-17
m+p-Xylenes			90.7		%		70-130	05-SEP-17
Methyl Ethyl Ketone			99.6		%		60-140	05-SEP-17
Methyl Isobutyl Ketone			95.6		%		60-140	05-SEP-17
Methylene Chloride			96.7		%		70-130	05-SEP-17
MTBE			93.0		%		70-130	05-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-1 LCS								
o-Xylene			88.0		%		70-130	05-SEP-17
Styrene			83.3		%		70-130	05-SEP-17
Tetrachloroethylene			92.5		%		70-130	05-SEP-17
Toluene			91.1		%		70-130	05-SEP-17
trans-1,2-Dichloroethylene			96.1		%		70-130	05-SEP-17
trans-1,3-Dichloropropene			92.0		%		70-130	05-SEP-17
Trichloroethylene			93.1		%		70-130	05-SEP-17
Trichlorofluoromethane			95.9		%		60-140	05-SEP-17
Vinyl chloride			91.2		%		60-140	05-SEP-17
WG2604829-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	05-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	05-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	05-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	05-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	05-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	05-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	05-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	05-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	05-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	05-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	05-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	05-SEP-17
Acetone			<30		ug/L		30	05-SEP-17
Benzene			<0.50		ug/L		0.5	05-SEP-17
Bromodichloromethane			<2.0		ug/L		2	05-SEP-17
Bromoform			<5.0		ug/L		5	05-SEP-17
Bromomethane			<0.50		ug/L		0.5	05-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	05-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	05-SEP-17
Chloroform			<1.0		ug/L		1	05-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	05-SEP-17
Dibromochloromethane			<2.0		ug/L		2	05-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	05-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-2 MB								
Ethylbenzene			<0.50		ug/L		0.5	05-SEP-17
n-Hexane			<0.50		ug/L		0.5	05-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	05-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	05-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	05-SEP-17
Methylene Chloride			<5.0		ug/L		5	05-SEP-17
MTBE			<2.0		ug/L		2	05-SEP-17
o-Xylene			<0.30		ug/L		0.3	05-SEP-17
Styrene			<0.50		ug/L		0.5	05-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	05-SEP-17
Toluene			<0.50		ug/L		0.5	05-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	05-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	05-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	05-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	05-SEP-17
Surrogate: 1,4-Difluorobenzene			101.1		%		70-130	05-SEP-17
Surrogate: 4-Bromofluorobenzene			96.1		%		70-130	05-SEP-17
WG2604829-5 MS		**WG2604829-3**						
1,1,1,2-Tetrachloroethane			87.8		%		50-140	06-SEP-17
1,1,2,2-Tetrachloroethane			78.1		%		50-140	06-SEP-17
1,1,1-Trichloroethane			96.1		%		50-140	06-SEP-17
1,1,2-Trichloroethane			85.7		%		50-140	06-SEP-17
1,1-Dichloroethane			94.8		%		50-140	06-SEP-17
1,1-Dichloroethylene			88.3		%		50-140	06-SEP-17
1,2-Dibromoethane			82.2		%		50-140	06-SEP-17
1,2-Dichlorobenzene			90.9		%		50-140	06-SEP-17
1,2-Dichloroethane			88.9		%		50-140	06-SEP-17
1,2-Dichloropropane			91.3		%		50-140	06-SEP-17
1,3-Dichlorobenzene			92.9		%		50-140	06-SEP-17
1,4-Dichlorobenzene			94.1		%		50-140	06-SEP-17
Acetone			97.7		%		50-140	06-SEP-17
Benzene			95.5		%		50-140	06-SEP-17
Bromodichloromethane			86.6		%		50-140	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3818645								
WG2604829-5 MS		**WG2604829-3**						
Bromoform			76.9		%		50-140	06-SEP-17
Bromomethane			90.4		%		50-140	06-SEP-17
Carbon tetrachloride			95.9		%		50-140	06-SEP-17
Chlorobenzene			92.3		%		50-140	06-SEP-17
Chloroform			94.9		%		50-140	06-SEP-17
cis-1,2-Dichloroethylene			91.2		%		50-140	06-SEP-17
cis-1,3-Dichloropropene			88.6		%		50-140	06-SEP-17
Dibromochloromethane			86.8		%		50-140	06-SEP-17
Dichlorodifluoromethane			78.1		%		50-140	06-SEP-17
Ethylbenzene			89.4		%		50-140	06-SEP-17
n-Hexane			107.2		%		50-140	06-SEP-17
m+p-Xylenes			92.4		%		50-140	06-SEP-17
Methyl Ethyl Ketone			86.5		%		50-140	06-SEP-17
Methyl Isobutyl Ketone			79.7		%		50-140	06-SEP-17
Methylene Chloride			93.5		%		50-140	06-SEP-17
MTBE			93.5		%		50-140	06-SEP-17
o-Xylene			88.2		%		50-140	06-SEP-17
Styrene			80.1		%		50-140	06-SEP-17
Tetrachloroethylene			94.9		%		50-140	06-SEP-17
Toluene			91.5		%		50-140	06-SEP-17
trans-1,2-Dichloroethylene			95.2		%		50-140	06-SEP-17
trans-1,3-Dichloropropene			87.0		%		50-140	06-SEP-17
Trichloroethylene			94.3		%		50-140	06-SEP-17
Trichlorofluoromethane			96.5		%		50-140	06-SEP-17
Vinyl chloride			85.9		%		50-140	06-SEP-17
Batch R3820370								
WG2603492-4 DUP		**WG2603492-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3820370								
WG2603492-4 DUP		**WG2603492-3**						
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	06-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	06-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
Trichlorofluoromethane		<5.0	<5.0		ug/L			06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3820370								
WG2603492-4 DUP		**WG2603492-3**						
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-SEP-17
WG2603492-1 LCS								
1,1,1,2-Tetrachloroethane			85.6		%		70-130	06-SEP-17
1,1,2,2-Tetrachloroethane			83.0		%		70-130	06-SEP-17
1,1,1-Trichloroethane			91.5		%		70-130	06-SEP-17
1,1,2-Trichloroethane			86.5		%		70-130	06-SEP-17
1,1-Dichloroethane			92.4		%		70-130	06-SEP-17
1,1-Dichloroethylene			87.0		%		70-130	06-SEP-17
1,2-Dibromoethane			86.4		%		70-130	06-SEP-17
1,2-Dichlorobenzene			88.5		%		70-130	06-SEP-17
1,2-Dichloroethane			92.7		%		70-130	06-SEP-17
1,2-Dichloropropane			91.8		%		70-130	06-SEP-17
1,3-Dichlorobenzene			89.0		%		70-130	06-SEP-17
1,4-Dichlorobenzene			92.4		%		70-130	06-SEP-17
Acetone			111.9		%		60-140	06-SEP-17
Benzene			93.8		%		70-130	06-SEP-17
Bromodichloromethane			87.0		%		70-130	06-SEP-17
Bromoform			81.8		%		70-130	06-SEP-17
Bromomethane			93.2		%		60-140	06-SEP-17
Carbon tetrachloride			91.7		%		70-130	06-SEP-17
Chlorobenzene			88.8		%		70-130	06-SEP-17
Chloroform			92.8		%		70-130	06-SEP-17
cis-1,2-Dichloroethylene			90.5		%		70-130	06-SEP-17
cis-1,3-Dichloropropene			84.2		%		70-130	06-SEP-17
Dibromochloromethane			91.0		%		70-130	06-SEP-17
Dichlorodifluoromethane			93.6		%		50-140	06-SEP-17
Ethylbenzene			90.1		%		70-130	06-SEP-17
n-Hexane			104.9		%		70-130	06-SEP-17
m+p-Xylenes			91.5		%		70-130	06-SEP-17
Methyl Ethyl Ketone			93.2		%		60-140	06-SEP-17
Methyl Isobutyl Ketone			89.0		%		60-140	06-SEP-17
Methylene Chloride			96.7		%		70-130	06-SEP-17
MTBE			90.0		%		70-130	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3820370								
WG2603492-1 LCS								
o-Xylene			90.9		%		70-130	06-SEP-17
Styrene			90.2		%		70-130	06-SEP-17
Tetrachloroethylene			86.9		%		70-130	06-SEP-17
Toluene			84.4		%		70-130	06-SEP-17
trans-1,2-Dichloroethylene			94.1		%		70-130	06-SEP-17
trans-1,3-Dichloropropene			87.9		%		70-130	06-SEP-17
Trichloroethylene			90.3		%		70-130	06-SEP-17
Trichlorofluoromethane			95.8		%		60-140	06-SEP-17
Vinyl chloride			92.8		%		60-140	06-SEP-17
WG2603492-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	06-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	06-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	06-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	06-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	06-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	06-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	06-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	06-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	06-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	06-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	06-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	06-SEP-17
Acetone			<30		ug/L		30	06-SEP-17
Benzene			<0.50		ug/L		0.5	06-SEP-17
Bromodichloromethane			<2.0		ug/L		2	06-SEP-17
Bromoform			<5.0		ug/L		5	06-SEP-17
Bromomethane			<0.50		ug/L		0.5	06-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	06-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	06-SEP-17
Chloroform			<1.0		ug/L		1	06-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	06-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	06-SEP-17
Dibromochloromethane			<2.0		ug/L		2	06-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3820370								
WG2603492-2 MB								
Ethylbenzene			<0.50		ug/L		0.5	06-SEP-17
n-Hexane			<0.50		ug/L		0.5	06-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	06-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	06-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	06-SEP-17
Methylene Chloride			<5.0		ug/L		5	06-SEP-17
MTBE			<2.0		ug/L		2	06-SEP-17
o-Xylene			<0.30		ug/L		0.3	06-SEP-17
Styrene			<0.50		ug/L		0.5	06-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	06-SEP-17
Toluene			<0.50		ug/L		0.5	06-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	06-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	06-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	06-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	06-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	06-SEP-17
Surrogate: 1,4-Difluorobenzene			99.6		%		70-130	06-SEP-17
Surrogate: 4-Bromofluorobenzene			94.9		%		70-130	06-SEP-17
WG2603492-5 MS		**WG2603492-3**						
1,1,1,2-Tetrachloroethane			89.3		%		50-140	06-SEP-17
1,1,2,2-Tetrachloroethane			98.4		%		50-140	06-SEP-17
1,1,1-Trichloroethane			92.7		%		50-140	06-SEP-17
1,1,2-Trichloroethane			95.6		%		50-140	06-SEP-17
1,1-Dichloroethane			97.8		%		50-140	06-SEP-17
1,1-Dichloroethylene			86.4		%		50-140	06-SEP-17
1,2-Dibromoethane			96.5		%		50-140	06-SEP-17
1,2-Dichlorobenzene			90.6		%		50-140	06-SEP-17
1,2-Dichloroethane			105.1		%		50-140	06-SEP-17
1,2-Dichloropropane			99.3		%		50-140	06-SEP-17
1,3-Dichlorobenzene			87.2		%		50-140	06-SEP-17
1,4-Dichlorobenzene			92.3		%		50-140	06-SEP-17
Acetone			121.1		%		50-140	06-SEP-17
Benzene			98.9		%		50-140	06-SEP-17
Bromodichloromethane			97.0		%		50-140	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3820370								
WG2603492-5 MS		**WG2603492-3**						
Bromoform			93.2		%		50-140	06-SEP-17
Bromomethane			99.4		%		50-140	06-SEP-17
Carbon tetrachloride			92.1		%		50-140	06-SEP-17
Chlorobenzene			91.7		%		50-140	06-SEP-17
Chloroform			99.8		%		50-140	06-SEP-17
cis-1,2-Dichloroethylene			96.4		%		50-140	06-SEP-17
cis-1,3-Dichloropropene			99.2		%		50-140	06-SEP-17
Dibromochloromethane			99.8		%		50-140	06-SEP-17
Dichlorodifluoromethane			77.2		%		50-140	06-SEP-17
Ethylbenzene			86.9		%		50-140	06-SEP-17
n-Hexane			99.4		%		50-140	06-SEP-17
m+p-Xylenes			90.1		%		50-140	06-SEP-17
Methyl Ethyl Ketone			108.6		%		50-140	06-SEP-17
Methyl Isobutyl Ketone			108.1		%		50-140	06-SEP-17
Methylene Chloride			106.0		%		50-140	06-SEP-17
MTBE			93.2		%		50-140	06-SEP-17
o-Xylene			89.8		%		50-140	06-SEP-17
Styrene			91.6		%		50-140	06-SEP-17
Tetrachloroethylene			83.6		%		50-140	06-SEP-17
Toluene			82.4		%		50-140	06-SEP-17
trans-1,2-Dichloroethylene			96.4		%		50-140	06-SEP-17
trans-1,3-Dichloropropene			101.2		%		50-140	06-SEP-17
Trichloroethylene			92.3		%		50-140	06-SEP-17
Trichlorofluoromethane			92.8		%		50-140	06-SEP-17
Vinyl chloride			87.5		%		50-140	06-SEP-17
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloropropane		1.24	1.24		ug/L	0.0	30	07-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	07-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
m+p-Xylenes		0.63	0.65		ug/L	3.1	30	07-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
o-Xylene		0.33	0.33		ug/L	0.0	30	07-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Toluene		1.17	1.22		ug/L	4.2	30	07-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichlorofluoromethane		<5.0	<5.0		ug/L			07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2594557-1 LCS								
1,1,1,2-Tetrachloroethane			89.5		%		70-130	07-SEP-17
1,1,2,2-Tetrachloroethane			100.5		%		70-130	07-SEP-17
1,1,1-Trichloroethane			88.9		%		70-130	07-SEP-17
1,1,2-Trichloroethane			97.6		%		70-130	07-SEP-17
1,1-Dichloroethane			96.6		%		70-130	07-SEP-17
1,1-Dichloroethylene			85.2		%		70-130	07-SEP-17
1,2-Dibromoethane			99.6		%		70-130	07-SEP-17
1,2-Dichlorobenzene			90.3		%		70-130	07-SEP-17
1,2-Dichloroethane			92.2		%		70-130	07-SEP-17
1,2-Dichloropropane			100.4		%		70-130	07-SEP-17
1,3-Dichlorobenzene			86.7		%		70-130	07-SEP-17
1,4-Dichlorobenzene			89.6		%		70-130	07-SEP-17
Acetone			114.0		%		60-140	07-SEP-17
Benzene			97.7		%		70-130	07-SEP-17
Bromodichloromethane			96.3		%		70-130	07-SEP-17
Bromoform			94.5		%		70-130	07-SEP-17
Bromomethane			102.6		%		60-140	07-SEP-17
Carbon tetrachloride			86.9		%		70-130	07-SEP-17
Chlorobenzene			91.1		%		70-130	07-SEP-17
Chloroform			95.8		%		70-130	07-SEP-17
cis-1,2-Dichloroethylene			94.9		%		70-130	07-SEP-17
cis-1,3-Dichloropropene			101.9		%		70-130	07-SEP-17
Dibromochloromethane			98.8		%		70-130	07-SEP-17
Dichlorodifluoromethane			86.0		%		50-140	07-SEP-17
Ethylbenzene			82.4		%		70-130	07-SEP-17
n-Hexane			103.2		%		70-130	07-SEP-17
m+p-Xylenes			85.6		%		70-130	07-SEP-17
Methyl Ethyl Ketone			102.2		%		60-140	07-SEP-17
Methyl Isobutyl Ketone			92.5		%		60-140	07-SEP-17
Methylene Chloride			95.3		%		70-130	07-SEP-17
MTBE			93.0		%		70-130	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-1 LCS								
o-Xylene			84.6		%		70-130	07-SEP-17
Styrene			84.8		%		70-130	07-SEP-17
Tetrachloroethylene			83.2		%		70-130	07-SEP-17
Toluene			86.3		%		70-130	07-SEP-17
trans-1,2-Dichloroethylene			94.9		%		70-130	07-SEP-17
trans-1,3-Dichloropropene			97.5		%		70-130	07-SEP-17
Trichloroethylene			91.0		%		70-130	07-SEP-17
Trichlorofluoromethane			89.6		%		60-140	07-SEP-17
Vinyl chloride			90.9		%		60-140	07-SEP-17
WG2594557-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	07-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	07-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Acetone			<30		ug/L		30	07-SEP-17
Benzene			<0.50		ug/L		0.5	07-SEP-17
Bromodichloromethane			<2.0		ug/L		2	07-SEP-17
Bromoform			<5.0		ug/L		5	07-SEP-17
Bromomethane			<0.50		ug/L		0.5	07-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	07-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Chloroform			<1.0		ug/L		1	07-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Dibromochloromethane			<2.0		ug/L		2	07-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-2 MB								
Ethylbenzene			<0.50		ug/L		0.5	07-SEP-17
n-Hexane			<0.50		ug/L		0.5	07-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	07-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	07-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	07-SEP-17
Methylene Chloride			<5.0		ug/L		5	07-SEP-17
MTBE			<2.0		ug/L		2	07-SEP-17
o-Xylene			<0.30		ug/L		0.3	07-SEP-17
Styrene			<0.50		ug/L		0.5	07-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	07-SEP-17
Toluene			<0.50		ug/L		0.5	07-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	07-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	07-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	07-SEP-17
Surrogate: 1,4-Difluorobenzene			100.3		%		70-130	07-SEP-17
Surrogate: 4-Bromofluorobenzene			91.3		%		70-130	07-SEP-17
WG2594557-5 MS		**WG2594557-3**						
1,1,1,2-Tetrachloroethane			89.2		%		50-140	07-SEP-17
1,1,2,2-Tetrachloroethane			82.8		%		50-140	07-SEP-17
1,1,1-Trichloroethane			93.7		%		50-140	07-SEP-17
1,1,2-Trichloroethane			87.5		%		50-140	07-SEP-17
1,1-Dichloroethane			96.4		%		50-140	07-SEP-17
1,1-Dichloroethylene			88.6		%		50-140	07-SEP-17
1,2-Dibromoethane			86.4		%		50-140	07-SEP-17
1,2-Dichlorobenzene			90.2		%		50-140	07-SEP-17
1,2-Dichloroethane			81.4		%		50-140	07-SEP-17
1,2-Dichloropropane			94.7		%		50-140	07-SEP-17
1,3-Dichlorobenzene			90.9		%		50-140	07-SEP-17
1,4-Dichlorobenzene			92.6		%		50-140	07-SEP-17
Acetone			88.9		%		50-140	07-SEP-17
Benzene			96.5		%		50-140	07-SEP-17
Bromodichloromethane			91.2		%		50-140	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-5 MS		**WG2594557-3**						
Bromoform			81.6		%		50-140	07-SEP-17
Bromomethane			97.6		%		50-140	07-SEP-17
Carbon tetrachloride			93.2		%		50-140	07-SEP-17
Chlorobenzene			90.8		%		50-140	07-SEP-17
Chloroform			94.7		%		50-140	07-SEP-17
cis-1,2-Dichloroethylene			92.5		%		50-140	07-SEP-17
cis-1,3-Dichloropropene			88.4		%		50-140	07-SEP-17
Dibromochloromethane			91.4		%		50-140	07-SEP-17
Dichlorodifluoromethane			86.6		%		50-140	07-SEP-17
Ethylbenzene			85.7		%		50-140	07-SEP-17
n-Hexane			108.0		%		50-140	07-SEP-17
m+p-Xylenes			89.2		%		50-140	07-SEP-17
Methyl Ethyl Ketone			72.7		%		50-140	07-SEP-17
Methyl Isobutyl Ketone			67.0		%		50-140	07-SEP-17
Methylene Chloride			89.5		%		50-140	07-SEP-17
MTBE			93.0		%		50-140	07-SEP-17
o-Xylene			85.3		%		50-140	07-SEP-17
Styrene			79.7		%		50-140	07-SEP-17
Tetrachloroethylene			89.4		%		50-140	07-SEP-17
Toluene			88.7		%		50-140	07-SEP-17
trans-1,2-Dichloroethylene			95.1		%		50-140	07-SEP-17
trans-1,3-Dichloropropene			83.1		%		50-140	07-SEP-17
Trichloroethylene			93.4		%		50-140	07-SEP-17
Trichlorofluoromethane			94.9		%		50-140	07-SEP-17
Vinyl chloride			92.0		%		50-140	07-SEP-17

Quality Control Report

Workorder: L1985429 Report Date: 12-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

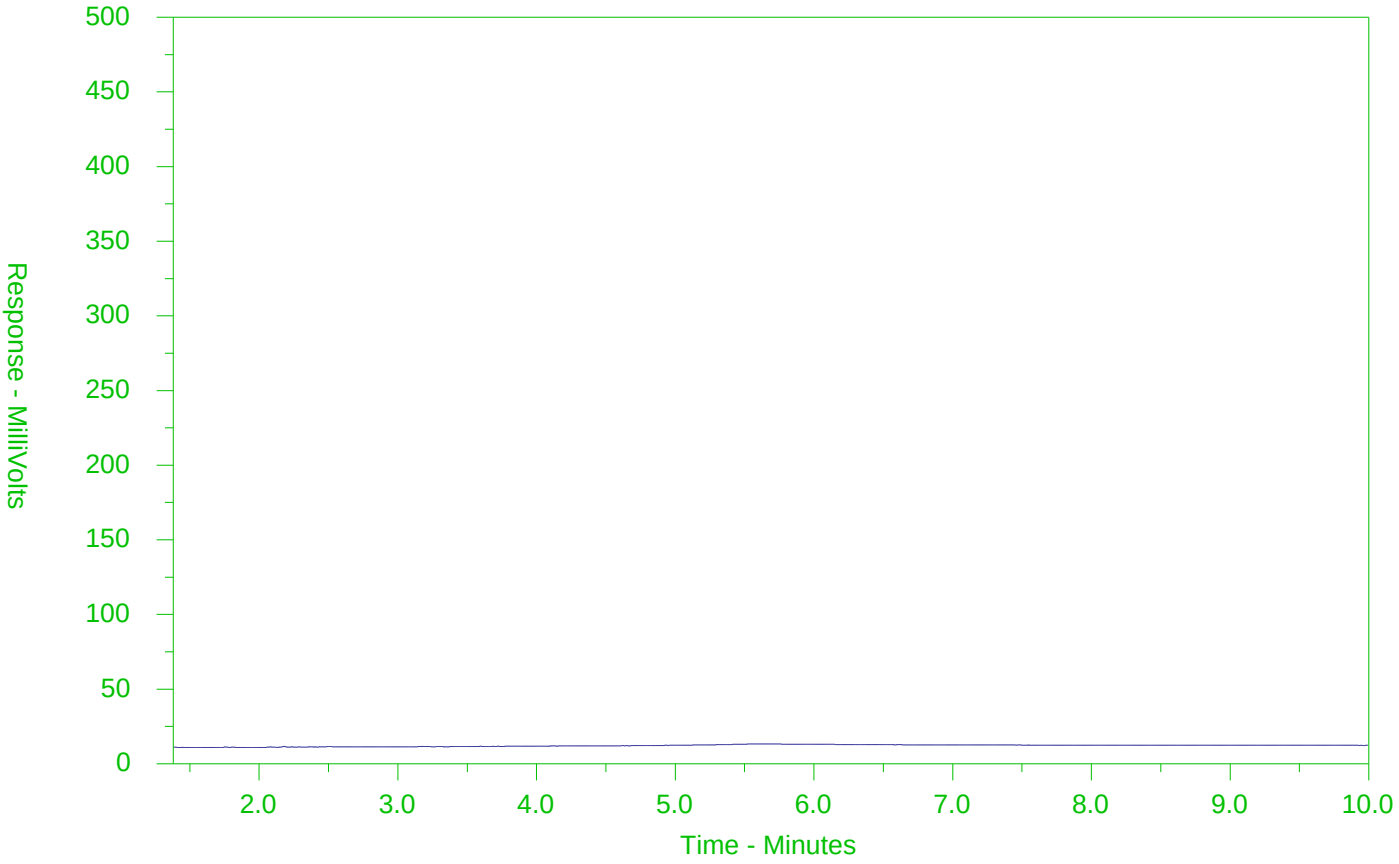
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-1
Client Sample ID: OW26S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

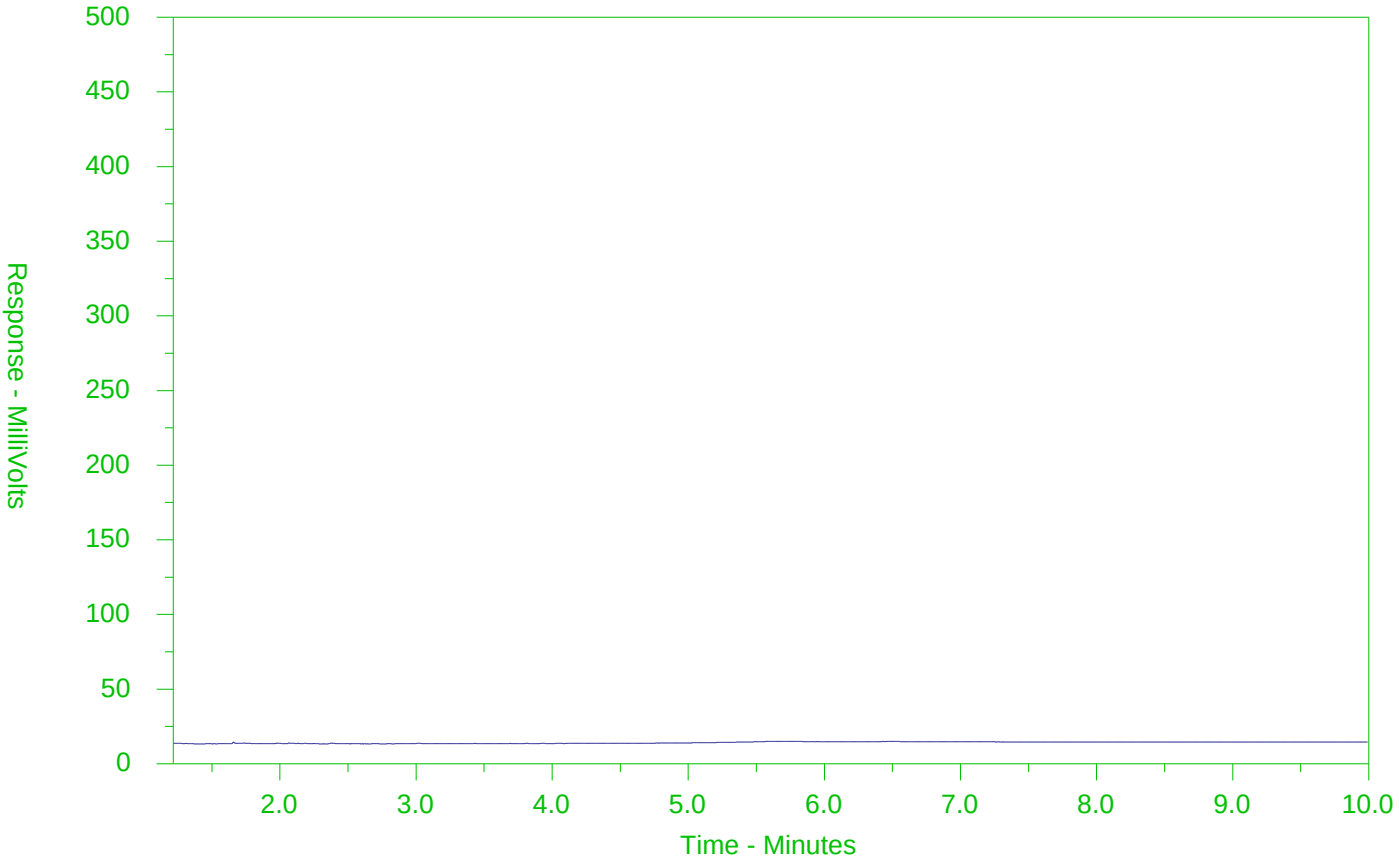
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-2
Client Sample ID: OW26D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

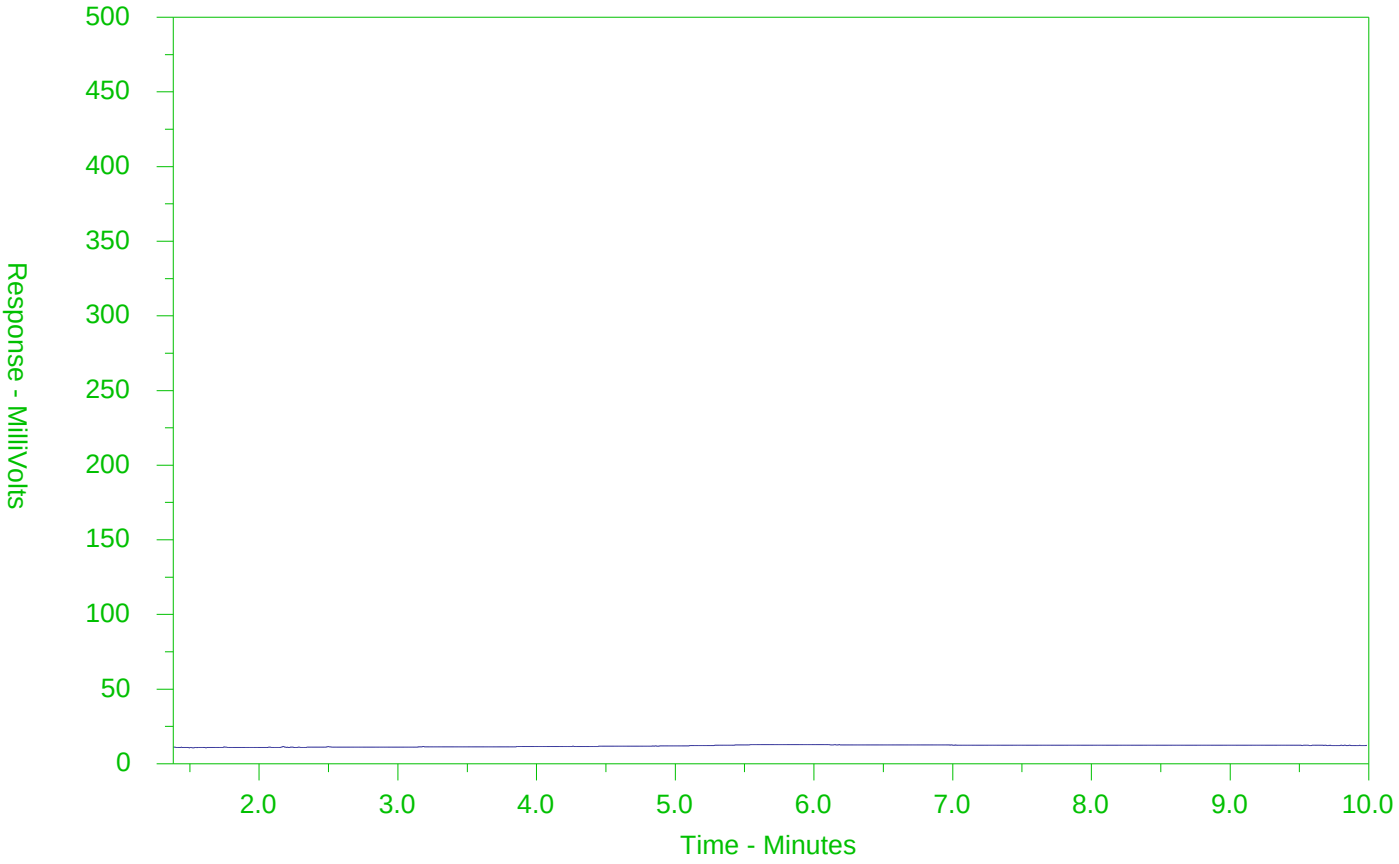
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-3
Client Sample ID: OW07-34D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

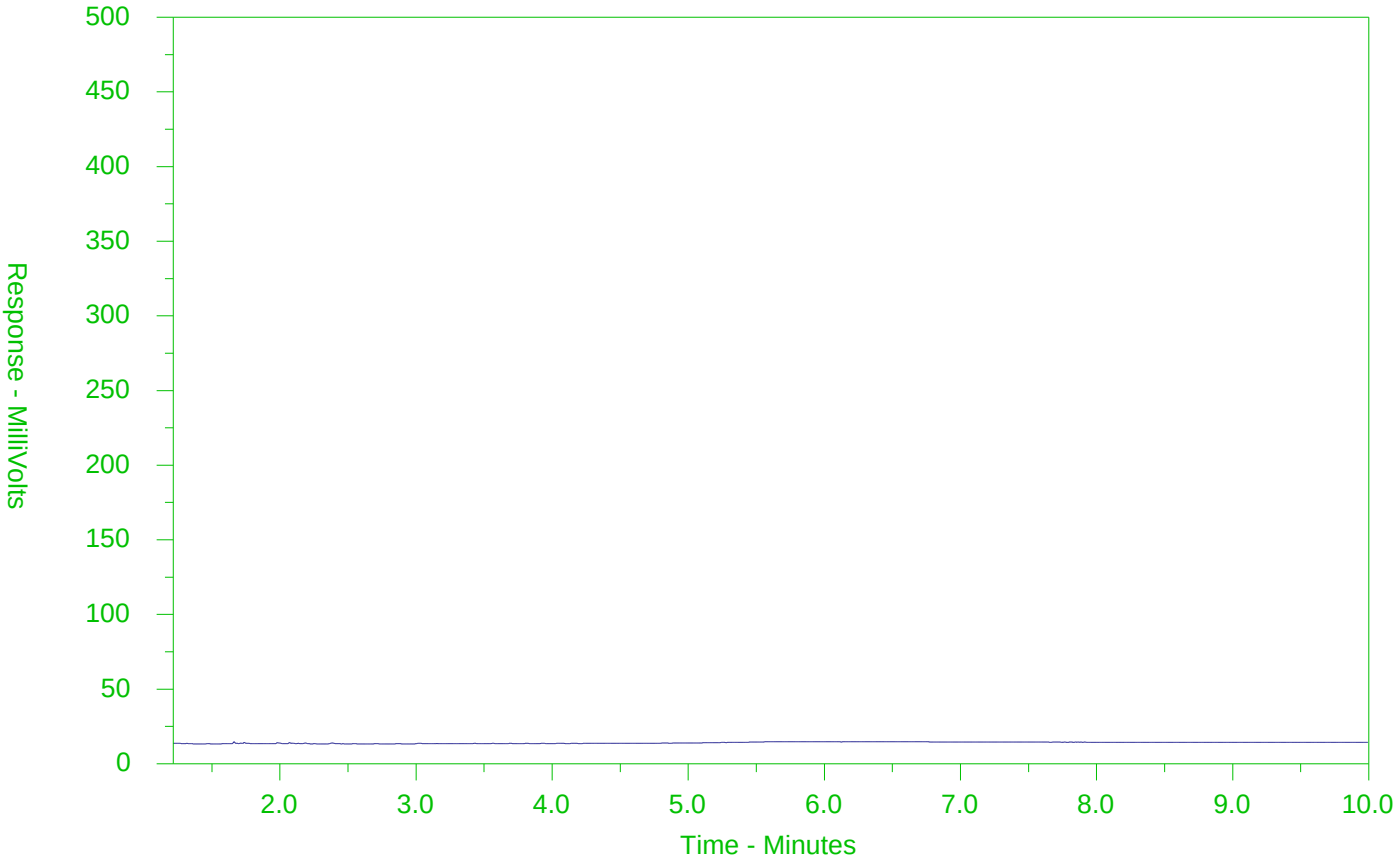
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-4
Client Sample ID: OW07-34S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

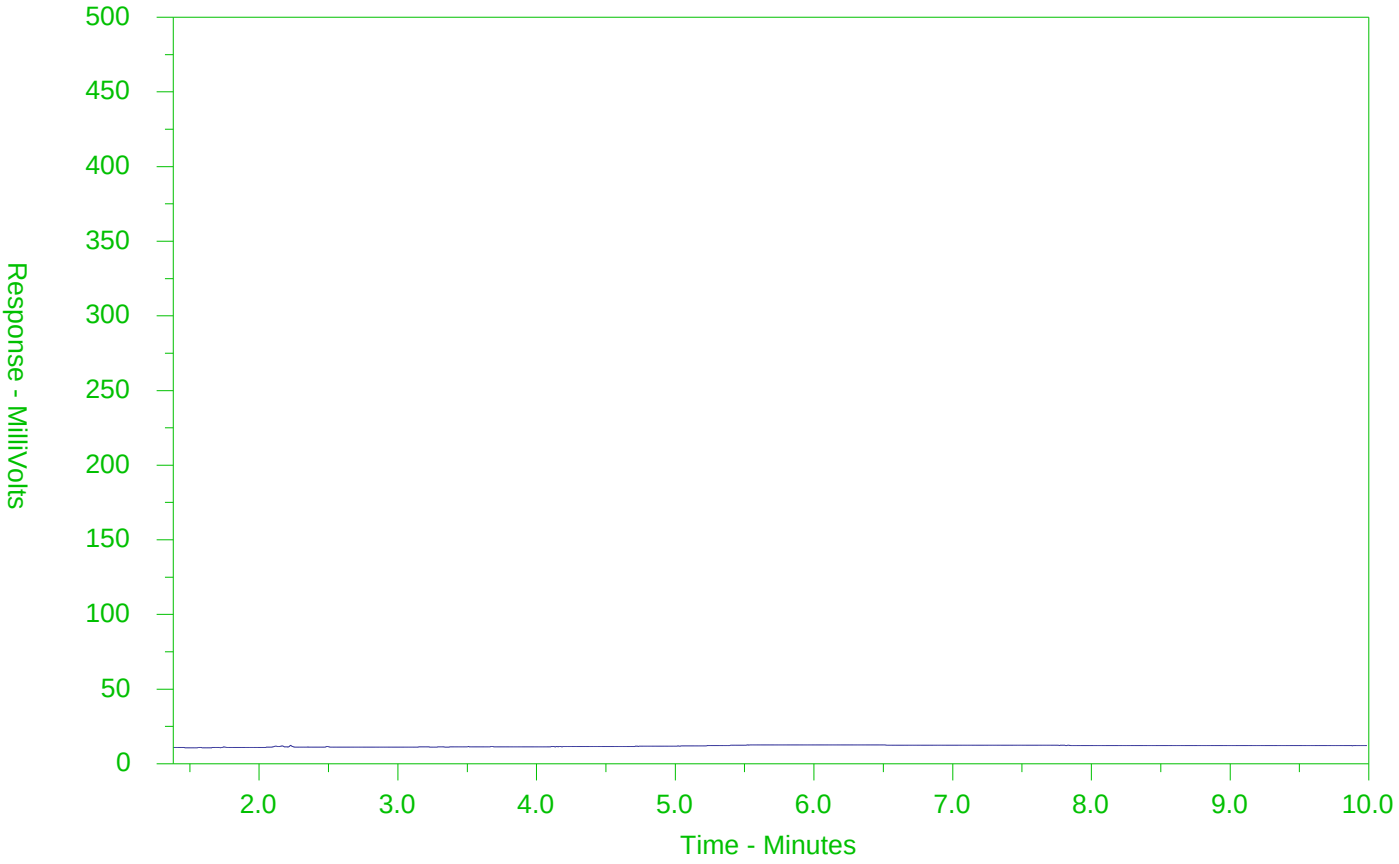
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-5
Client Sample ID: OW25



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

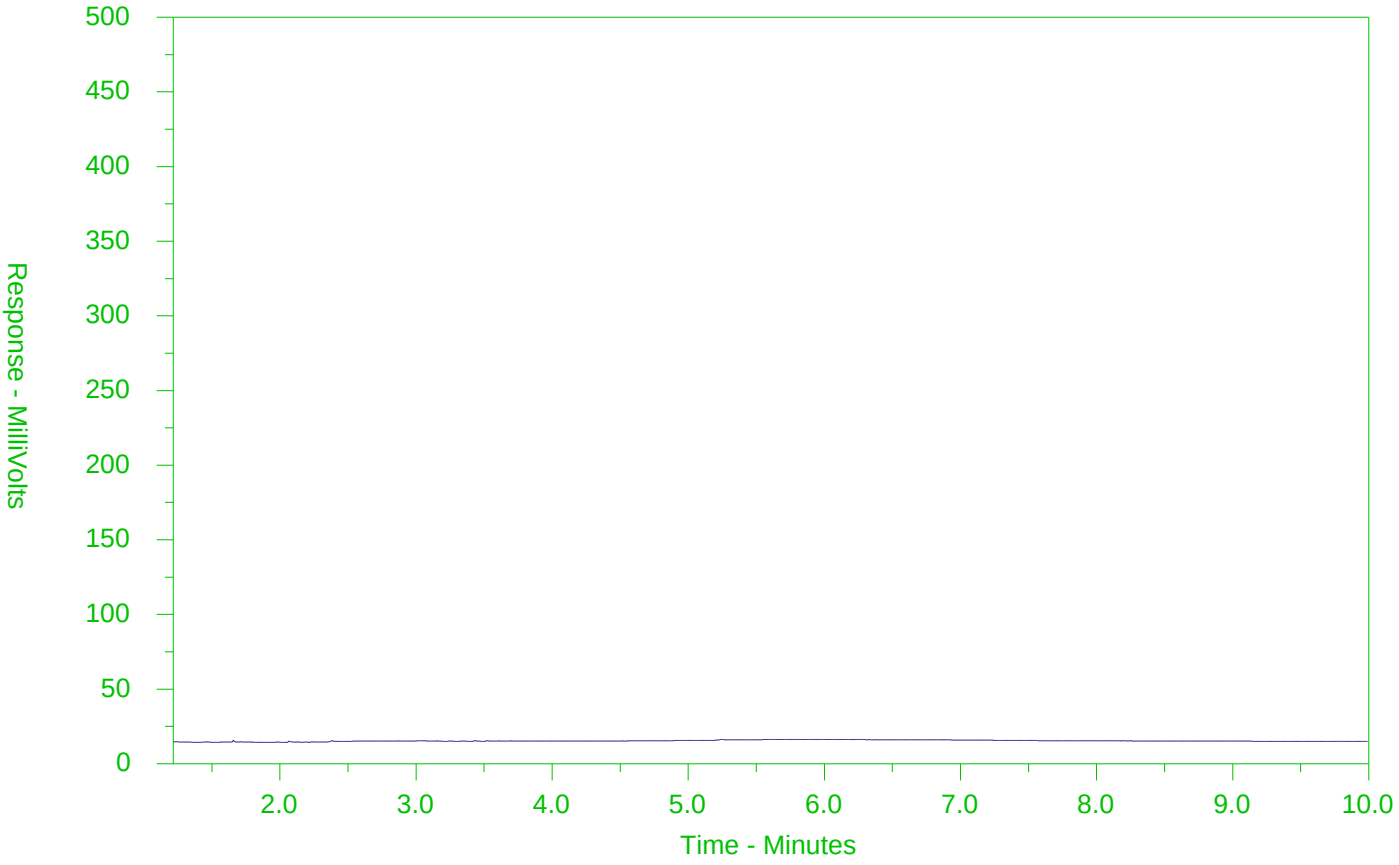
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-6
Client Sample ID: OW07-33



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

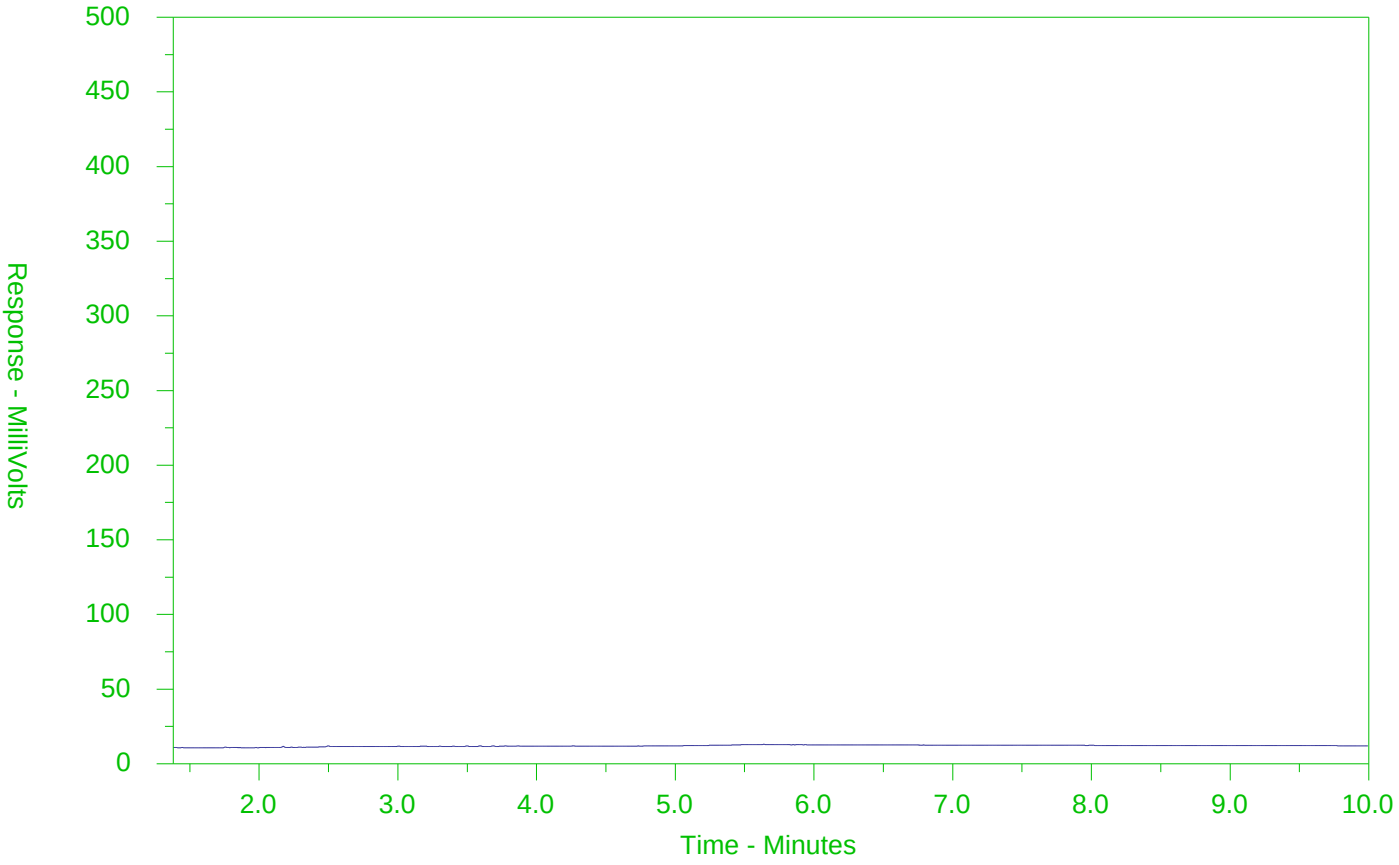
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-7
Client Sample ID: DUP1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

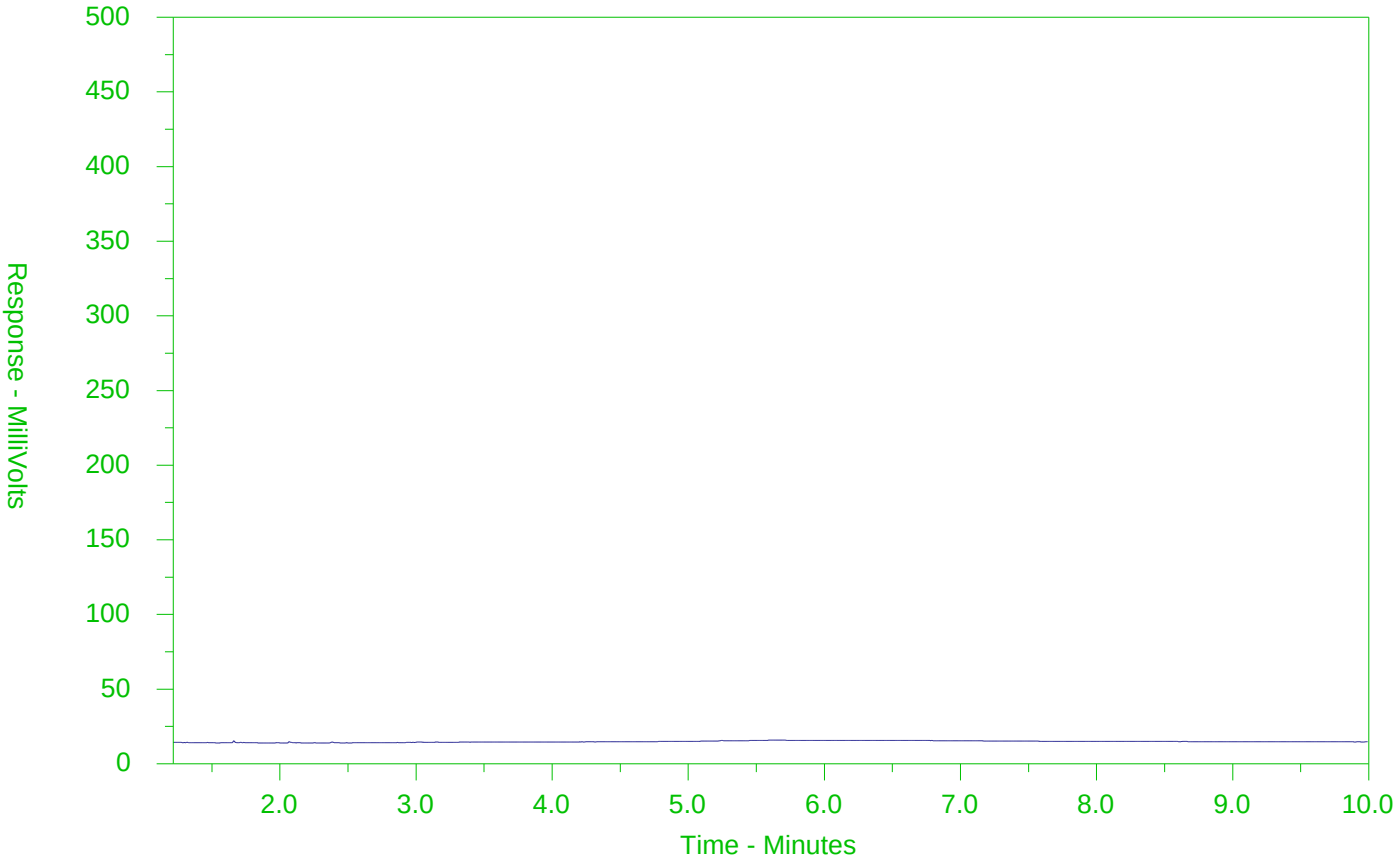
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-8
Client Sample ID: OW11-I



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

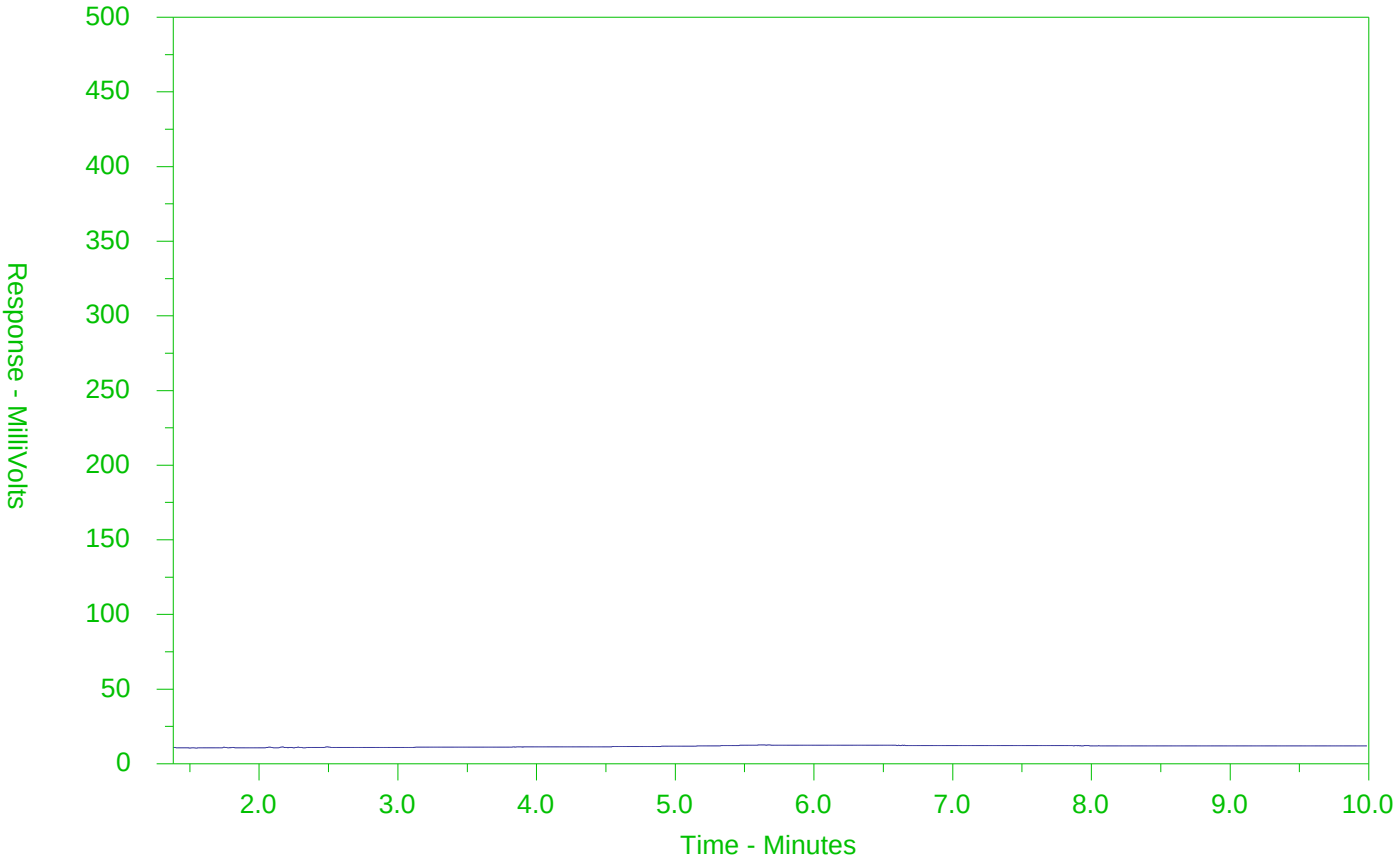
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-9
Client Sample ID: DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

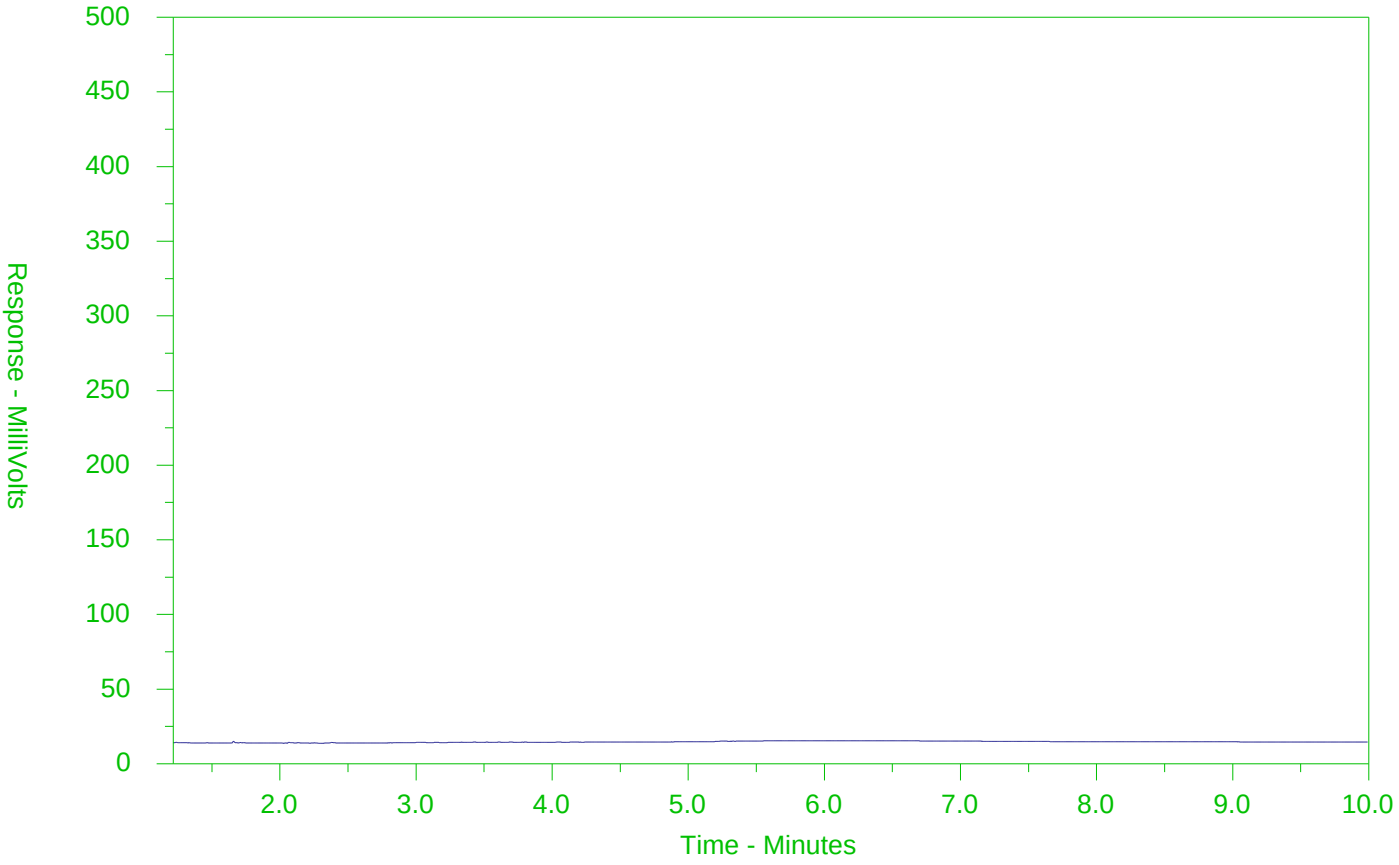
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-10
Client Sample ID: OW11-II



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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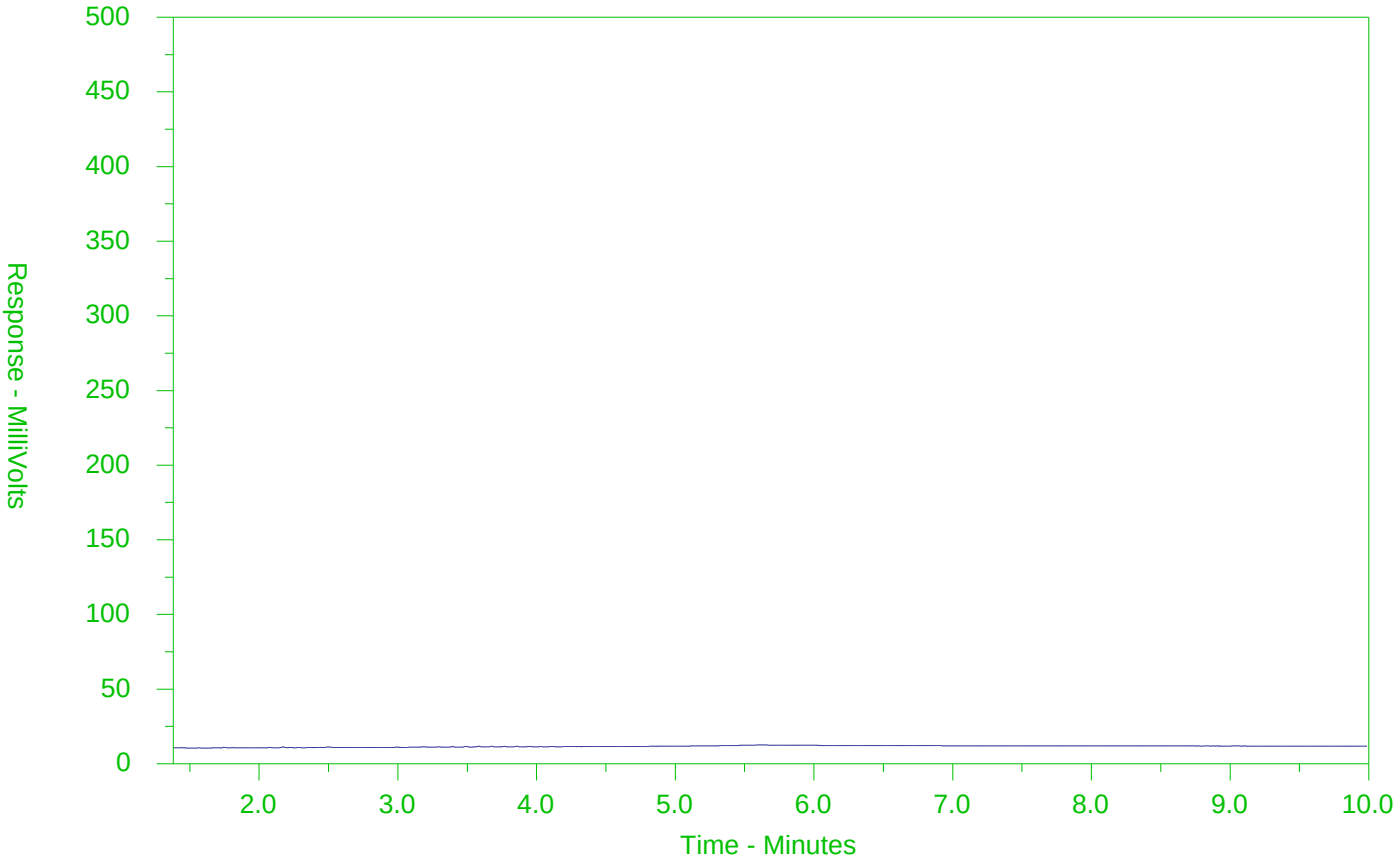
Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1985429-11
Client Sample ID: DUP3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

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The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

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Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1985429-COFC

COC Number: 15 -

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill Kitchener	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	300-72 Victoria St. South	Email 1 or Fax: Michael.Shiry@ch2m.com	Date and Time Required for all E&P TATs: 5E dd-mmm-yy hh:mm
City/Province:	Kitchener, ON	Email 2: Peter.Mamo@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M Hill Kitchener	Email 1 or Fax:	F
Contact:	Accounts Payable	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62158	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L1985429 RW	ALS Contact: Mathy	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4	1,4 Dioxane	PCB	VOC,F1 (Trip Blank)	Number of Containers
1	OW26S	31-Aug-17	15:30	Water	✓			✓	✓	✓	✓		15
2	OW26D	31-Aug-17	16:38		✓			✓	✓	✓			13
3	OW07-34D	01-Sep-17	09:00		✓			✓	✓	✓			13
4	OW07-34S	01-Sep-17	10:07		✓		✓	✓	✓		✓		14
5	OW25	01-Sep-17	11:03		✓		✓	✓	✓		✓		14
6	OW07-33	01-Sep-17	12:13		✓	✓		✓	✓	✓	✓		18
7	Dup 1	—	—		✓	✓		✓	✓	✓	✓		18
8	OW11-1	01-Sep-17	13:55		✓		✓	✓	✓				12
9	Dup 2	—	—		✓		✓	✓	✓				12
10	OW11-11	01-Sep-17	16:00		✓		✓	✓	✓				12
11	Dup 3	—	—		✓		✓	✓	✓				12
12	Trip Blank 2	01-Sep-17	—	Water								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.3	6.3	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Mamo	Date: 01/09/17	Time: 1750	Received by:	Date:	Time:	Received by: DA	Date: 01/09/17 Time: 17:55

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

[1] If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1985429-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill Kitchener	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	300-72 Victoria St. South	Email 1 or Fax: Michael.Shiry@ch2m.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Kitchener, ON	Email 2: Peter.Mamo@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M Hill Kitchener	Email 1 or Fax:	
Contact:	Accounts Payable	Email 2:	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62158	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L1985429 RW	ALS Contact: Mathy	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4	1,4 Dioxane	PCB	VOC,F1 (Trip Blank)	Number of Containers
13	Trip Blank 3	01-Sep-17	—	Water								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.3	6.3	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: RW	Date: 01/09/17	Time: 17:55
Peter Mamo	01/09/2017	1750						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1 If any water samples are taken from a Regulated Drinking Water (DW) System please submit using an Authorized DW COC form.

DA

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 05-SEP-17
Report Date: 15-SEP-17 06:54 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1986110

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-1 OW12 Sampled By: CLIENT on 05-SEP-17 @ 09:30 Matrix: WATER							
Physical Tests							
Conductivity	0.589		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.51		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	1.84		0.50	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231
Antimony (Sb)-Dissolved	0.37		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.20		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	44.4		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	74		10	ug/L	06-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	1.33		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	3.29		0.20	ug/L	06-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	0.650		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.85		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.802		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	2990		500	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.120		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.39		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	367		1.0	ug/L	06-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-1 OW12 Sampled By: CLIENT on 05-SEP-17 @ 09:30 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	2.26		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.95	DLQ	0.95	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
1,4-Dioxane	<20		20	ug/L		07-SEP-17	R3821109
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	11.7		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	91.0		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	99.1		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-1 OW12 Sampled By: CLIENT on 05-SEP-17 @ 09:30 Matrix: WATER							
Hydrocarbons							
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	104.3		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	84.7		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	94.1		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	94.9		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	94.5		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	103.4		60-140	%	06-SEP-17	08-SEP-17	R3821704
L1986110-2 OW16 Sampled By: CLIENT on 05-SEP-17 @ 11:15 Matrix: WATER							
Physical Tests							
Conductivity	0.532		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.42		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	3.27		0.50	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-2 OW16 Sampled By: CLIENT on 05-SEP-17 @ 11:15 Matrix: WATER							
Dissolved Metals							
Antimony (Sb)-Dissolved	0.20		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	0.58		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	31.8		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	63		10	ug/L	06-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.969		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.93		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	8.00		0.20	ug/L	06-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	3.25		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	1.70		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	6.70		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.079		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	2860		500	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.157		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	0.826		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	349		1.0	ug/L	06-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-2 OW16 Sampled By: CLIENT on 05-SEP-17 @ 11:15 Matrix: WATER							
Volatile Organic Compounds							
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	90.2		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	99.1		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	109.1		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	87.0		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-2 OW16 Sampled By: CLIENT on 05-SEP-17 @ 11:15 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	91.4		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	93.5		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	91.5		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	102.9		60-140	%	06-SEP-17	08-SEP-17	R3821704
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	73.9		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1986110-3 OW15 Sampled By: CLIENT on 05-SEP-17 @ 11:45 Matrix: WATER							
Physical Tests							
Conductivity	0.571		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.38		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	14.8		0.50	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	2.01		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-3 OW15 Sampled By: CLIENT on 05-SEP-17 @ 11:45 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	44.7		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	76		10	ug/L	06-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.016		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.16		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	06-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	0.275		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	1.56		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.92		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.076		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	9730		500	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.015		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	0.452		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	87.5		1.0	ug/L	06-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-3 OW15 Sampled By: CLIENT on 05-SEP-17 @ 11:45 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	89.3		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	106.0		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	77.0		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-3 OW15 Sampled By: CLIENT on 05-SEP-17 @ 11:45 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	94.7		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	97.1		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	94.9		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	106.4		60-140	%	06-SEP-17	08-SEP-17	R3821704
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1248	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1254	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Aroclor 1260	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824408
Total PCBs	<0.040		0.040	ug/L	11-SEP-17	12-SEP-17	R3824408
Surrogate: 2-fluorobiphenyl	74.1		50-150	%	11-SEP-17	12-SEP-17	R3824408
L1986110-4 OW07-31 Sampled By: CLIENT on 05-SEP-17 @ 13:52 Matrix: WATER							
Physical Tests							
Conductivity	1.53		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.42		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	327	DLHC	2.5	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	07-SEP-17	R3821118
Arsenic (As)-Dissolved	45.7		0.10	ug/L	06-SEP-17	07-SEP-17	R3821118
Barium (Ba)-Dissolved	72.8		0.10	ug/L	06-SEP-17	07-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	07-SEP-17	R3821118

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-4 OW07-31 Sampled By: CLIENT on 05-SEP-17 @ 13:52 Matrix: WATER							
Dissolved Metals							
Boron (B)-Dissolved	53		10	ug/L	06-SEP-17	07-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.017		0.010	ug/L	06-SEP-17	07-SEP-17	R3821118
Chromium (Cr)-Dissolved	0.53		0.50	ug/L	06-SEP-17	07-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.38		0.10	ug/L	06-SEP-17	07-SEP-17	R3821118
Copper (Cu)-Dissolved	0.24		0.20	ug/L	06-SEP-17	07-SEP-17	R3821118
Lead (Pb)-Dissolved	0.244		0.050	ug/L	06-SEP-17	07-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	1.78		0.050	ug/L	06-SEP-17	07-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.39		0.50	ug/L	06-SEP-17	07-SEP-17	R3821118
Selenium (Se)-Dissolved	0.260		0.050	ug/L	06-SEP-17	07-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	07-SEP-17	R3821118
Sodium (Na)-Dissolved	165000	DLHC	5000	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.014		0.010	ug/L	06-SEP-17	07-SEP-17	R3821118
Uranium (U)-Dissolved	1.23		0.010	ug/L	06-SEP-17	07-SEP-17	R3821118
Vanadium (V)-Dissolved	1.66		0.50	ug/L	06-SEP-17	07-SEP-17	R3821118
Zinc (Zn)-Dissolved	47.0		1.0	ug/L	06-SEP-17	07-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-4 OW07-31 Sampled By: CLIENT on 05-SEP-17 @ 13:52 Matrix: WATER							
Volatile Organic Compounds							
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	89.9		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	98.8		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	108.4		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	76.9		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-4 OW07-31 Sampled By: CLIENT on 05-SEP-17 @ 13:52 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	92.2		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	97.8		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	92.5		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	103.3		60-140	%	06-SEP-17	08-SEP-17	R3821704
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
4-Chloroaniline	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2-Chlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dichlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
Diethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Dimethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dimethylphenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrophenol	<1.0		1.0	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,6-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		12-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	08-SEP-17	12-SEP-17	R3823758
Pentachlorophenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenanthrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Pyrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2-Fluorobiphenyl	99.3		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Nitrobenzene d5	99.9		50-140	%	08-SEP-17	12-SEP-17	R3823758

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-4 OW07-31 Sampled By: CLIENT on 05-SEP-17 @ 13:52 Matrix: WATER							
Semi-Volatile Organics							
Surrogate: Phenol d5	49.6		30-130	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: p-Terphenyl d14	86.6		60-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2,4,6-Tribromophenol	123.9		50-140	%	08-SEP-17	12-SEP-17	R3823758
L1986110-5 OW02 Sampled By: CLIENT on 05-SEP-17 @ 15:02 Matrix: WATER							
Physical Tests							
Conductivity	0.724		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.28		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	7.51		0.50	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231
Antimony (Sb)-Dissolved	0.34		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	1.00		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	45.5		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	82		10	ug/L	06-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.012		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	0.82		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Copper (Cu)-Dissolved	0.85		0.20	ug/L	06-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	1.86		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	7.14		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.110		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	6050		500	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.084		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	2.50		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	154		1.0	ug/L	06-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-5 OW02 Sampled By: CLIENT on 05-SEP-17 @ 15:02 Matrix: WATER							
Volatile Organic Compounds							
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	89.7		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	99.3		70-130	%		07-SEP-17	R3821109

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-5 OW02 Sampled By: CLIENT on 05-SEP-17 @ 15:02 Matrix: WATER							
Volatile Organic Compounds **Hydrocarbons**							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	103.3		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	72.3		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.050		0.050	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	89.7		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	98.3		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	90.7		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	100.8		60-140	%	06-SEP-17	08-SEP-17	R3821704
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
4-Chloroaniline	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2-Chlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-5 OW02 Sampled By: CLIENT on 05-SEP-17 @ 15:02 Matrix: WATER							
Semi-Volatile Organics							
2,4-Dichlorophenol	<0.30		0.30	ug/L	08-SEP-17	12-SEP-17	R3823758
Diethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Dimethylphthalate	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dimethylphenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrophenol	<1.0		1.0	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,6-Dinitrotoluene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		12-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	08-SEP-17	12-SEP-17	R3823758
Pentachlorophenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenanthrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Phenol	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3823758
Pyrene	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2-Fluorobiphenyl	98.3		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Nitrobenzene d5	98.8		50-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: Phenol d5	52.2		30-130	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: p-Terphenyl d14	86.7		60-140	%	08-SEP-17	12-SEP-17	R3823758
Surrogate: 2,4,6-Tribromophenol	126.4		50-140	%	08-SEP-17	12-SEP-17	R3823758
L1986110-6 OW17 Sampled By: CLIENT on 05-SEP-17 @ 16:02 Matrix: WATER							
Physical Tests							
Conductivity	0.830		0.0030	mS/cm		06-SEP-17	R3820599
pH	7.49		0.10	pH units		06-SEP-17	R3820599
Anions and Nutrients							
Chloride (Cl)	2.55		0.50	mg/L		08-SEP-17	R3823730
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		12-SEP-17	R3827207
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					06-SEP-17	R3820347
Dissolved Metals Filtration Location	FIELD					06-SEP-17	R3820231
Antimony (Sb)-Dissolved	0.23		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Arsenic (As)-Dissolved	3.92		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Barium (Ba)-Dissolved	56.2		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118
Boron (B)-Dissolved	90		10	ug/L	06-SEP-17	06-SEP-17	R3821118
Cadmium (Cd)-Dissolved	0.013		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Cobalt (Co)-Dissolved	1.12		0.10	ug/L	06-SEP-17	06-SEP-17	R3821118

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-6 OW17 Sampled By: CLIENT on 05-SEP-17 @ 16:02 Matrix: WATER							
Dissolved Metals							
Copper (Cu)-Dissolved	0.99		0.20	ug/L	06-SEP-17	06-SEP-17	R3821118
Lead (Pb)-Dissolved	0.083		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-SEP-17	06-SEP-17	R3820537
Molybdenum (Mo)-Dissolved	1.34		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Nickel (Ni)-Dissolved	1.81		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Selenium (Se)-Dissolved	0.188		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	06-SEP-17	06-SEP-17	R3821118
Sodium (Na)-Dissolved	5090		500	ug/L	06-SEP-17	06-SEP-17	R3821118
Thallium (Tl)-Dissolved	0.023		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Uranium (U)-Dissolved	1.00		0.010	ug/L	06-SEP-17	06-SEP-17	R3821118
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	06-SEP-17	06-SEP-17	R3821118
Zinc (Zn)-Dissolved	94.1		1.0	ug/L	06-SEP-17	06-SEP-17	R3821118
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		07-SEP-17	R3821991
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821109
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821109
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821109
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821109
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821109
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821109
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821109
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821109
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821109
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821109
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821109

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-6 OW17 Sampled By: CLIENT on 05-SEP-17 @ 16:02 Matrix: WATER							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821109
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821109
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821109
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821109
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821109
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821109
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821109
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	88.4		70-130	%		07-SEP-17	R3821109
Surrogate: 1,4-Difluorobenzene	98.7		70-130	%		07-SEP-17	R3821109
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821109
F1-BTEX	<25		25	ug/L		08-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	105.0		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	67.9		60-140	%		07-SEP-17	R3821109
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.062		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Acenaphthylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(a)pyrene	<0.010		0.010	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(b)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Benzo(k)fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Chrysene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Fluoranthene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-6 OW17 Sampled By: CLIENT on 05-SEP-17 @ 16:02 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Fluorene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		08-SEP-17	
1-Methylnaphthalene	0.025		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
2-Methylnaphthalene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Naphthalene	<0.060	DLQ	0.060	ug/L	06-SEP-17	08-SEP-17	R3821704
Phenanthrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Pyrene	<0.020		0.020	ug/L	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Acenaphthene	87.8		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d12-Chrysene	89.9		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d8-Naphthalene	86.7		60-140	%	06-SEP-17	08-SEP-17	R3821704
Surrogate: d10-Phenanthrene	101.0		60-140	%	06-SEP-17	08-SEP-17	R3821704
L1986110-7 TRIP BLANK 4 Sampled By: CLIENT on 05-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		07-SEP-17	R3821238
Benzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Bromodichloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821238
Bromoform	<5.0		5.0	ug/L		07-SEP-17	R3821238
Bromomethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
Carbon tetrachloride	<0.20		0.20	ug/L		07-SEP-17	R3821238
Chlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Dibromochloromethane	<2.0		2.0	ug/L		07-SEP-17	R3821238
Chloroform	<1.0		1.0	ug/L		07-SEP-17	R3821238
1,2-Dibromoethane	<0.20		0.20	ug/L		07-SEP-17	R3821238
1,2-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,3-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,4-Dichlorobenzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Dichlorodifluoromethane	<2.0		2.0	ug/L		07-SEP-17	R3821238
1,1-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,2-Dichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,1-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821238
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821238
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Methylene Chloride	<5.0		5.0	ug/L		07-SEP-17	R3821238
1,2-Dichloropropane	<0.50		0.50	ug/L		07-SEP-17	R3821238
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821238
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		07-SEP-17	R3821238
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		07-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		07-SEP-17	R3821238
n-Hexane	<0.50		0.50	ug/L		07-SEP-17	R3821238

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1986110-7 TRIP BLANK 4 Sampled By: CLIENT on 05-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<20		20	ug/L		07-SEP-17	R3821238
Methyl Isobutyl Ketone	<20		20	ug/L		07-SEP-17	R3821238
MTBE	<2.0		2.0	ug/L		07-SEP-17	R3821238
Styrene	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
Tetrachloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Toluene	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,1,1-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
1,1,2-Trichloroethane	<0.50		0.50	ug/L		07-SEP-17	R3821238
Trichloroethylene	<0.50		0.50	ug/L		07-SEP-17	R3821238
Trichlorofluoromethane	<5.0		5.0	ug/L		07-SEP-17	R3821238
Vinyl chloride	<0.50		0.50	ug/L		07-SEP-17	R3821238
o-Xylene	<0.30		0.30	ug/L		07-SEP-17	R3821238
m+p-Xylenes	<0.40		0.40	ug/L		07-SEP-17	R3821238
Xylenes (Total)	<0.50		0.50	ug/L		07-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.9		70-130	%		07-SEP-17	R3821238
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		07-SEP-17	R3821238
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		07-SEP-17	R3821238
F1-BTEX	<25		25	ug/L		07-SEP-17	
Surrogate: 3,4-Dichlorotoluene	126.2		60-140	%		07-SEP-17	R3821238

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Pentachlorophenol	LCS-H	L1986110-4, -5
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1986110-1, -2, -3, -4, -5, -6
Matrix Spike	Boron (B)-Dissolved	MS-B	L1986110-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1986110-1, -2, -3, -4, -5, -6
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1986110-1, -2, -3, -4, -5, -6

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH

Reference Information

represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT Water F2-F4 (O.Reg.153/04) MOE DECPH-E3398/CCME TIER 1

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT Water pH APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT Water Sum of Xylene Isomer Concentrations CALCULATION

Reference Information

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1986110 Report Date: 15-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2594557-1 LCS								
1,4-Dioxane			102.5		%		60-140	07-SEP-17
WG2594557-2 MB								
1,4-Dioxane			<20		ug/L		20	07-SEP-17
WG2594557-5 MS		**WG2594557-3**						
1,4-Dioxane			98.2		%		50-140	07-SEP-17
625-511-WT	**Water**							
Batch R3823758								
WG2611207-2 LCS								
1,2,4-Trichlorobenzene			81.9		%		50-140	11-SEP-17
2-Chlorophenol			84.8		%		50-140	11-SEP-17
2,4-Dichlorophenol			97.8		%		50-140	11-SEP-17
2,4-Dimethylphenol			95.1		%		30-130	11-SEP-17
2,4-Dinitrophenol			138.2		%		50-140	11-SEP-17
2,4-Dinitrotoluene			105.3		%		50-140	11-SEP-17
2,4,5-Trichlorophenol			109.6		%		50-140	11-SEP-17
2,4,6-Trichlorophenol			103.4		%		50-140	11-SEP-17
2,6-Dinitrotoluene			97.5		%		50-140	11-SEP-17
3,3'-Dichlorobenzidine			81.4		%		30-130	11-SEP-17
4-Chloroaniline			49.1		%		30-130	11-SEP-17
Biphenyl			91.9		%		50-140	11-SEP-17
Bis(2-chloroethyl)ether			90.0		%		50-140	11-SEP-17
Bis(2-chloroisopropyl)ether			88.9		%		50-140	11-SEP-17
Bis(2-ethylhexyl)phthalate			73.1		%		50-140	11-SEP-17
Diethylphthalate			86.5		%		50-140	11-SEP-17
Dimethylphthalate			84.8		%		50-140	11-SEP-17
Pentachlorophenol			140.1	LCS-H	%		50-140	11-SEP-17
Phenanthrene			94.4		%		50-140	11-SEP-17
Phenol			48.7		%		30-130	11-SEP-17
Pyrene			77.1		%		50-140	11-SEP-17
WG2611207-3 LCSD		**WG2611207-2**						
1,2,4-Trichlorobenzene		81.9	83.6		%	2.0	50	11-SEP-17
2-Chlorophenol		84.8	91.2		%	7.3	50	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3823758								
WG2611207-3 LCSD		**WG2611207-2**						
2,4-Dichlorophenol		97.8	103.9		%	6.0	50	11-SEP-17
2,4-Dimethylphenol		95.1	112.5		%	17	50	11-SEP-17
2,4-Dinitrophenol		138.2	130.5		%	5.7	50	11-SEP-17
2,4-Dinitrotoluene		105.3	109.1		%	3.5	50	11-SEP-17
2,4,5-Trichlorophenol		109.6	117.8		%	7.2	50	11-SEP-17
2,4,6-Trichlorophenol		103.4	109.4		%	5.6	50	11-SEP-17
2,6-Dinitrotoluene		97.5	104.3		%	6.7	50	11-SEP-17
3,3'-Dichlorobenzidine		81.4	76.1		%	6.8	50	11-SEP-17
4-Chloroaniline		49.1	72.5		%	38	50	11-SEP-17
Biphenyl		91.9	95.2		%	3.5	50	11-SEP-17
Bis(2-chloroethyl)ether		90.0	93.2		%	3.5	50	11-SEP-17
Bis(2-chloroisopropyl)ether		88.9	90.8		%	2.2	50	11-SEP-17
Bis(2-ethylhexyl)phthalate		73.1	78.5		%	7.2	50	11-SEP-17
Diethylphthalate		86.5	91.5		%	5.7	50	11-SEP-17
Dimethylphthalate		84.8	89.1		%	4.9	50	11-SEP-17
Pentachlorophenol		140.1	142.1		%	1.4	50	11-SEP-17
Phenanthrene		94.4	99.0		%	4.7	50	11-SEP-17
Phenol		48.7	51.6		%	5.9	50	11-SEP-17
Pyrene		77.1	86.2		%	11	50	11-SEP-17
WG2611207-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	11-SEP-17
2-Chlorophenol			<0.30		ug/L		0.3	11-SEP-17
2,4-Dichlorophenol			<0.30		ug/L		0.3	11-SEP-17
2,4-Dimethylphenol			<0.50		ug/L		0.5	11-SEP-17
2,4-Dinitrophenol			<1.0		ug/L		1	11-SEP-17
2,4-Dinitrotoluene			<0.40		ug/L		0.4	11-SEP-17
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	11-SEP-17
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	11-SEP-17
2,6-Dinitrotoluene			<0.40		ug/L		0.4	11-SEP-17
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	11-SEP-17
4-Chloroaniline			<0.40		ug/L		0.4	11-SEP-17
Biphenyl			<0.40		ug/L		0.4	11-SEP-17
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3823758								
WG2611207-1 MB								
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	11-SEP-17
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	11-SEP-17
Diethylphthalate			<0.20		ug/L		0.2	11-SEP-17
Dimethylphthalate			<0.20		ug/L		0.2	11-SEP-17
Pentachlorophenol			<0.50		ug/L		0.5	11-SEP-17
Phenanthrene			<0.20		ug/L		0.2	11-SEP-17
Phenol			<0.50		ug/L		0.5	11-SEP-17
Pyrene			<0.20		ug/L		0.2	11-SEP-17
Surrogate: 2-Fluorobiphenyl			98.5		%		50-140	11-SEP-17
Surrogate: 2,4,6-Tribromophenol			99.9		%		50-140	11-SEP-17
Surrogate: Nitrobenzene d5			99.0		%		50-140	11-SEP-17
Surrogate: p-Terphenyl d14			91.2		%		60-140	11-SEP-17
Surrogate: Phenol d5			46.1		%		30-130	11-SEP-17
CL-IC-N-WT	**Water**							
Batch R3823730								
WG2611499-10 DUP		**WG2611499-8**						
Chloride (Cl)		3.28	3.29		mg/L	0.5	20	08-SEP-17
WG2611499-7 LCS								
Chloride (Cl)			101.4		%		90-110	08-SEP-17
WG2611499-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	08-SEP-17
WG2611499-9 MS		**WG2611499-8**						
Chloride (Cl)			100.6		%		75-125	08-SEP-17
CN-WAD-R511-WT	**Water**							
Batch R3827207								
WG2613826-3 DUP		**L1986110-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	12-SEP-17
WG2613826-2 LCS								
Cyanide, Weak Acid Diss			106.2		%		80-120	12-SEP-17
WG2613826-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	12-SEP-17
WG2613826-4 MS		**L1986110-1**						
Cyanide, Weak Acid Diss			108.8		%		70-130	12-SEP-17
CR-CR6-IC-R511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	**Water**							
Batch R3821991								
WG2610623-4 DUP		**WG2610623-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	07-SEP-17
WG2610623-2 LCS								
Chromium, Hexavalent			101.6		%		80-120	07-SEP-17
WG2610623-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	07-SEP-17
WG2610623-5 MS		**WG2610623-3**						
Chromium, Hexavalent			98.1		%		70-130	07-SEP-17
EC-R511-WT	**Water**							
Batch R3820599								
WG2609262-4 DUP		**WG2609262-3**						
Conductivity		1.74	1.75		mS/cm	0.1	10	06-SEP-17
WG2609262-8 DUP		**WG2609262-7**						
Conductivity		0.335	0.336		mS/cm	0.3	10	06-SEP-17
WG2609262-2 LCS								
Conductivity			101.7		%		90-110	06-SEP-17
WG2609262-6 LCS								
Conductivity			101.6		%		90-110	06-SEP-17
WG2609262-1 MB								
Conductivity			<0.0030		mS/cm		0.003	06-SEP-17
WG2609262-5 MB								
Conductivity			<0.0030		mS/cm		0.003	06-SEP-17
F1-HS-511-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2594557-1 LCS								
F1 (C6-C10)			104.7		%		80-120	07-SEP-17
WG2594557-2 MB								
F1 (C6-C10)			<25		ug/L		25	07-SEP-17
Surrogate: 3,4-Dichlorotoluene			77.9		%		60-140	07-SEP-17
WG2594557-5 MS		**WG2594557-3**						
F1 (C6-C10)			94.8		%		60-140	07-SEP-17
Batch R3821238								
WG2604556-4 DUP		**WG2604556-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2604556-1 LCS								

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R3821238								
WG2604556-1 LCS								
F1 (C6-C10)			115.9		%		80-120	07-SEP-17
WG2604556-2 MB								
F1 (C6-C10)			<25		ug/L		25	07-SEP-17
Surrogate: 3,4-Dichlorotoluene			117.3		%		60-140	07-SEP-17
WG2604556-5 MS		**WG2604556-3**						
F1 (C6-C10)			115.6		%		60-140	07-SEP-17
F2-F4-UW-WT	**Water**							
Batch R3828769								
WG2614609-2 LCS								
F2 (C10-C16)			111.8		%		70-130	14-SEP-17
F3a (C16-C22)			108.4		%		70-130	14-SEP-17
F3b (C22-C34)			99.4		%		70-130	14-SEP-17
F3 (C16-C34)			104.6		%		70-130	14-SEP-17
F4 (C34-C50)			127.7		%		70-130	14-SEP-17
WG2614609-3 LCSD		**WG2614609-2**						
F2 (C10-C16)		111.8	118.4		%	5.7	50	14-SEP-17
F3a (C16-C22)		108.4	114.7		%	5.6	50	14-SEP-17
F3b (C22-C34)		99.4	114.6		%	14	50	14-SEP-17
F3 (C16-C34)		104.6	114.7		%	9.2	50	14-SEP-17
F4 (C34-C50)		127.7	127.1		%	0.5	50	14-SEP-17
WG2614609-1 MB								
F2 (C10-C16)			<100		ug/L		100	14-SEP-17
F3a (C16-C22)			<130		ug/L		125	14-SEP-17
F3b (C22-C34)			<130		ug/L		125	14-SEP-17
F3 (C16-C34)			<250		ug/L		250	14-SEP-17
F4 (C34-C50)			<250		ug/L		250	14-SEP-17
Surrogate: 2-Bromobenzotrifluoride			106.4		%		60-140	14-SEP-17
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3820537								
WG2609321-4 DUP		**WG2609321-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	06-SEP-17
WG2609321-2 LCS								
Mercury (Hg)-Dissolved			106.0		%		80-120	06-SEP-17
WG2609321-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3820537								
WG2609321-6 MS		**WG2609321-5**						
Mercury (Hg)-Dissolved			96.7		%		70-130	06-SEP-17
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2609142-4 DUP		**WG2609142-3**						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Arsenic (As)-Dissolved		3.5	3.6		ug/L	5.0	20	06-SEP-17
Barium (Ba)-Dissolved		21.2	21.1		ug/L	0.6	20	06-SEP-17
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Boron (B)-Dissolved		<100	<100	RPD-NA	ug/L	N/A	20	06-SEP-17
Cadmium (Cd)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	06-SEP-17
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Cobalt (Co)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Copper (Cu)-Dissolved		<2.0	<2.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	06-SEP-17
Molybdenum (Mo)-Dissolved		2.95	2.92		ug/L	0.8	20	06-SEP-17
Nickel (Ni)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Selenium (Se)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	06-SEP-17
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	06-SEP-17
Sodium (Na)-Dissolved		17300	17500		ug/L	1.4	20	06-SEP-17
Thallium (Tl)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	06-SEP-17
Uranium (U)-Dissolved		0.27	0.25		ug/L	7.9	20	06-SEP-17
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	06-SEP-17
Zinc (Zn)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	06-SEP-17
WG2609142-2 LCS								
Antimony (Sb)-Dissolved			95.8		%		80-120	06-SEP-17
Arsenic (As)-Dissolved			99.1		%		80-120	06-SEP-17
Barium (Ba)-Dissolved			105.5		%		80-120	06-SEP-17
Beryllium (Be)-Dissolved			99.7		%		80-120	06-SEP-17
Boron (B)-Dissolved			100.5		%		80-120	06-SEP-17
Cadmium (Cd)-Dissolved			94.9		%		80-120	06-SEP-17
Chromium (Cr)-Dissolved			98.9		%		80-120	06-SEP-17
Cobalt (Co)-Dissolved			98.2		%		80-120	06-SEP-17
Copper (Cu)-Dissolved			96.9				80-120	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2609142-2 LCS								
Copper (Cu)-Dissolved			96.9		%		80-120	06-SEP-17
Lead (Pb)-Dissolved			104.3		%		80-120	06-SEP-17
Molybdenum (Mo)-Dissolved			101.5		%		80-120	06-SEP-17
Nickel (Ni)-Dissolved			98.1		%		80-120	06-SEP-17
Selenium (Se)-Dissolved			97.4		%		80-120	06-SEP-17
Silver (Ag)-Dissolved			96.6		%		80-120	06-SEP-17
Sodium (Na)-Dissolved			100.9		%		80-120	06-SEP-17
Thallium (Tl)-Dissolved			103.6		%		80-120	06-SEP-17
Uranium (U)-Dissolved			102.1		%		80-120	06-SEP-17
Vanadium (V)-Dissolved			99.4		%		80-120	06-SEP-17
Zinc (Zn)-Dissolved			93.7		%		80-120	06-SEP-17
WG2609142-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Boron (B)-Dissolved			<10		ug/L		10	06-SEP-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	06-SEP-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	06-SEP-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	06-SEP-17
Sodium (Na)-Dissolved			<500		ug/L		500	06-SEP-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	06-SEP-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	06-SEP-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	06-SEP-17
WG2609142-5 MS		**WG2609142-3**						
Antimony (Sb)-Dissolved			94.4		%		70-130	06-SEP-17
Arsenic (As)-Dissolved			88.7		%		70-130	06-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3821118								
WG2609142-5 MS		**WG2609142-3**						
Barium (Ba)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Beryllium (Be)-Dissolved			93.7		%		70-130	06-SEP-17
Boron (B)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Cadmium (Cd)-Dissolved			90.8		%		70-130	06-SEP-17
Chromium (Cr)-Dissolved			92.8		%		70-130	06-SEP-17
Cobalt (Co)-Dissolved			93.1		%		70-130	06-SEP-17
Copper (Cu)-Dissolved			85.6		%		70-130	06-SEP-17
Lead (Pb)-Dissolved			95.5		%		70-130	06-SEP-17
Molybdenum (Mo)-Dissolved			74.6		%		70-130	06-SEP-17
Nickel (Ni)-Dissolved			93.3		%		70-130	06-SEP-17
Selenium (Se)-Dissolved			92.7		%		70-130	06-SEP-17
Silver (Ag)-Dissolved			87.3		%		70-130	06-SEP-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Thallium (Tl)-Dissolved			93.5		%		70-130	06-SEP-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	06-SEP-17
Vanadium (V)-Dissolved			94.2		%		70-130	06-SEP-17
PAH-511-WT	**Water**							
Batch R3821704								
WG2609278-2 LCS								
1-Methylnaphthalene			99.5		%		50-140	07-SEP-17
2-Methylnaphthalene			100.1		%		50-140	07-SEP-17
Acenaphthene			101.8		%		50-140	07-SEP-17
Acenaphthylene			109.6		%		50-140	07-SEP-17
Anthracene			111.4		%		50-140	07-SEP-17
Benzo(a)anthracene			112.2		%		50-140	07-SEP-17
Benzo(a)pyrene			117.5		%		50-140	07-SEP-17
Benzo(b)fluoranthene			123.5		%		50-140	07-SEP-17
Benzo(g,h,i)perylene			115.8		%		50-140	07-SEP-17
Benzo(k)fluoranthene			118.6		%		50-140	07-SEP-17
Chrysene			103.2		%		50-140	07-SEP-17
Dibenzo(ah)anthracene			123.0		%		50-140	07-SEP-17
Fluoranthene			115.4		%		50-140	07-SEP-17
Fluorene			108.6		%		50-140	07-SEP-17
Indeno(1,2,3-cd)pyrene			122.1		%		50-140	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3821704								
WG2609278-2 LCS								
Indeno(1,2,3-cd)pyrene			122.1		%		50-140	07-SEP-17
Naphthalene			103.8		%		50-140	07-SEP-17
Phenanthrene			114.6		%		50-140	07-SEP-17
Pyrene			117.4		%		50-140	07-SEP-17
WG2609278-3 LCSD		**WG2609278-2**						
1-Methylnaphthalene		99.5	101.4		%	1.9	50	07-SEP-17
2-Methylnaphthalene		100.1	102.3		%	2.2	50	07-SEP-17
Acenaphthene		101.8	103.4		%	1.5	50	07-SEP-17
Acenaphthylene		109.6	110.5		%	0.8	50	07-SEP-17
Anthracene		111.4	111.5		%	0.1	50	07-SEP-17
Benzo(a)anthracene		112.2	115.8		%	3.2	50	07-SEP-17
Benzo(a)pyrene		117.5	119.2		%	1.4	50	07-SEP-17
Benzo(b)fluoranthene		123.5	126.8		%	2.6	50	07-SEP-17
Benzo(g,h,i)perylene		115.8	117.8		%	1.8	50	07-SEP-17
Benzo(k)fluoranthene		118.6	122.7		%	3.4	50	07-SEP-17
Chrysene		103.2	112.9		%	9.0	50	07-SEP-17
Dibenzo(ah)anthracene		123.0	127.4		%	3.5	50	07-SEP-17
Fluoranthene		115.4	117.7		%	2.0	50	07-SEP-17
Fluorene		108.6	109.7		%	1.0	50	07-SEP-17
Indeno(1,2,3-cd)pyrene		122.1	126.2		%	3.3	50	07-SEP-17
Naphthalene		103.8	106.1		%	2.1	50	07-SEP-17
Phenanthrene		114.6	115.4		%	0.7	50	07-SEP-17
Pyrene		117.4	119.3		%	1.6	50	07-SEP-17
WG2609278-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	07-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	07-SEP-17
Acenaphthene			<0.020		ug/L		0.02	07-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	07-SEP-17
Anthracene			<0.020		ug/L		0.02	07-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	07-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	07-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	07-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3821704								
WG2609278-1 MB								
Benzo(k)fluoranthene			<0.020		ug/L		0.02	07-SEP-17
Chrysene			<0.020		ug/L		0.02	07-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	07-SEP-17
Fluoranthene			<0.020		ug/L		0.02	07-SEP-17
Fluorene			<0.020		ug/L		0.02	07-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	07-SEP-17
Naphthalene			<0.050		ug/L		0.05	07-SEP-17
Phenanthrene			<0.020		ug/L		0.02	07-SEP-17
Pyrene			<0.020		ug/L		0.02	07-SEP-17
Surrogate: d8-Naphthalene			82.8		%		60-140	07-SEP-17
Surrogate: d10-Phenanthrene			93.2		%		60-140	07-SEP-17
Surrogate: d12-Chrysene			89.2		%		60-140	07-SEP-17
Surrogate: d10-Acenaphthene			83.2		%		60-140	07-SEP-17
PCB-511-WT	**Water**							
Batch R3824408								
WG2611650-2 LCS								
Aroclor 1242			81.7		%		60-140	12-SEP-17
Aroclor 1248			81.9		%		60-140	12-SEP-17
Aroclor 1254			85.9		%		60-140	12-SEP-17
Aroclor 1260			86.1		%		60-140	12-SEP-17
WG2611650-3 LCSD		**WG2611650-2**						
Aroclor 1242		81.7	78.9		%	3.4	50	12-SEP-17
Aroclor 1248		81.9	81.9		%	0.0	50	12-SEP-17
Aroclor 1254		85.9	97.7		%	13	50	12-SEP-17
Aroclor 1260		86.1	99.7		%	15	50	12-SEP-17
WG2611650-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1248			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1254			<0.020		ug/L		0.02	12-SEP-17
Aroclor 1260			<0.020		ug/L		0.02	12-SEP-17
Surrogate: 2-fluorobiphenyl			69.1		%		50-150	12-SEP-17
PH-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R3820599								
WG2609262-4 DUP		**WG2609262-3**						
pH		7.48	7.50	J	pH units	0.02	0.2	06-SEP-17
WG2609262-8 DUP		**WG2609262-7**						
pH		8.09	8.11	J	pH units	0.02	0.2	06-SEP-17
WG2609262-2 LCS								
pH			6.99		pH units		6.9-7.1	06-SEP-17
WG2609262-6 LCS								
pH			6.99		pH units		6.9-7.1	06-SEP-17
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloropropane		1.24	1.24		ug/L	0.0	30	07-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	07-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Dichlorodifluoromethane		<2.0	<2.0		ug/L			07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-4 DUP		**WG2594557-3**						
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
m+p-Xylenes		0.63	0.65		ug/L	3.1	30	07-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
o-Xylene		0.33	0.33		ug/L	0.0	30	07-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Toluene		1.17	1.22		ug/L	4.2	30	07-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2594557-1 LCS								
1,1,1,2-Tetrachloroethane			89.5		%		70-130	07-SEP-17
1,1,2,2-Tetrachloroethane			100.5		%		70-130	07-SEP-17
1,1,1-Trichloroethane			88.9		%		70-130	07-SEP-17
1,1,2-Trichloroethane			97.6		%		70-130	07-SEP-17
1,1-Dichloroethane			96.6		%		70-130	07-SEP-17
1,1-Dichloroethylene			85.2		%		70-130	07-SEP-17
1,2-Dibromoethane			99.6		%		70-130	07-SEP-17
1,2-Dichlorobenzene			90.3		%		70-130	07-SEP-17
1,2-Dichloroethane			92.2		%		70-130	07-SEP-17
1,2-Dichloropropane			100.4		%		70-130	07-SEP-17
1,3-Dichlorobenzene			86.7		%		70-130	07-SEP-17
1,4-Dichlorobenzene			89.6		%		70-130	07-SEP-17
Acetone			114.0		%		60-140	07-SEP-17
Benzene			97.7		%		70-130	07-SEP-17
Bromodichloromethane			96.3		%		70-130	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-1 LCS								
Bromoform			94.5		%		70-130	07-SEP-17
Bromomethane			102.6		%		60-140	07-SEP-17
Carbon tetrachloride			86.9		%		70-130	07-SEP-17
Chlorobenzene			91.1		%		70-130	07-SEP-17
Chloroform			95.8		%		70-130	07-SEP-17
cis-1,2-Dichloroethylene			94.9		%		70-130	07-SEP-17
cis-1,3-Dichloropropene			101.9		%		70-130	07-SEP-17
Dibromochloromethane			98.8		%		70-130	07-SEP-17
Dichlorodifluoromethane			86.0		%		50-140	07-SEP-17
Ethylbenzene			82.4		%		70-130	07-SEP-17
n-Hexane			103.2		%		70-130	07-SEP-17
m+p-Xylenes			85.6		%		70-130	07-SEP-17
Methyl Ethyl Ketone			102.2		%		60-140	07-SEP-17
Methyl Isobutyl Ketone			92.5		%		60-140	07-SEP-17
Methylene Chloride			95.3		%		70-130	07-SEP-17
MTBE			93.0		%		70-130	07-SEP-17
o-Xylene			84.6		%		70-130	07-SEP-17
Styrene			84.8		%		70-130	07-SEP-17
Tetrachloroethylene			83.2		%		70-130	07-SEP-17
Toluene			86.3		%		70-130	07-SEP-17
trans-1,2-Dichloroethylene			94.9		%		70-130	07-SEP-17
trans-1,3-Dichloropropene			97.5		%		70-130	07-SEP-17
Trichloroethylene			91.0		%		70-130	07-SEP-17
Trichlorofluoromethane			89.6		%		60-140	07-SEP-17
Vinyl chloride			90.9		%		60-140	07-SEP-17
WG2594557-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	07-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-2 MB								
1,2-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	07-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Acetone			<30		ug/L		30	07-SEP-17
Benzene			<0.50		ug/L		0.5	07-SEP-17
Bromodichloromethane			<2.0		ug/L		2	07-SEP-17
Bromoform			<5.0		ug/L		5	07-SEP-17
Bromomethane			<0.50		ug/L		0.5	07-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	07-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Chloroform			<1.0		ug/L		1	07-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Dibromochloromethane			<2.0		ug/L		2	07-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	07-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	07-SEP-17
n-Hexane			<0.50		ug/L		0.5	07-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	07-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	07-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	07-SEP-17
Methylene Chloride			<5.0		ug/L		5	07-SEP-17
MTBE			<2.0		ug/L		2	07-SEP-17
o-Xylene			<0.30		ug/L		0.3	07-SEP-17
Styrene			<0.50		ug/L		0.5	07-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	07-SEP-17
Toluene			<0.50		ug/L		0.5	07-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	07-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	07-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	07-SEP-17
Surrogate: 1,4-Difluorobenzene			100.3		%		70-130	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-2 MB								
Surrogate: 4-Bromofluorobenzene			91.3		%		70-130	07-SEP-17
WG2594557-5 MS		**WG2594557-3**						
1,1,1,2-Tetrachloroethane			89.2		%		50-140	07-SEP-17
1,1,2,2-Tetrachloroethane			82.8		%		50-140	07-SEP-17
1,1,1-Trichloroethane			93.7		%		50-140	07-SEP-17
1,1,2-Trichloroethane			87.5		%		50-140	07-SEP-17
1,1-Dichloroethane			96.4		%		50-140	07-SEP-17
1,1-Dichloroethylene			88.6		%		50-140	07-SEP-17
1,2-Dibromoethane			86.4		%		50-140	07-SEP-17
1,2-Dichlorobenzene			90.2		%		50-140	07-SEP-17
1,2-Dichloroethane			81.4		%		50-140	07-SEP-17
1,2-Dichloropropane			94.7		%		50-140	07-SEP-17
1,3-Dichlorobenzene			90.9		%		50-140	07-SEP-17
1,4-Dichlorobenzene			92.6		%		50-140	07-SEP-17
Acetone			88.9		%		50-140	07-SEP-17
Benzene			96.5		%		50-140	07-SEP-17
Bromodichloromethane			91.2		%		50-140	07-SEP-17
Bromoform			81.6		%		50-140	07-SEP-17
Bromomethane			97.6		%		50-140	07-SEP-17
Carbon tetrachloride			93.2		%		50-140	07-SEP-17
Chlorobenzene			90.8		%		50-140	07-SEP-17
Chloroform			94.7		%		50-140	07-SEP-17
cis-1,2-Dichloroethylene			92.5		%		50-140	07-SEP-17
cis-1,3-Dichloropropene			88.4		%		50-140	07-SEP-17
Dibromochloromethane			91.4		%		50-140	07-SEP-17
Dichlorodifluoromethane			86.6		%		50-140	07-SEP-17
Ethylbenzene			85.7		%		50-140	07-SEP-17
n-Hexane			108.0		%		50-140	07-SEP-17
m+p-Xylenes			89.2		%		50-140	07-SEP-17
Methyl Ethyl Ketone			72.7		%		50-140	07-SEP-17
Methyl Isobutyl Ketone			67.0		%		50-140	07-SEP-17
Methylene Chloride			89.5		%		50-140	07-SEP-17
MTBE			93.0		%		50-140	07-SEP-17
o-Xylene			85.3		%		50-140	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821109								
WG2594557-5 MS		**WG2594557-3**						
Styrene			79.7		%		50-140	07-SEP-17
Tetrachloroethylene			89.4		%		50-140	07-SEP-17
Toluene			88.7		%		50-140	07-SEP-17
trans-1,2-Dichloroethylene			95.1		%		50-140	07-SEP-17
trans-1,3-Dichloropropene			83.1		%		50-140	07-SEP-17
Trichloroethylene			93.4		%		50-140	07-SEP-17
Trichlorofluoromethane			94.9		%		50-140	07-SEP-17
Vinyl chloride			92.0		%		50-140	07-SEP-17
Batch R3821238								
WG2604556-4 DUP		**WG2604556-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	07-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821238								
WG2604556-4 DUP		**WG2604556-3**						
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	07-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-SEP-17
WG2604556-1 LCS								
1,1,1,2-Tetrachloroethane			87.7		%		70-130	07-SEP-17
1,1,2,2-Tetrachloroethane			89.9		%		70-130	07-SEP-17
1,1,1-Trichloroethane			95.6		%		70-130	07-SEP-17
1,1,2-Trichloroethane			90.4		%		70-130	07-SEP-17
1,1-Dichloroethane			101.5		%		70-130	07-SEP-17
1,1-Dichloroethylene			92.9		%		70-130	07-SEP-17
1,2-Dibromoethane			88.5		%		70-130	07-SEP-17
1,2-Dichlorobenzene			92.7		%		70-130	07-SEP-17
1,2-Dichloroethane			99.2		%		70-130	07-SEP-17
1,2-Dichloropropane			98.9		%		70-130	07-SEP-17
1,3-Dichlorobenzene			91.7		%		70-130	07-SEP-17
1,4-Dichlorobenzene			94.0		%		70-130	07-SEP-17
Acetone			114.2		%		60-140	07-SEP-17
Benzene			99.3		%		70-130	07-SEP-17
Bromodichloromethane			94.2		%		70-130	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821238								
WG2604556-1 LCS								
Bromoform			83.4		%		70-130	07-SEP-17
Bromomethane			97.0		%		60-140	07-SEP-17
Carbon tetrachloride			94.2		%		70-130	07-SEP-17
Chlorobenzene			92.6		%		70-130	07-SEP-17
Chloroform			97.3		%		70-130	07-SEP-17
cis-1,2-Dichloroethylene			96.1		%		70-130	07-SEP-17
cis-1,3-Dichloropropene			97.8		%		70-130	07-SEP-17
Dibromochloromethane			92.0		%		70-130	07-SEP-17
Dichlorodifluoromethane			85.3		%		50-140	07-SEP-17
Ethylbenzene			94.0		%		70-130	07-SEP-17
n-Hexane			114.8		%		70-130	07-SEP-17
m+p-Xylenes			95.1		%		70-130	07-SEP-17
Methyl Ethyl Ketone			100.7		%		60-140	07-SEP-17
Methyl Isobutyl Ketone			99.4		%		60-140	07-SEP-17
Methylene Chloride			98.2		%		70-130	07-SEP-17
MTBE			96.7		%		70-130	07-SEP-17
o-Xylene			93.9		%		70-130	07-SEP-17
Styrene			90.4		%		70-130	07-SEP-17
Tetrachloroethylene			91.1		%		70-130	07-SEP-17
Toluene			95.0		%		70-130	07-SEP-17
trans-1,2-Dichloroethylene			100.7		%		70-130	07-SEP-17
trans-1,3-Dichloropropene			93.9		%		70-130	07-SEP-17
Trichloroethylene			93.3		%		70-130	07-SEP-17
Trichlorofluoromethane			97.6		%		60-140	07-SEP-17
Vinyl chloride			95.5		%		60-140	07-SEP-17
WG2604556-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	07-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821238								
WG2604556-2 MB								
1,2-Dichloroethane			<0.50		ug/L		0.5	07-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	07-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Acetone			<30		ug/L		30	07-SEP-17
Benzene			<0.50		ug/L		0.5	07-SEP-17
Bromodichloromethane			<2.0		ug/L		2	07-SEP-17
Bromoform			<5.0		ug/L		5	07-SEP-17
Bromomethane			<0.50		ug/L		0.5	07-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	07-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	07-SEP-17
Chloroform			<1.0		ug/L		1	07-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Dibromochloromethane			<2.0		ug/L		2	07-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	07-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	07-SEP-17
n-Hexane			<0.50		ug/L		0.5	07-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	07-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	07-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	07-SEP-17
Methylene Chloride			<5.0		ug/L		5	07-SEP-17
MTBE			<2.0		ug/L		2	07-SEP-17
o-Xylene			<0.30		ug/L		0.3	07-SEP-17
Styrene			<0.50		ug/L		0.5	07-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	07-SEP-17
Toluene			<0.50		ug/L		0.5	07-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	07-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	07-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	07-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	07-SEP-17
Surrogate: 1,4-Difluorobenzene			100.8		%		70-130	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821238								
WG2604556-2 MB								
Surrogate: 4-Bromofluorobenzene			95.0		%		70-130	07-SEP-17
WG2604556-5 MS		**WG2604556-3**						
1,1,1,2-Tetrachloroethane			87.7		%		50-140	07-SEP-17
1,1,2,2-Tetrachloroethane			100.4		%		50-140	07-SEP-17
1,1,1-Trichloroethane			91.7		%		50-140	07-SEP-17
1,1,2-Trichloroethane			95.6		%		50-140	07-SEP-17
1,1-Dichloroethane			100.4		%		50-140	07-SEP-17
1,1-Dichloroethylene			86.3		%		50-140	07-SEP-17
1,2-Dibromoethane			95.2		%		50-140	07-SEP-17
1,2-Dichlorobenzene			92.0		%		50-140	07-SEP-17
1,2-Dichloroethane			106.9		%		50-140	07-SEP-17
1,2-Dichloropropane			102.7		%		50-140	07-SEP-17
1,3-Dichlorobenzene			89.5		%		50-140	07-SEP-17
1,4-Dichlorobenzene			91.8		%		50-140	07-SEP-17
Acetone			120.6		%		50-140	07-SEP-17
Benzene			99.1		%		50-140	07-SEP-17
Bromodichloromethane			98.6		%		50-140	07-SEP-17
Bromoform			89.9		%		50-140	07-SEP-17
Bromomethane			95.5		%		50-140	07-SEP-17
Carbon tetrachloride			89.0		%		50-140	07-SEP-17
Chlorobenzene			92.0		%		50-140	07-SEP-17
Chloroform			98.3		%		50-140	07-SEP-17
cis-1,2-Dichloroethylene			97.0		%		50-140	07-SEP-17
cis-1,3-Dichloropropene			110.5		%		50-140	07-SEP-17
Dibromochloromethane			95.7		%		50-140	07-SEP-17
Dichlorodifluoromethane			71.3		%		50-140	07-SEP-17
Ethylbenzene			89.8		%		50-140	07-SEP-17
n-Hexane			103.9		%		50-140	07-SEP-17
m+p-Xylenes			91.2		%		50-140	07-SEP-17
Methyl Ethyl Ketone			114.3		%		50-140	07-SEP-17
Methyl Isobutyl Ketone			115.2		%		50-140	07-SEP-17
Methylene Chloride			100.5		%		50-140	07-SEP-17
MTBE			96.1		%		50-140	07-SEP-17
o-Xylene			91.3		%		50-140	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3821238								
WG2604556-5 MS		**WG2604556-3**						
Styrene			90.4		%		50-140	07-SEP-17
Tetrachloroethylene			84.6		%		50-140	07-SEP-17
Toluene			91.0		%		50-140	07-SEP-17
trans-1,2-Dichloroethylene			97.3		%		50-140	07-SEP-17
trans-1,3-Dichloropropene			105.7		%		50-140	07-SEP-17
Trichloroethylene			91.2		%		50-140	07-SEP-17
Trichlorofluoromethane			88.3		%		50-140	07-SEP-17
Vinyl chloride			86.1		%		50-140	07-SEP-17

Quality Control Report

Workorder: L1986110 Report Date: 15-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

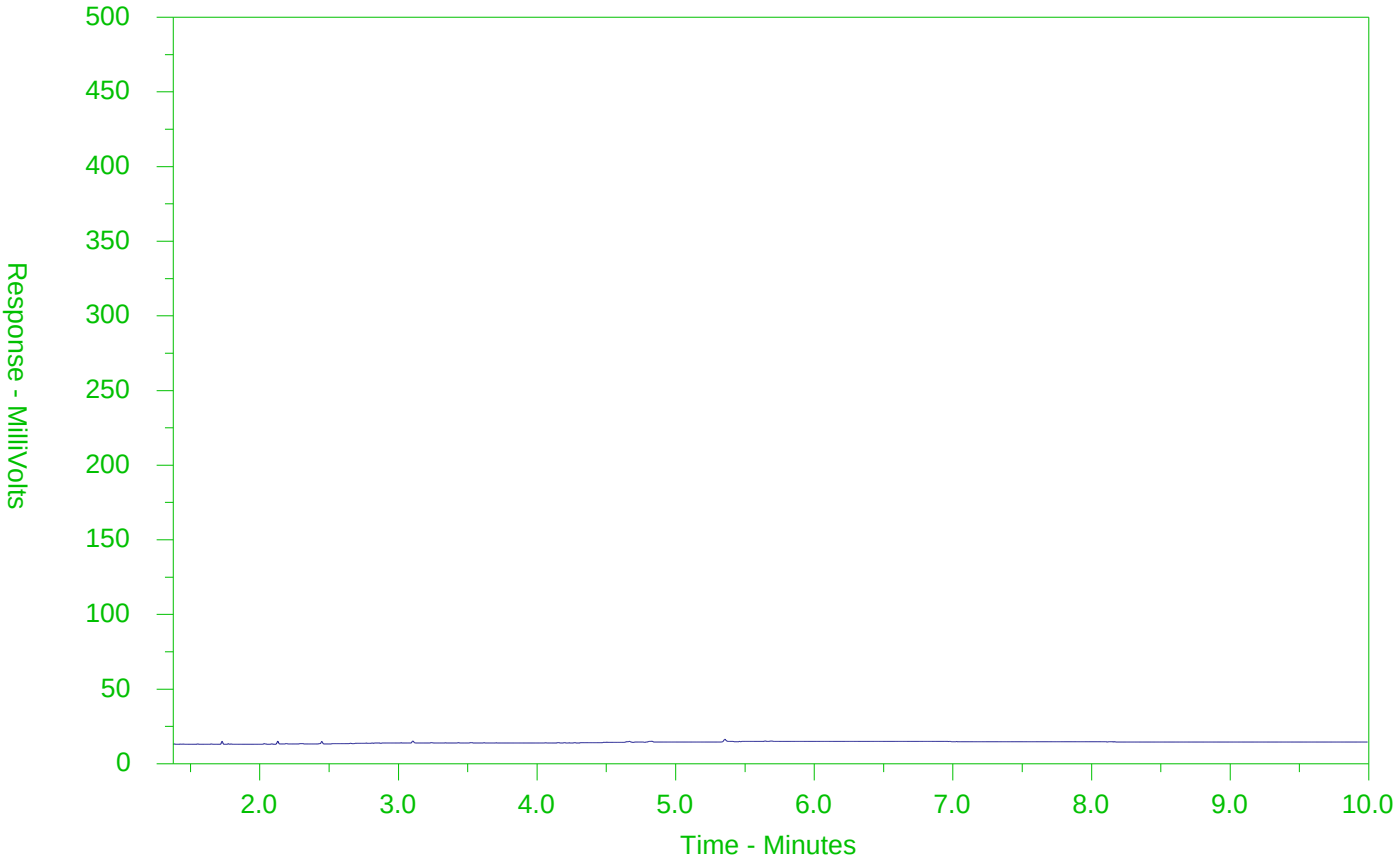
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-1
Client Sample ID: OW12



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

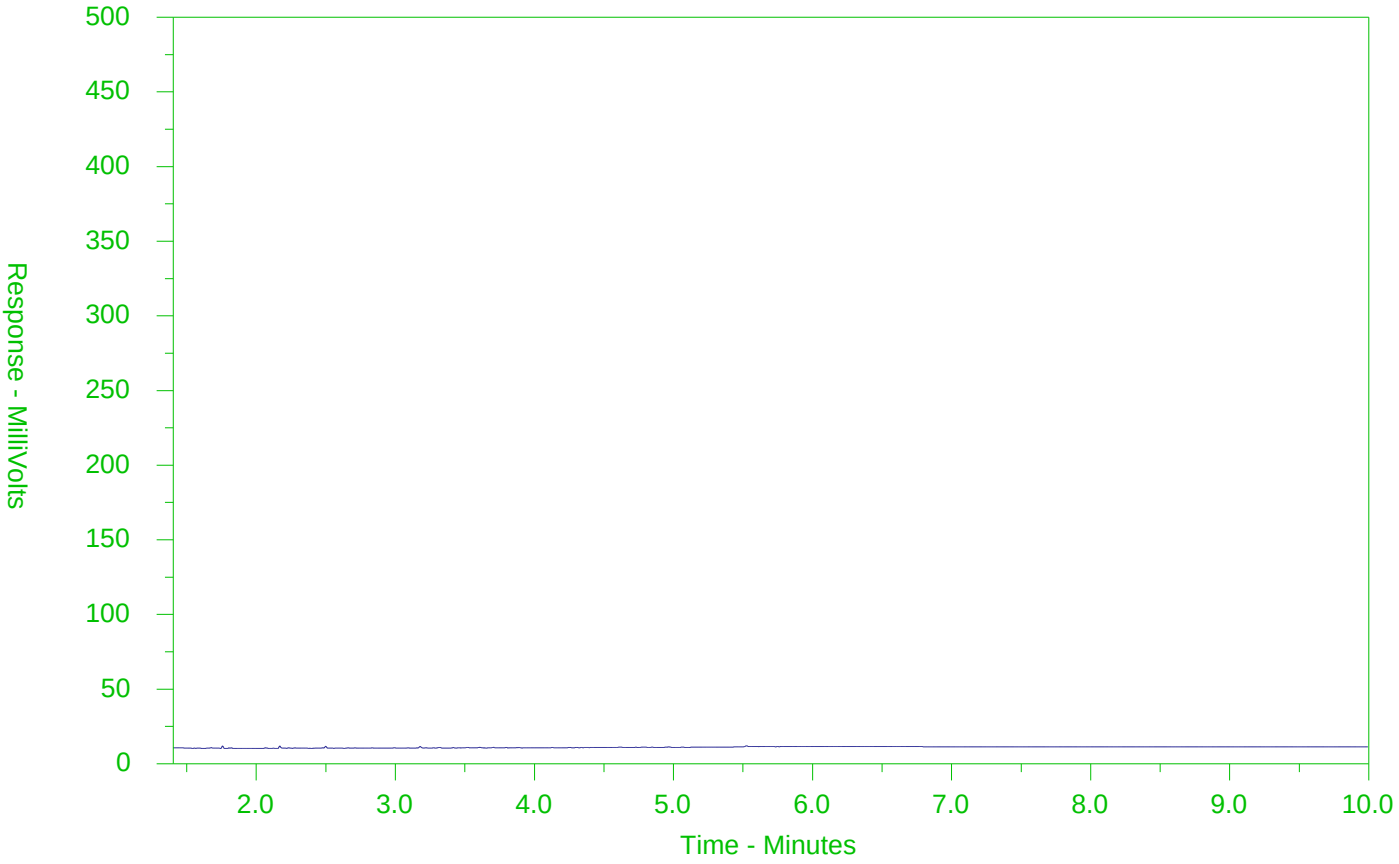
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-2
Client Sample ID: OW16



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

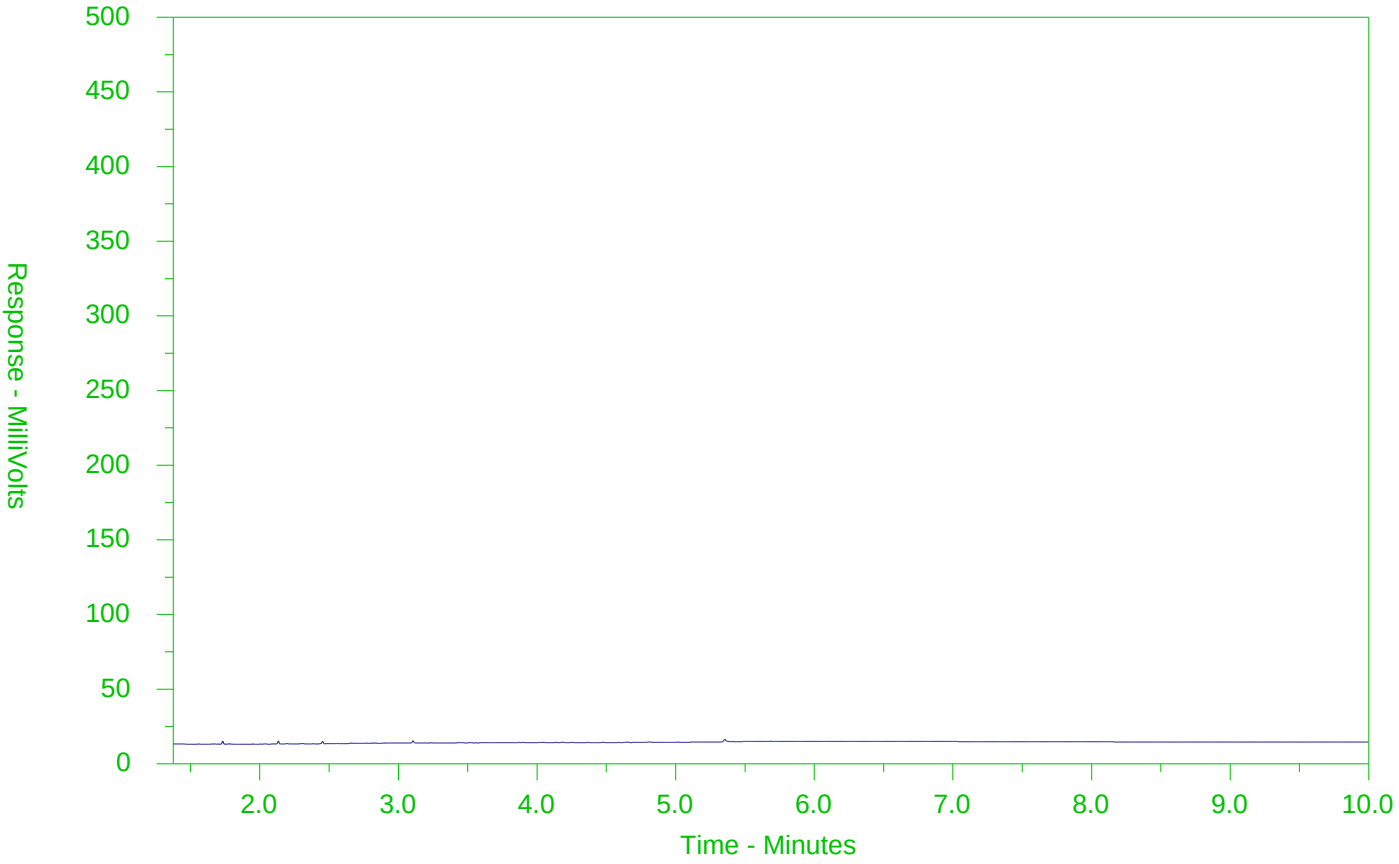
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-3
Client Sample ID: OW15



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

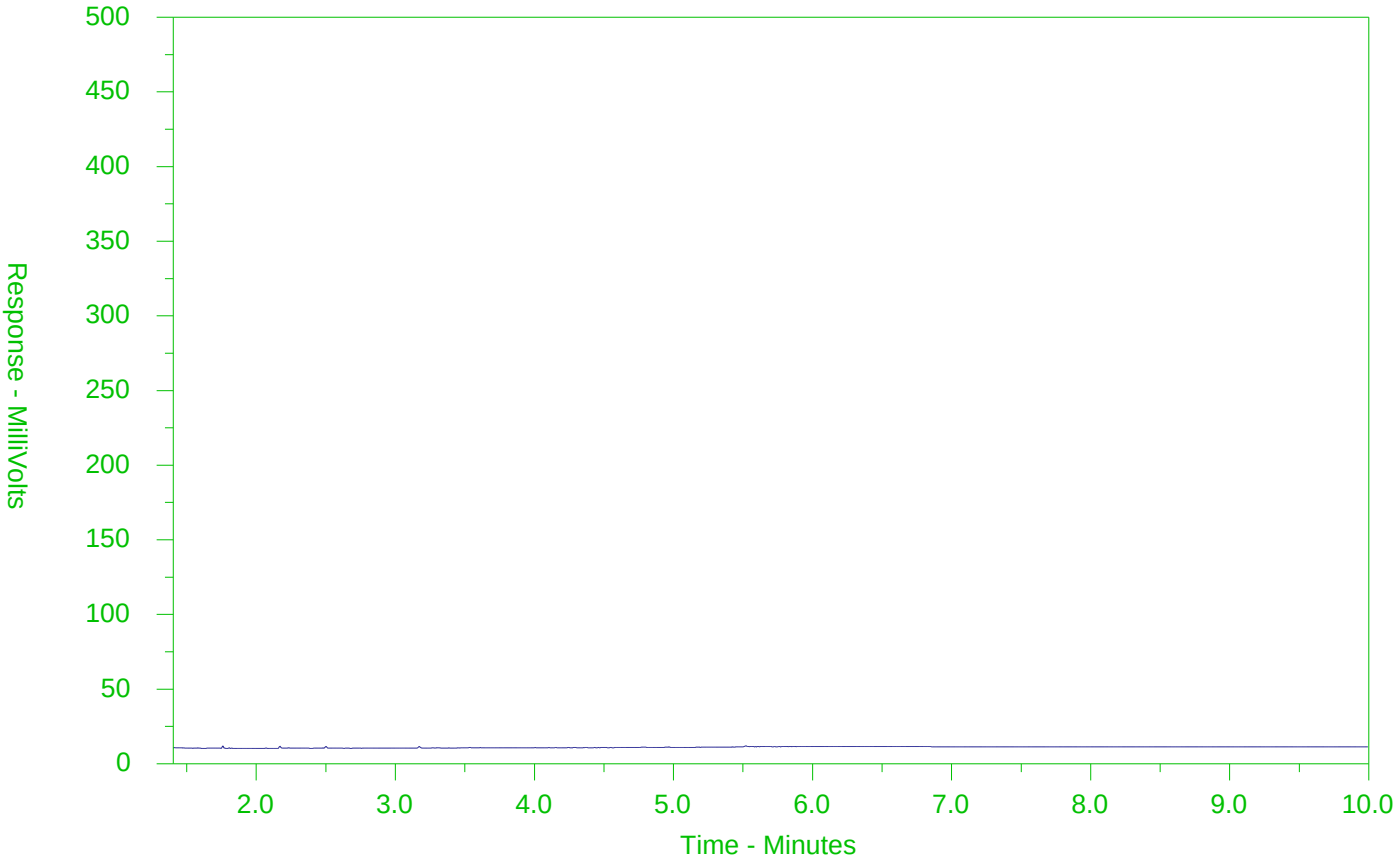
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-4
Client Sample ID: OW07-31



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

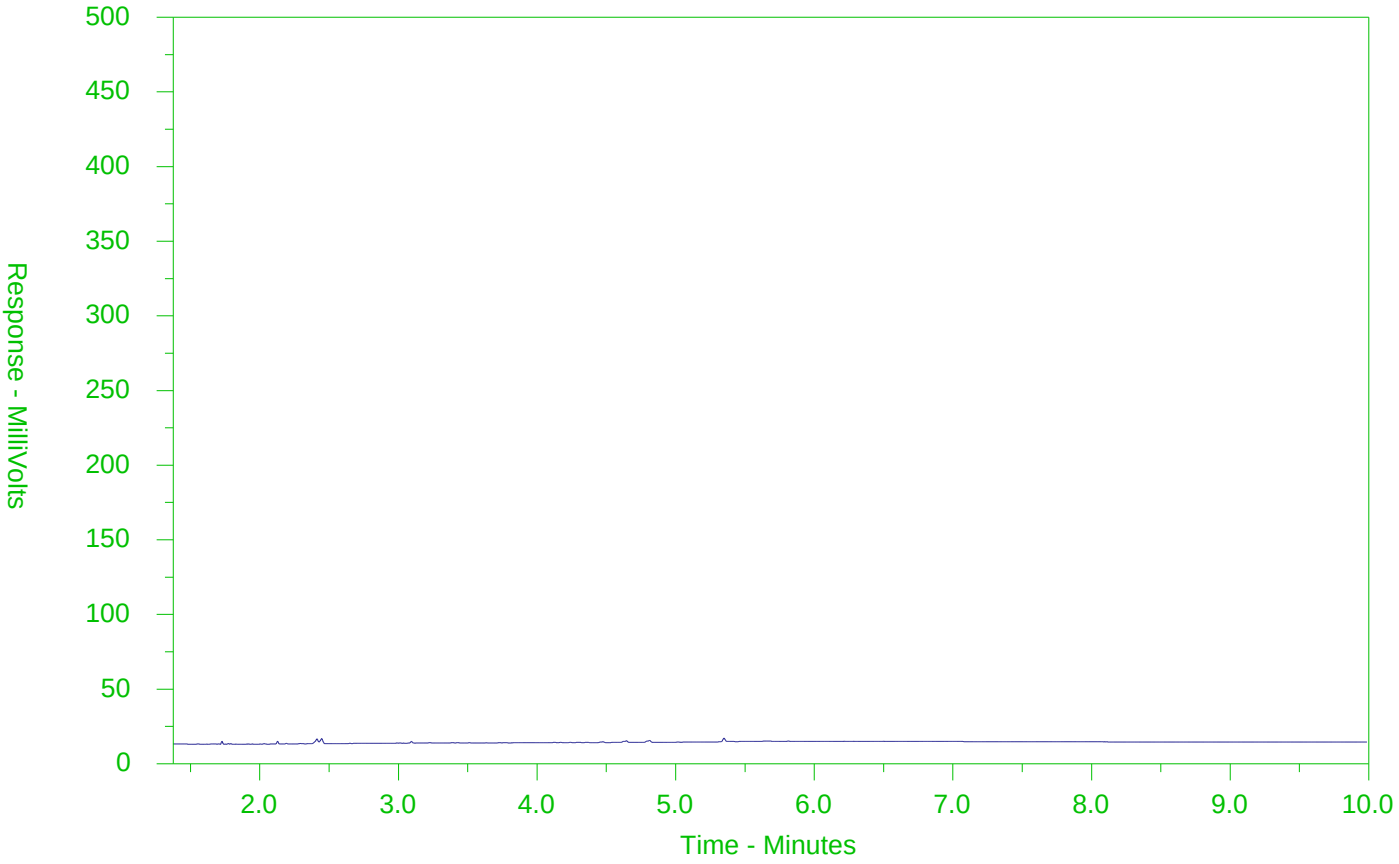
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-5
Client Sample ID: OW02



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

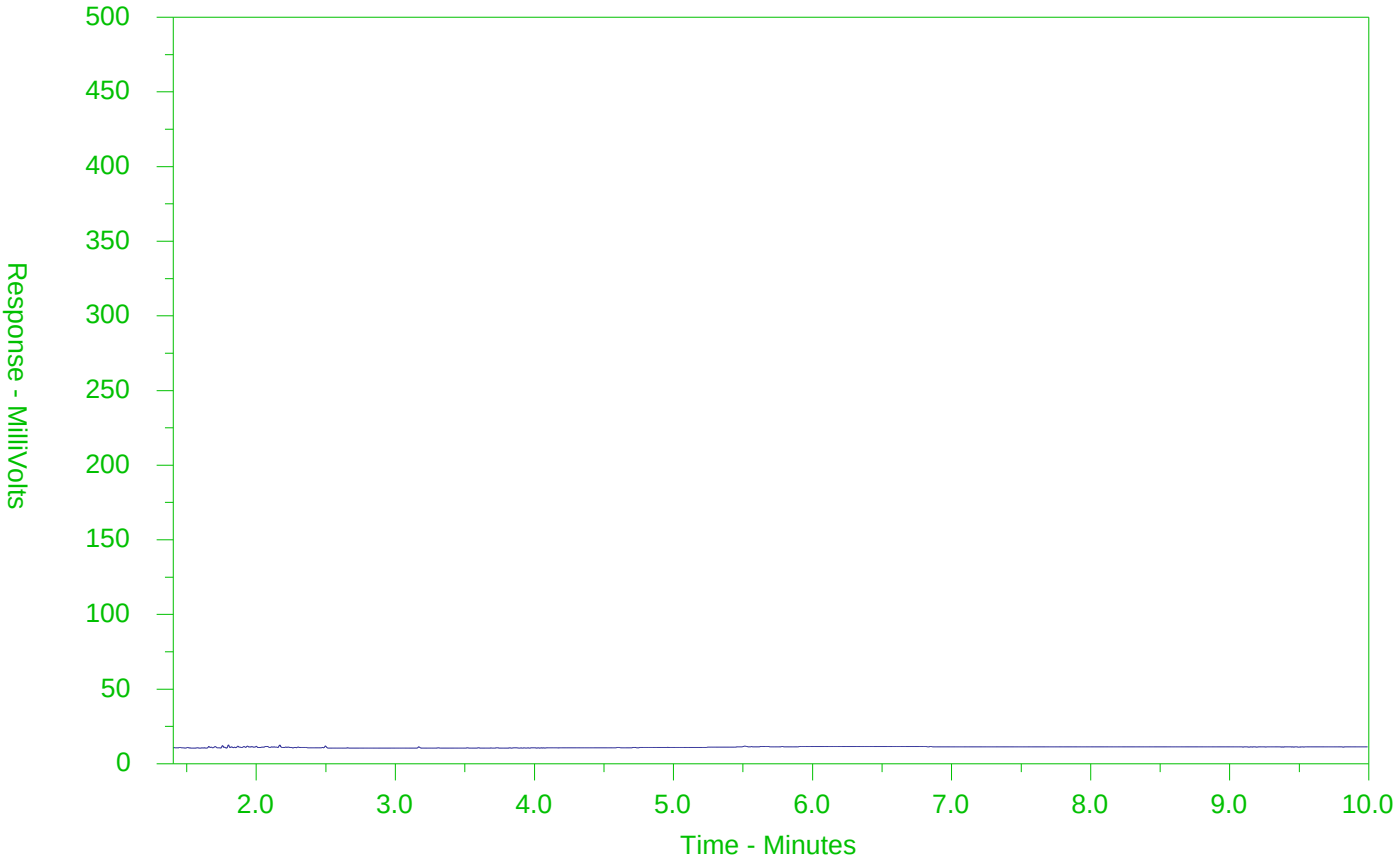
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1986110-6
Client Sample ID: OW17



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1986110-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill Kitchenor
Contact:	Michael Shiry / Peter Marno
Phone:	289 971 1779
	Company address below will appear on the final report
Street:	300-72 Victoria St. South
City/Province:	Kitchener, ON
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill Kitchener
Contact:	Accounts Payable

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: Michael.Shiry@ch2m.com

Email 2: Peter.Mamo@ch2m.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax

Email 2

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q62156

Job #: 694757

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#

Major/Minor Code: | Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (lab use only): L1986110 AK OSB

ALS Contact: Mathy | Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4 - UW	1,4 Dioxane	PCB	VOC,F1 (Trip Blank)	Number of Containers
	OW12	05-Sep-17	9:30	Water	✓		✓	✓	✓	✓			15
	OW16	↓	11:15	↓	✓		✓	✓	✓		✓		14
	OW15	↓	11:45	↓	✓		✓	✓	✓		✓		14
	OW07-31	↓	13:52	↓	✓	✓		✓	✓				13
	OW02	↓	15:02	↓	✓	✓		✓	✓				13
	OW17	↓	16:02	↓	✓		✓	✓	✓				12
	Trip Blank 4	05-Sep-17	—	Water								✓	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C | FINAL COOLER TEMPERATURES °C: -4.3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Mamo	Date: 17/09/05	Time: 1715	Received by:	Date:	Time:	Received by: AK	Date: 05/09/17	Time: 17:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Rw

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 08-SEP-17
Report Date: 18-SEP-17 13:32 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1988005

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-1 OW07-37 Sampled By: CLIENT on 06-SEP-17 @ 09:22 Matrix: WATER							
Physical Tests							
Conductivity	1.30		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.37		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	215	DLHC	2.5	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	0.63		0.10	ug/L	08-SEP-17	12-SEP-17	R3824202
Arsenic (As)-Dissolved	0.34		0.10	ug/L	08-SEP-17	12-SEP-17	R3824202
Barium (Ba)-Dissolved	38.7		0.10	ug/L	08-SEP-17	12-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	12-SEP-17	R3824202
Boron (B)-Dissolved	65		10	ug/L	08-SEP-17	12-SEP-17	R3824202
Cadmium (Cd)-Dissolved	1.05		0.010	ug/L	08-SEP-17	12-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.18		0.10	ug/L	08-SEP-17	12-SEP-17	R3824202
Copper (Cu)-Dissolved	14.4		0.20	ug/L	08-SEP-17	12-SEP-17	R3824202
Lead (Pb)-Dissolved	1.02		0.050	ug/L	08-SEP-17	12-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	4.00		0.050	ug/L	08-SEP-17	12-SEP-17	R3824202
Nickel (Ni)-Dissolved	6.43		0.50	ug/L	08-SEP-17	12-SEP-17	R3824202
Selenium (Se)-Dissolved	0.869		0.050	ug/L	08-SEP-17	12-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	12-SEP-17	R3824202
Sodium (Na)-Dissolved	130000		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.162		0.010	ug/L	08-SEP-17	12-SEP-17	R3824202
Uranium (U)-Dissolved	9.48		0.010	ug/L	08-SEP-17	12-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	12-SEP-17	R3824202
Zinc (Zn)-Dissolved	681		1.0	ug/L	08-SEP-17	12-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-1 OW07-37 Sampled By: CLIENT on 06-SEP-17 @ 09:22 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.8		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		18-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F2-Naphth	<100		100	ug/L		18-SEP-17	
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-1 OW07-37 Sampled By: CLIENT on 06-SEP-17 @ 09:22 Matrix: WATER							
Hydrocarbons							
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3-PAH	<250		250	ug/L		18-SEP-17	
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Total Hydrocarbons (C6-C50)	<370		370	ug/L		18-SEP-17	
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	102.5		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	95.9		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluorene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		18-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	101.0		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d12-Chrysene	113.3		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	104.1		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	108.3		60-140	%	11-SEP-17	12-SEP-17	R3824208
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
4-Chloroaniline	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2-Chlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
Diethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Dimethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-1 OW07-37 Sampled By: CLIENT on 06-SEP-17 @ 09:22 Matrix: WATER							
Semi-Volatile Organics							
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		18-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-SEP-17	18-SEP-17	R3828279
Pentachlorophenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenanthrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Pyrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2-Fluorobiphenyl	101.2		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Nitrobenzene d5	97.3		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Phenol d5	42.9		30-130	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: p-Terphenyl d14	102.4		60-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2,4,6-Tribromophenol	112.5		50-140	%	13-SEP-17	18-SEP-17	R3828279
L1988005-2 OW07-32 Sampled By: CLIENT on 06-SEP-17 @ 10:35 Matrix: WATER							
Physical Tests							
Conductivity	1.03		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.53		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	123		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	0.41		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.73		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	47.5		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	74		10	ug/L	08-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.613		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	2.29		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	6.58		0.20	ug/L	08-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	1.08		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-2 OW07-32 Sampled By: CLIENT on 06-SEP-17 @ 10:35 Matrix: WATER							
Dissolved Metals							
Molybdenum (Mo)-Dissolved	3.48		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	10.1		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.292		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	72900		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.984		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	4.71		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	1270	DLHC	10	ug/L	08-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	1.58		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	1.08		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-2 OW07-32 Sampled By: CLIENT on 06-SEP-17 @ 10:35 Matrix: WATER							
Volatile Organic Compounds							
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	1.36		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	0.92		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.1		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	105.1		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	90.9		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluorene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-2 OW07-32 Sampled By: CLIENT on 06-SEP-17 @ 10:35 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	91.4		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d12-Chrysene	89.6		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	93.3		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	99.1		60-140	%	11-SEP-17	12-SEP-17	R3824208
L1988005-3 OW03-I Sampled By: CLIENT on 06-SEP-17 @ 11:57 Matrix: WATER							
Physical Tests							
Conductivity	0.847		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.24		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	2.64		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	0.27		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.41		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	49.5		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	105		10	ug/L	08-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.766		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.13		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	3.77		0.20	ug/L	08-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.962		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	0.638		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	5.57		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.103		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	3550		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.042		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	3.11		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	0.51		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	562		1.0	ug/L	08-SEP-17	11-SEP-17	R3824202

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-3 OW03-I Sampled By: CLIENT on 06-SEP-17 @ 11:57 Matrix: WATER							
Dissolved Metals							
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-3 OW03-I Sampled By: CLIENT on 06-SEP-17 @ 11:57 Matrix: WATER							
Volatile Organic Compounds							
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		18-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F2-Naphth	<100		100	ug/L		18-SEP-17	
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3-PAH	<250		250	ug/L		18-SEP-17	
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Total Hydrocarbons (C6-C50)	<370		370	ug/L		18-SEP-17	
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	106.3		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	97.8		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluorene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		18-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	104.0		60-140	%	11-SEP-17	12-SEP-17	R3824208

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-3 OW03-I Sampled By: CLIENT on 06-SEP-17 @ 11:57 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Surrogate: d12-Chrysene	106.9		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	106.3		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	114.0		60-140	%	11-SEP-17	12-SEP-17	R3824208
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
4-Chloroaniline	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2-Chlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
Diethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Dimethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		18-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-SEP-17	18-SEP-17	R3828279
Pentachlorophenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenanthrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Pyrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2-Fluorobiphenyl	98.1		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Nitrobenzene d5	94.7		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Phenol d5	44.2		30-130	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: p-Terphenyl d14	117.6		60-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2,4,6-Tribromophenol	112.0		50-140	%	13-SEP-17	18-SEP-17	R3828279
L1988005-4 OW03-II Sampled By: CLIENT on 06-SEP-17 @ 12:55 Matrix: WATER							
Physical Tests							
Conductivity	0.815		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.41		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	3.42		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-4 OW03-II Sampled By: CLIENT on 06-SEP-17 @ 12:55 Matrix: WATER							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	16.5		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	63.6		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	121		10	ug/L	08-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	08-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	4.47		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	2.33		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	6620		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.013		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	1.59		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	22.5		1.0	ug/L	08-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-4 OW03-II Sampled By: CLIENT on 06-SEP-17 @ 12:55 Matrix: WATER							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.4		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	106.6		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	87.8		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-4 OW03-II Sampled By: CLIENT on 06-SEP-17 @ 12:55 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluorene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	95.7		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d12-Chrysene	97.5		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	98.8		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	105.2		60-140	%	11-SEP-17	12-SEP-17	R3824208
L1988005-5 OW07-38S Sampled By: CLIENT on 06-SEP-17 @ 14:00 Matrix: WATER							
Physical Tests							
Conductivity	0.815		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.61		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	2.88		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	0.36		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.32		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	36.7		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	135		10	ug/L	08-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.293		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-5 OW07-38S Sampled By: CLIENT on 06-SEP-17 @ 14:00 Matrix: WATER							
Dissolved Metals							
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	1.56		0.20	ug/L	08-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.057		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	0.966		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	7.30		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.395		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	6030		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.157		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	2.05		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	455		1.0	ug/L	08-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-5 OW07-38S Sampled By: CLIENT on 06-SEP-17 @ 14:00 Matrix: WATER							
Volatile Organic Compounds							
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.8		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	111.9		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	88.7		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-5 OW07-38S Sampled By: CLIENT on 06-SEP-17 @ 14:00 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluorene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	99.9		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d12-Chrysene	105.7		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	102.8		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	107.8		60-140	%	11-SEP-17	12-SEP-17	R3824208
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	14-SEP-17	15-SEP-17	R3829539
Aroclor 1248	<0.020		0.020	ug/L	14-SEP-17	15-SEP-17	R3829539
Aroclor 1254	<0.020		0.020	ug/L	14-SEP-17	15-SEP-17	R3829539
Aroclor 1260	<0.020		0.020	ug/L	14-SEP-17	15-SEP-17	R3829539
Total PCBs	<0.040		0.040	ug/L	14-SEP-17	15-SEP-17	R3829539
Surrogate: 2-fluorobiphenyl	100.0		50-150	%	14-SEP-17	15-SEP-17	R3829539
L1988005-6 OW22D Sampled By: CLIENT on 06-SEP-17 @ 15:08 Matrix: WATER							
Physical Tests							
Conductivity	1.64		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.58		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	48.3	DLHC	2.5	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					08-SEP-17	R3822259
Antimony (Sb)-Dissolved	0.28		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	21.7		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	107		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	89		10	ug/L	08-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.21		0.10	ug/L	08-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	08-SEP-17	11-SEP-17	R3824202

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-6 OW22D Sampled By: CLIENT on 06-SEP-17 @ 15:08 Matrix: WATER							
Dissolved Metals							
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	3.25		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	3.45		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.053		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	08-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	29700		500	ug/L	08-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.032		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	3.46		0.010	ug/L	08-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	08-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	860		1.0	ug/L	08-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	1.39		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	0.61		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823436
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-6 OW22D Sampled By: CLIENT on 06-SEP-17 @ 15:08 Matrix: WATER							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.5		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	107.4		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	90.2		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.065		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Acenaphthylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(a)pyrene	<0.010		0.010	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(b)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Benzo(k)fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Chrysene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Fluoranthene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-6 OW22D Sampled By: CLIENT on 06-SEP-17 @ 15:08 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Fluorene	0.031		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		12-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
2-Methylnaphthalene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Naphthalene	<0.050		0.050	ug/L	11-SEP-17	12-SEP-17	R3824208
Phenanthrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Pyrene	<0.020		0.020	ug/L	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Acenaphthene	88.9		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d12-Chrysene	88.3		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d8-Naphthalene	89.8		60-140	%	11-SEP-17	12-SEP-17	R3824208
Surrogate: d10-Phenanthrene	100.6		60-140	%	11-SEP-17	12-SEP-17	R3824208
L1988005-7 DUP 4 Sampled By: CLIENT on 06-SEP-17 Matrix: WATER							
Physical Tests							
Conductivity	1.64		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.52		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	50.0	DLHC	2.5	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.28		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	22.2		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	107		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	88		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.20		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	3.25		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	3.32		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.057		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	29200		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.033		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-7 DUP 4 Sampled By: CLIENT on 06-SEP-17 Matrix: WATER							
Dissolved Metals							
Uranium (U)-Dissolved	3.47		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	846		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	1.35		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	0.59		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823436
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-7 DUP 4 Sampled By: CLIENT on 06-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	92.8		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		13-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	104.9		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	96.4		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.066		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Acenaphthylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)pyrene	<0.010		0.010	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(b)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(k)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Chrysene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluorene	0.033		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		13-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
2-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Naphthalene	<0.050		0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Phenanthrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-7 DUP 4 Sampled By: CLIENT on 06-SEP-17 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Surrogate: d10-Acenaphthene	88.0		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d12-Chrysene	99.5		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d8-Naphthalene	88.7		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Phenanthrene	101.1		60-140	%	12-SEP-17	13-SEP-17	R3826603
L1988005-8 OW22S Sampled By: CLIENT on 06-SEP-17 @ 16:45 Matrix: WATER							
Physical Tests							
Conductivity	1.28		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.59		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	<2.5	DLHC	2.5	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822248
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.59		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.20		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	38.7		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	63		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.25		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.166		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823689
Molybdenum (Mo)-Dissolved	3.46		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	16.2		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.393		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	2480		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	25.9		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	0.57		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	17.3		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-8 OW22S Sampled By: CLIENT on 06-SEP-17 @ 16:45 Matrix: WATER							
Volatile Organic Compounds							
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<1.7	DLVH	1.7	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	104.9		70-130	%		11-SEP-17	R3823436

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-8 OW22S Sampled By: CLIENT on 06-SEP-17 @ 16:45 Matrix: WATER							
Volatile Organic Compounds							
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	94		25	ug/L		11-SEP-17	R3823436
F1-BTEX	94		25	ug/L		13-SEP-17	
F2 (C10-C16)	6170		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	18500		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	57500		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	38900		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	4060		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	109.5		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	91.9		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	1.01	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Acenaphthylene	<0.290	DLQ	0.29	ug/L	12-SEP-17	13-SEP-17	R3826603
Anthracene	<1.20	DLQ	0.20	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)anthracene	<0.580	DLQ	0.58	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)pyrene	0.106	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(b)fluoranthene	0.248	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(g,h,i)perylene	0.054	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(k)fluoranthene	0.060	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Chrysene	<1.35	DLQ	1.4	ug/L	12-SEP-17	13-SEP-17	R3826603
Dibenzo(ah)anthracene	<0.050	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluoranthene	0.625	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluorene	2.31	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Indeno(1,2,3-cd)pyrene	0.050	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
1+2-Methylnaphthalenes	2.55		0.12	ug/L		13-SEP-17	
1-Methylnaphthalene	2.55	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
2-Methylnaphthalene	<0.110	DLQ	0.11	ug/L	12-SEP-17	13-SEP-17	R3826603
Naphthalene	<0.25	DLQ	0.25	ug/L	12-SEP-17	13-SEP-17	R3826603
Phenanthrene	<1.40	DLQ	1.4	ug/L	12-SEP-17	13-SEP-17	R3826603
Pyrene	1.63	DLM	0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Acenaphthene	100.4		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d12-Chrysene	101.75		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d8-Naphthalene	98.2		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Phenanthrene	106.3		60-140	%	12-SEP-17	13-SEP-17	R3826603
L1988005-9 OW19 Sampled By: CLIENT on 07-SEP-17 @ 09:23 Matrix: WATER							
Physical Tests							
Conductivity	0.777		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.37		0.10	pH units		08-SEP-17	R3822482

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-9 OW19 Sampled By: CLIENT on 07-SEP-17 @ 09:23 Matrix: WATER							
Physical Tests							
Anions and Nutrients							
Chloride (Cl)	4.37		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	1.38		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	101		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	91		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	2.22		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.370		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691
Molybdenum (Mo)-Dissolved	0.945		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	10.1		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.063		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	4490		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	1.96		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	1360	DLHC	10	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-9 OW19 Sampled By: CLIENT on 07-SEP-17 @ 09:23 Matrix: WATER							
Volatile Organic Compounds							
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	4.06		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	0.91		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	0.97		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	1.05		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	96.2		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		13-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-9 OW19 Sampled By: CLIENT on 07-SEP-17 @ 09:23 Matrix: WATER							
Hydrocarbons							
Surrogate: 2-Bromobenzotrifluoride	104.4		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	91.4		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.247		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Acenaphthylene	<0.035	DLQ	0.035	ug/L	12-SEP-17	13-SEP-17	R3826603
Anthracene	<0.065	DLQ	0.065	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)pyrene	<0.010		0.010	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(b)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(k)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Chrysene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluorene	0.352		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
1+2-Methylnaphthalenes	0.277		0.028	ug/L		13-SEP-17	
1-Methylnaphthalene	0.250		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
2-Methylnaphthalene	0.027		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Naphthalene	<0.075	DLQ	0.075	ug/L	12-SEP-17	13-SEP-17	R3826603
Phenanthrene	<0.075	DLQ	0.075	ug/L	12-SEP-17	13-SEP-17	R3826603
Pyrene	0.051		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Acenaphthene	90.3		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d12-Chrysene	105.1		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d8-Naphthalene	89.3		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Phenanthrene	104.1		60-140	%	12-SEP-17	13-SEP-17	R3826603
L1988005-10 OW23D Sampled By: CLIENT on 07-SEP-17 @ 10:25 Matrix: WATER							
Physical Tests							
Conductivity	0.902		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.56		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	67.0		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.14		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	14.0		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	102		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-10 OW23D Sampled By: CLIENT on 07-SEP-17 @ 10:25 Matrix: WATER							
Dissolved Metals							
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	71		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.42		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	1.67		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691
Molybdenum (Mo)-Dissolved	2.64		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	4.27		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.051		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	35200		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.063		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	2.19		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	553		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		08-SEP-17	R3823185
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	1.10		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	25.4		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	0.55		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-10 OW23D Sampled By: CLIENT on 07-SEP-17 @ 10:25 Matrix: WATER							
Volatile Organic Compounds							
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823436
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	2.23		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	7.26		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	92.4		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	99.6		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823436
F1-BTEX	<25		25	ug/L		13-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828769
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F3 (C16-C34)	430		250	ug/L	14-SEP-17	14-SEP-17	R3828769
F3b (C22-C34)	310		130	ug/L	14-SEP-17	14-SEP-17	R3828769
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828769
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828769
Surrogate: 2-Bromobenzotrifluoride	108.4		60-140	%	14-SEP-17	14-SEP-17	R3828769
Surrogate: 3,4-Dichlorotoluene	68.9		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Acenaphthylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)pyrene	<0.010		0.010	ug/L	12-SEP-17	13-SEP-17	R3826603

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-10 OW23D Sampled By: CLIENT on 07-SEP-17 @ 10:25 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(b)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(k)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Chrysene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluorene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		13-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
2-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Naphthalene	<0.050		0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Phenanthrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Acenaphthene	85.5		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d12-Chrysene	97.7		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d8-Naphthalene	85.8		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Phenanthrene	96.3		60-140	%	12-SEP-17	13-SEP-17	R3826603
L1988005-11 OW13-39D Sampled By: CLIENT on 07-SEP-17 @ 12:06 Matrix: WATER							
Physical Tests							
Conductivity	0.930		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.57		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	44.3		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.23		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	9.58		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	283		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	251		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.28		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	3.92		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-11 OW13-39D Sampled By: CLIENT on 07-SEP-17 @ 12:06 Matrix: WATER							
Dissolved Metals							
Molybdenum (Mo)-Dissolved	3.82		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	2.16		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	25000		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	3.65		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	260		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		12-SEP-17	R3825902
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	0.61		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	15.2		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	192		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	22.2		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		12-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823436
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-11 OW13-39D Sampled By: CLIENT on 07-SEP-17 @ 12:06 Matrix: WATER							
Volatile Organic Compounds							
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	1290	DLHC	5.0	ug/L		12-SEP-17	R3823489
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	45.2		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		12-SEP-17	
Surrogate: 4-Bromofluorobenzene	94.2		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	313		25	ug/L		11-SEP-17	R3823436
F1-BTEX	312		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	15-SEP-17	15-SEP-17	R3830635
F3a (C16-C22)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F3 (C16-C34)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
F3b (C22-C34)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F4 (C34-C50)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
Chrom. to baseline at nC50	YES				15-SEP-17	15-SEP-17	R3830635
Surrogate: 2-Bromobenzotrifluoride	99.3		60-140	%	15-SEP-17	15-SEP-17	R3830635
Surrogate: 3,4-Dichlorotoluene	87.8		60-140	%		11-SEP-17	R3823436
L1988005-12 OW13-39S Sampled By: CLIENT on 07-SEP-17 @ 13:21 Matrix: WATER							
Physical Tests							
Conductivity	0.761		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.51		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	19.3		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.73		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-12 OW13-39S Sampled By: CLIENT on 07-SEP-17 @ 13:21 Matrix: WATER							
Dissolved Metals							
Barium (Ba)-Dissolved	68.0		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	133		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.245		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	0.74		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	0.59		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	0.55		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.476		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691
Molybdenum (Mo)-Dissolved	0.563		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	2.27		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.313		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	15300		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.060		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	0.881		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	698		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		12-SEP-17	R3825902
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	1.00		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	51.2		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	4.72		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-12 OW13-39S Sampled By: CLIENT on 07-SEP-17 @ 13:21 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	184		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	2.76		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	95.3		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	34		25	ug/L		11-SEP-17	R3823436
F1-BTEX	34		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	15-SEP-17	15-SEP-17	R3830635
F3a (C16-C22)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F3 (C16-C34)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
F3b (C22-C34)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F4 (C34-C50)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
Chrom. to baseline at nC50	YES				15-SEP-17	15-SEP-17	R3830635
Surrogate: 2-Bromobenzotrifluoride	108.6		60-140	%	15-SEP-17	15-SEP-17	R3830635
Surrogate: 3,4-Dichlorotoluene	72.2		60-140	%		11-SEP-17	R3823436
L1988005-13 OW24S Sampled By: CLIENT on 07-SEP-17 @ 15:05 Matrix: WATER							
Physical Tests							
Conductivity	1.21		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.55		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-13 OW24S Sampled By: CLIENT on 07-SEP-17 @ 15:05 Matrix: WATER							
Anions and Nutrients							
Chloride (Cl)	170	DLHC	2.5	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.12		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	0.11		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	65.0		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	125		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.358		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	1.00		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691
Molybdenum (Mo)-Dissolved	0.225		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	1.20		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.555		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	100000	DLHC	5000	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.069		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	0.747		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	674		1.0	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		12-SEP-17	R3825902
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-13 OW24S Sampled By: CLIENT on 07-SEP-17 @ 15:05 Matrix: WATER							
Volatile Organic Compounds							
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	0.85		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	45.1		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	2.47		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	325		0.50	ug/L		11-SEP-17	R3823436
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.9		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	84		25	ug/L		11-SEP-17	R3823436
F1-BTEX	84		25	ug/L		18-SEP-17	
F2 (C10-C16)	<100		100	ug/L	15-SEP-17	15-SEP-17	R3830635
F2-Naphth	<100		100	ug/L		18-SEP-17	
F3a (C16-C22)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F3 (C16-C34)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
F3b (C22-C34)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F3-PAH	<250		250	ug/L		18-SEP-17	
F4 (C34-C50)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-13 OW24S Sampled By: CLIENT on 07-SEP-17 @ 15:05 Matrix: WATER							
Hydrocarbons							
Total Hydrocarbons (C6-C50)	<370		370	ug/L		18-SEP-17	
Chrom. to baseline at nC50	YES				15-SEP-17	15-SEP-17	R3830635
Surrogate: 2-Bromobenzotrifluoride	104.0		60-140	%	15-SEP-17	15-SEP-17	R3830635
Surrogate: 3,4-Dichlorotoluene	93.9		60-140	%		11-SEP-17	R3823436
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Acenaphthylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(a)pyrene	<0.010		0.010	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(b)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Benzo(k)fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Chrysene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluoranthene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Fluorene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		18-SEP-17	
1-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
2-Methylnaphthalene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Naphthalene	<0.050		0.050	ug/L	12-SEP-17	13-SEP-17	R3826603
Phenanthrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Pyrene	<0.020		0.020	ug/L	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Acenaphthene	89.6		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d12-Chrysene	101.7		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d8-Naphthalene	89.8		60-140	%	12-SEP-17	13-SEP-17	R3826603
Surrogate: d10-Phenanthrene	98.8		60-140	%	12-SEP-17	13-SEP-17	R3826603
Semi-Volatile Organics							
Biphenyl	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
4-Chloroaniline	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2-Chlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-SEP-17	18-SEP-17	R3828279
Diethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Dimethylphthalate	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-13 OW24S Sampled By: CLIENT on 07-SEP-17 @ 15:05 Matrix: WATER							
Semi-Volatile Organics							
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L		18-SEP-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-SEP-17	18-SEP-17	R3828279
Pentachlorophenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenanthrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Phenol	<0.50		0.50	ug/L	13-SEP-17	18-SEP-17	R3828279
Pyrene	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2-Fluorobiphenyl	102.5		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Nitrobenzene d5	93.7		50-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: Phenol d5	45.9		30-130	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: p-Terphenyl d14	99.9		60-140	%	13-SEP-17	18-SEP-17	R3828279
Surrogate: 2,4,6-Tribromophenol	117.0		50-140	%	13-SEP-17	18-SEP-17	R3828279
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	18-SEP-17	18-SEP-17	R3829539
Aroclor 1248	<0.020		0.020	ug/L	18-SEP-17	18-SEP-17	R3829539
Aroclor 1254	<0.020		0.020	ug/L	18-SEP-17	18-SEP-17	R3829539
Aroclor 1260	<0.020		0.020	ug/L	18-SEP-17	18-SEP-17	R3829539
Total PCBs	<0.040		0.040	ug/L	18-SEP-17	18-SEP-17	R3829539
Surrogate: 2-fluorobiphenyl	81.8		50-150	%	18-SEP-17	18-SEP-17	R3829539
L1988005-14 OW24D Sampled By: CLIENT on 07-SEP-17 @ 16:08 Matrix: WATER							
Physical Tests							
Conductivity	0.814		0.0030	mS/cm		08-SEP-17	R3822482
pH	7.56		0.10	pH units		08-SEP-17	R3822482
Anions and Nutrients							
Chloride (Cl)	41.1		0.50	mg/L		13-SEP-17	R3828551
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		14-SEP-17	R3829167
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					08-SEP-17	R3822249
Dissolved Metals Filtration Location	FIELD					11-SEP-17	R3823390
Antimony (Sb)-Dissolved	0.19		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Arsenic (As)-Dissolved	1.01		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Barium (Ba)-Dissolved	187		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Boron (B)-Dissolved	134		10	ug/L	11-SEP-17	11-SEP-17	R3824202
Cadmium (Cd)-Dissolved	0.751		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-14 OW24D Sampled By: CLIENT on 07-SEP-17 @ 16:08 Matrix: WATER							
Dissolved Metals							
Cobalt (Co)-Dissolved	0.34		0.10	ug/L	11-SEP-17	11-SEP-17	R3824202
Copper (Cu)-Dissolved	0.67		0.20	ug/L	11-SEP-17	11-SEP-17	R3824202
Lead (Pb)-Dissolved	0.141		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	08-SEP-17	11-SEP-17	R3823691
Molybdenum (Mo)-Dissolved	0.586		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Nickel (Ni)-Dissolved	1.96		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Selenium (Se)-Dissolved	0.130		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	11-SEP-17	11-SEP-17	R3824202
Sodium (Na)-Dissolved	26900		500	ug/L	11-SEP-17	11-SEP-17	R3824202
Thallium (Tl)-Dissolved	0.137		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Uranium (U)-Dissolved	1.23		0.010	ug/L	11-SEP-17	11-SEP-17	R3824202
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	11-SEP-17	11-SEP-17	R3824202
Zinc (Zn)-Dissolved	949	DLHC	10	ug/L	11-SEP-17	11-SEP-17	R3824202
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		12-SEP-17	R3825902
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823436
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823436
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823436
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823436
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823436
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823436
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1-Dichloroethylene	9.93		0.50	ug/L		11-SEP-17	R3823436
cis-1,2-Dichloroethylene	225		0.50	ug/L		11-SEP-17	R3823436
trans-1,2-Dichloroethylene	22.7		0.50	ug/L		11-SEP-17	R3823436
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823436
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823436
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823436
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		12-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823436

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-14 OW24D Sampled By: CLIENT on 07-SEP-17 @ 16:08 Matrix: WATER							
Volatile Organic Compounds							
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823436
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823436
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823436
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823436
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823436
Trichloroethylene	1170	DLHC	5.0	ug/L		12-SEP-17	R3823489
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823436
Vinyl chloride	14.2		0.50	ug/L		11-SEP-17	R3823436
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823436
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823436
Xylenes (Total)	<0.50		0.50	ug/L		12-SEP-17	
Surrogate: 4-Bromofluorobenzene	93.5		70-130	%		11-SEP-17	R3823436
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		11-SEP-17	R3823436
Hydrocarbons							
F1 (C6-C10)	304		25	ug/L		11-SEP-17	R3823436
F1-BTEX	304		25	ug/L		12-SEP-17	
F2 (C10-C16)	<100		100	ug/L	15-SEP-17	15-SEP-17	R3830635
F3a (C16-C22)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F3 (C16-C34)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
F3b (C22-C34)	<130		130	ug/L	15-SEP-17	15-SEP-17	R3830635
F4 (C34-C50)	<250		250	ug/L	15-SEP-17	15-SEP-17	R3830635
Chrom. to baseline at nC50	YES				15-SEP-17	15-SEP-17	R3830635
Surrogate: 2-Bromobenzotrifluoride	99.6		60-140	%	15-SEP-17	15-SEP-17	R3830635
Surrogate: 3,4-Dichlorotoluene	87.2		60-140	%		11-SEP-17	R3823436
L1988005-15 TRIP BLANK 5 Sampled By: CLIENT on 07-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-15 TRIP BLANK 5 Sampled By: CLIENT on 07-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	99.8		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	102.6		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
Surrogate: 3,4-Dichlorotoluene	103.8		60-140	%		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-16 TRIP BLANK 6 Sampled By: CLIENT on 07-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988005-16 TRIP BLANK 6 Sampled By: CLIENT on 07-SEP-17 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	99.7		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	102.0		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
Surrogate: 3,4-Dichlorotoluene	95.4		60-140	%		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1988005-1, -2, -3, -4, -5, -6
Matrix Spike	Boron (B)-Dissolved	MS-B	L1988005-1, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1988005-1, -2, -3, -4, -5, -6
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1988005-1, -2, -3, -4, -5, -6
Laboratory Control Sample Duplicate	4-Chloroaniline	RRQC	L1988005-1, -13, -3

Comments: Lab control sample recovery outside ALS DQO. Associated sample results have not been affected.

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRQC	Refer to report remarks for information regarding this QC result.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and

Reference Information

the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS
Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT Water F2-F4 (O.Reg.153/04) MOE DECPH-E3398/CCME TIER 1

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8
The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270
Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082
Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT Water pH APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260
Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1988005 Report Date: 18-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3823436								
WG2611290-4 DUP		**WG2611290-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2611290-1 LCS								
1,4-Dioxane			99.6		%		60-140	11-SEP-17
WG2611290-2 MB								
1,4-Dioxane			<20		ug/L		20	11-SEP-17
WG2611290-5 MS		**WG2611290-3**						
1,4-Dioxane			92.4		%		50-140	11-SEP-17
625-511-WT	**Water**							
Batch R3828279								
WG2613961-2 LCS								
1,2,4-Trichlorobenzene			68.8		%		50-140	14-SEP-17
2-Chlorophenol			93.5		%		50-140	14-SEP-17
2,4-Dichlorophenol			105.6		%		50-140	14-SEP-17
2,4-Dimethylphenol			110.0		%		30-130	14-SEP-17
2,4-Dinitrophenol			86.0		%		50-140	14-SEP-17
2,4-Dinitrotoluene			113.5		%		50-140	14-SEP-17
2,4,5-Trichlorophenol			112.4		%		50-140	14-SEP-17
2,4,6-Trichlorophenol			107.1		%		50-140	14-SEP-17
2,6-Dinitrotoluene			104.4		%		50-140	14-SEP-17
3,3'-Dichlorobenzidine			87.9		%		30-130	14-SEP-17
4-Chloroaniline			86.2		%		30-130	14-SEP-17
Biphenyl			87.1		%		50-140	14-SEP-17
Bis(2-chloroethyl)ether			99.4		%		50-140	14-SEP-17
Bis(2-chloroisopropyl)ether			95.7		%		50-140	14-SEP-17
Bis(2-ethylhexyl)phthalate			90.7		%		50-140	14-SEP-17
Diethylphthalate			93.4		%		50-140	14-SEP-17
Dimethylphthalate			89.4		%		50-140	14-SEP-17
Pentachlorophenol			112.6		%		50-140	14-SEP-17
Phenanthrene			101.4		%		50-140	14-SEP-17
Phenol			52.1		%		30-130	14-SEP-17
Pyrene			94.7		%		50-140	14-SEP-17
WG2613961-3 LCSD		**WG2613961-2**						
4-Chloroaniline		86.2	43.9	RRQC	%	65	50	14-SEP-17

COMMENTS: Lab control sample recovery outside ALS DQO. Associated sample results have not been affected.

WG2613961-3 LCSD **WG2613961-2**

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3828279								
WG2613961-3 LCSD		**WG2613961-2**						
1,2,4-Trichlorobenzene		68.8	67.9		%	1.3	50	14-SEP-17
2-Chlorophenol		93.5	89.8		%	4.0	50	14-SEP-17
2,4-Dichlorophenol		105.6	100.8		%	4.7	50	14-SEP-17
2,4-Dimethylphenol		110.0	106.1		%	3.7	50	14-SEP-17
2,4-Dinitrophenol		86.0	92.8		%	7.6	50	14-SEP-17
2,4-Dinitrotoluene		113.5	102.3		%	10	50	14-SEP-17
2,4,5-Trichlorophenol		112.4	110.9		%	1.3	50	14-SEP-17
2,4,6-Trichlorophenol		107.1	103.5		%	3.4	50	14-SEP-17
2,6-Dinitrotoluene		104.4	101.9		%	2.5	50	14-SEP-17
3,3'-Dichlorobenzidine		87.9	63.7		%	32	50	14-SEP-17
Biphenyl		87.1	84.6		%	2.9	50	14-SEP-17
Bis(2-chloroethyl)ether		99.4	92.7		%	7.0	50	14-SEP-17
Bis(2-chloroisopropyl)ether		95.7	94.3		%	1.5	50	14-SEP-17
Bis(2-ethylhexyl)phthalate		90.7	83.5		%	8.2	50	14-SEP-17
Diethylphthalate		93.4	88.3		%	5.7	50	14-SEP-17
Dimethylphthalate		89.4	87.8		%	1.7	50	14-SEP-17
Pentachlorophenol		112.6	117.9		%	4.6	50	14-SEP-17
Phenanthrene		101.4	95.5		%	6.0	50	14-SEP-17
Phenol		52.1	49.6		%	4.9	50	14-SEP-17
Pyrene		94.7	88.2		%	7.1	50	14-SEP-17
WG2613961-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	15-SEP-17
2-Chlorophenol			<0.30		ug/L		0.3	15-SEP-17
2,4-Dichlorophenol			<0.30		ug/L		0.3	15-SEP-17
2,4-Dimethylphenol			<0.50		ug/L		0.5	15-SEP-17
2,4-Dinitrophenol			<1.0		ug/L		1	15-SEP-17
2,4-Dinitrotoluene			<0.40		ug/L		0.4	15-SEP-17
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	15-SEP-17
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	15-SEP-17
2,6-Dinitrotoluene			<0.40		ug/L		0.4	15-SEP-17
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	15-SEP-17
4-Chloroaniline			<0.40		ug/L		0.4	15-SEP-17
Biphenyl			<0.40		ug/L		0.4	15-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3828279								
WG2613961-1 MB								
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	15-SEP-17
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	15-SEP-17
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	15-SEP-17
Diethylphthalate			<0.20		ug/L		0.2	15-SEP-17
Dimethylphthalate			<0.20		ug/L		0.2	15-SEP-17
Pentachlorophenol			<0.50		ug/L		0.5	15-SEP-17
Phenanthrene			<0.20		ug/L		0.2	15-SEP-17
Phenol			<0.50		ug/L		0.5	15-SEP-17
Pyrene			<0.20		ug/L		0.2	15-SEP-17
Surrogate: 2-Fluorobiphenyl			97.5		%		50-140	15-SEP-17
Surrogate: 2,4,6-Tribromophenol			98.2		%		50-140	15-SEP-17
Surrogate: Nitrobenzene d5			97.6		%		50-140	15-SEP-17
Surrogate: p-Terphenyl d14			95.9		%		60-140	15-SEP-17
Surrogate: Phenol d5			45.7		%		30-130	15-SEP-17
CL-IC-N-WT	**Water**							
Batch R3828551								
WG2614721-4 DUP		**WG2614721-3**						
Chloride (Cl)		31.0	31.1		mg/L	0.1	20	13-SEP-17
WG2614721-2 LCS								
Chloride (Cl)			99.1		%		90-110	13-SEP-17
WG2614721-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	13-SEP-17
WG2614721-5 MS		**WG2614721-3**						
Chloride (Cl)			103.2		%		75-125	13-SEP-17
CN-WAD-R511-WT	**Water**							
Batch R3829167								
WG2616103-3 DUP		**L1988005-1**						
Cyanide, Weak Acid Diss		<2.0	<2.0	RPD-NA	ug/L	N/A	20	14-SEP-17
WG2616103-2 LCS								
Cyanide, Weak Acid Diss			113.4		%		80-120	14-SEP-17
WG2616103-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	14-SEP-17
WG2616103-4 MS		**L1988005-1**						
Cyanide, Weak Acid Diss			113.3		%		70-130	14-SEP-17
CR-CR6-IC-R511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	**Water**							
Batch R3823185								
WG2611524-4 DUP		**WG2611524-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	08-SEP-17
WG2611524-2 LCS								
Chromium, Hexavalent			101.0		%		80-120	08-SEP-17
WG2611524-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	08-SEP-17
WG2611524-5 MS		**WG2611524-3**						
Chromium, Hexavalent			98.6		%		70-130	08-SEP-17
Batch R3825902								
WG2614549-4 DUP		**WG2614549-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	12-SEP-17
WG2614549-2 LCS								
Chromium, Hexavalent			100.1		%		80-120	12-SEP-17
WG2614549-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	12-SEP-17
WG2614549-5 MS		**WG2614549-3**						
Chromium, Hexavalent			100.8		%		70-130	12-SEP-17
EC-R511-WT	**Water**							
Batch R3822482								
WG2611419-20 DUP		**WG2611419-19**						
Conductivity		0.736	0.736		mS/cm	0.0	10	08-SEP-17
WG2611419-24 DUP		**WG2611419-23**						
Conductivity		1.64	1.64		mS/cm	0.1	10	08-SEP-17
WG2611419-18 LCS								
Conductivity			101.2		%		90-110	08-SEP-17
WG2611419-22 LCS								
Conductivity			101.8		%		90-110	08-SEP-17
WG2611419-17 MB								
Conductivity			<0.0030		mS/cm		0.003	08-SEP-17
WG2611419-21 MB								
Conductivity			<0.0030		mS/cm		0.003	08-SEP-17
F1-HS-511-WT	**Water**							
Batch R3823436								
WG2611290-4 DUP		**WG2611290-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2611290-1 LCS								
F1 (C6-C10)			105.2		%		80-120	11-SEP-17
WG2611290-2 MB								

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R3823436								
WG2611290-2 MB								
F1 (C6-C10)			<25		ug/L		25	11-SEP-17
Surrogate: 3,4-Dichlorotoluene			85.4		%		60-140	11-SEP-17
WG2611290-5 MS		**WG2611290-3**						
F1 (C6-C10)			74.3		%		60-140	11-SEP-17
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
F1 (C6-C10)			103.1		%		80-120	11-SEP-17
WG2594560-2 MB								
F1 (C6-C10)			<25		ug/L		25	11-SEP-17
Surrogate: 3,4-Dichlorotoluene			87.8		%		60-140	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
F1 (C6-C10)			88.7		%		60-140	11-SEP-17
F2-F4-UW-WT	**Water**							
Batch R3828769								
WG2614609-2 LCS								
F2 (C10-C16)			111.8		%		70-130	14-SEP-17
F3a (C16-C22)			108.4		%		70-130	14-SEP-17
F3b (C22-C34)			99.4		%		70-130	14-SEP-17
F3 (C16-C34)			104.6		%		70-130	14-SEP-17
F4 (C34-C50)			127.7		%		70-130	14-SEP-17
WG2614609-3 LCSD		**WG2614609-2**						
F2 (C10-C16)		111.8	118.4		%	5.7	50	14-SEP-17
F3a (C16-C22)		108.4	114.7		%	5.6	50	14-SEP-17
F3b (C22-C34)		99.4	114.6		%	14	50	14-SEP-17
F3 (C16-C34)		104.6	114.7		%	9.2	50	14-SEP-17
F4 (C34-C50)		127.7	127.1		%	0.5	50	14-SEP-17
WG2614609-1 MB								
F2 (C10-C16)			<100		ug/L		100	14-SEP-17
F3a (C16-C22)			<130		ug/L		125	14-SEP-17
F3b (C22-C34)			<130		ug/L		125	14-SEP-17
F3 (C16-C34)			<250		ug/L		250	14-SEP-17
F4 (C34-C50)			<250		ug/L		250	14-SEP-17
Surrogate: 2-Bromobenzotrifluoride			106.4		%		60-140	14-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Water**							
Batch R3830635								
WG2616554-2 LCS								
F2 (C10-C16)			111.7		%		70-130	15-SEP-17
F3a (C16-C22)			113.4		%		70-130	15-SEP-17
F3b (C22-C34)			116.0		%		70-130	15-SEP-17
F3 (C16-C34)			114.5		%		70-130	15-SEP-17
F4 (C34-C50)			120.3		%		70-130	15-SEP-17
WG2616554-3 LCSD		**WG2616554-2**						
F2 (C10-C16)		111.7	118.1		%	5.5	50	15-SEP-17
F3a (C16-C22)		113.4	116.1		%	2.3	50	15-SEP-17
F3b (C22-C34)		116.0	124.4		%	7.0	50	15-SEP-17
F3 (C16-C34)		114.5	119.6		%	4.4	50	15-SEP-17
F4 (C34-C50)		120.3	119.7		%	0.5	50	15-SEP-17
WG2616554-1 MB								
F2 (C10-C16)			<100		ug/L		100	15-SEP-17
F3a (C16-C22)			<130		ug/L		125	15-SEP-17
F3b (C22-C34)			<130		ug/L		125	15-SEP-17
F3 (C16-C34)			<250		ug/L		250	15-SEP-17
F4 (C34-C50)			<250		ug/L		250	15-SEP-17
Surrogate: 2-Bromobenzotrifluoride			99.6		%		60-140	15-SEP-17
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3823689								
WG2611556-4 DUP		**WG2611556-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	11-SEP-17
WG2611556-2 LCS								
Mercury (Hg)-Dissolved			101.0		%		80-120	11-SEP-17
WG2611556-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
WG2611556-6 MS		**WG2611556-5**						
Mercury (Hg)-Dissolved			97.8		%		70-130	11-SEP-17
Batch R3823691								
WG2611557-3 DUP		**L1988005-9**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	11-SEP-17
WG2611557-2 LCS								
Mercury (Hg)-Dissolved			100.0		%		80-120	11-SEP-17
WG2611557-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3823691								
WG2611557-4 MS		**L1988005-10**						
Mercury (Hg)-Dissolved			94.6		%		70-130	11-SEP-17
MET-D-UG/L-MS-WT	**Water**							
Batch R3824202								
WG2611560-4 DUP		**WG2611560-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	11-SEP-17
Arsenic (As)-Dissolved		0.22	0.25		ug/L	15	20	11-SEP-17
Barium (Ba)-Dissolved		123	119		ug/L	3.1	20	11-SEP-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	11-SEP-17
Boron (B)-Dissolved		191	200		ug/L	4.8	20	11-SEP-17
Cadmium (Cd)-Dissolved		0.040	0.047		ug/L	16	20	11-SEP-17
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-SEP-17
Cobalt (Co)-Dissolved		0.30	0.29		ug/L	2.3	20	11-SEP-17
Copper (Cu)-Dissolved		4.10	3.93		ug/L	4.2	20	11-SEP-17
Lead (Pb)-Dissolved		0.115	0.108		ug/L	5.8	20	11-SEP-17
Molybdenum (Mo)-Dissolved		0.309	0.258		ug/L	18	20	11-SEP-17
Nickel (Ni)-Dissolved		4.38	4.25		ug/L	3.1	20	11-SEP-17
Selenium (Se)-Dissolved		0.052	<0.050	RPD-NA	ug/L	N/A	20	11-SEP-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	11-SEP-17
Sodium (Na)-Dissolved		166000	165000		ug/L	0.9	20	11-SEP-17
Thallium (Tl)-Dissolved		0.059	0.061		ug/L	2.8	20	11-SEP-17
Uranium (U)-Dissolved		0.401	0.406		ug/L	1.4	20	11-SEP-17
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-SEP-17
Zinc (Zn)-Dissolved		5.6	4.4	J	ug/L	1.2	2	11-SEP-17
WG2612645-4 DUP		**WG2612645-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	11-SEP-17
Arsenic (As)-Dissolved		0.39	0.35		ug/L	11	20	11-SEP-17
Barium (Ba)-Dissolved		10.1	9.91		ug/L	1.5	20	11-SEP-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	11-SEP-17
Boron (B)-Dissolved		13	13		ug/L	3.9	20	11-SEP-17
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	11-SEP-17
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-SEP-17
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3824202								
WG2612645-4 DUP		**WG2612645-3**						
Copper (Cu)-Dissolved		0.47	0.47		ug/L	0.2	20	11-SEP-17
Lead (Pb)-Dissolved		0.050	0.051		ug/L	1.8	20	11-SEP-17
Molybdenum (Mo)-Dissolved		0.145	0.146		ug/L	0.9	20	11-SEP-17
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-SEP-17
Selenium (Se)-Dissolved		0.096	0.095		ug/L	1.4	20	11-SEP-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	11-SEP-17
Sodium (Na)-Dissolved		1490	1500		ug/L	0.9	20	11-SEP-17
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	11-SEP-17
Uranium (U)-Dissolved		0.097	0.099		ug/L	2.7	20	11-SEP-17
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	11-SEP-17
Zinc (Zn)-Dissolved		1.7	1.6		ug/L	9.9	20	11-SEP-17
WG2611560-2 LCS								
Antimony (Sb)-Dissolved			97.8		%		80-120	11-SEP-17
Arsenic (As)-Dissolved			100.7		%		80-120	11-SEP-17
Barium (Ba)-Dissolved			98.1		%		80-120	11-SEP-17
Beryllium (Be)-Dissolved			101.6		%		80-120	11-SEP-17
Boron (B)-Dissolved			101.0		%		80-120	11-SEP-17
Cadmium (Cd)-Dissolved			99.6		%		80-120	11-SEP-17
Chromium (Cr)-Dissolved			100.7		%		80-120	11-SEP-17
Cobalt (Co)-Dissolved			99.5		%		80-120	11-SEP-17
Copper (Cu)-Dissolved			98.5		%		80-120	11-SEP-17
Lead (Pb)-Dissolved			101.5		%		80-120	11-SEP-17
Molybdenum (Mo)-Dissolved			102.4		%		80-120	11-SEP-17
Nickel (Ni)-Dissolved			99.2		%		80-120	11-SEP-17
Selenium (Se)-Dissolved			98.7		%		80-120	11-SEP-17
Silver (Ag)-Dissolved			100.4		%		80-120	11-SEP-17
Sodium (Na)-Dissolved			101.4		%		80-120	11-SEP-17
Thallium (Tl)-Dissolved			96.1		%		80-120	11-SEP-17
Uranium (U)-Dissolved			101.7		%		80-120	11-SEP-17
Vanadium (V)-Dissolved			101.5		%		80-120	11-SEP-17
Zinc (Zn)-Dissolved			95.6		%		80-120	11-SEP-17
WG2612645-2 LCS								
Antimony (Sb)-Dissolved			96.9		%		80-120	11-SEP-17
Arsenic (As)-Dissolved			97.5		%		80-120	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3824202								
WG2612645-2 LCS								
Arsenic (As)-Dissolved			97.5		%		80-120	11-SEP-17
Barium (Ba)-Dissolved			97.8		%		80-120	11-SEP-17
Beryllium (Be)-Dissolved			97.4		%		80-120	11-SEP-17
Boron (B)-Dissolved			96.8		%		80-120	11-SEP-17
Cadmium (Cd)-Dissolved			95.6		%		80-120	11-SEP-17
Chromium (Cr)-Dissolved			95.9		%		80-120	11-SEP-17
Cobalt (Co)-Dissolved			94.8		%		80-120	11-SEP-17
Copper (Cu)-Dissolved			94.8		%		80-120	11-SEP-17
Lead (Pb)-Dissolved			101.1		%		80-120	11-SEP-17
Molybdenum (Mo)-Dissolved			101.5		%		80-120	11-SEP-17
Nickel (Ni)-Dissolved			94.7		%		80-120	11-SEP-17
Selenium (Se)-Dissolved			94.3		%		80-120	11-SEP-17
Silver (Ag)-Dissolved			100.5		%		80-120	11-SEP-17
Sodium (Na)-Dissolved			95.7		%		80-120	11-SEP-17
Thallium (Tl)-Dissolved			95.9		%		80-120	11-SEP-17
Uranium (U)-Dissolved			100.8		%		80-120	11-SEP-17
Vanadium (V)-Dissolved			97.1		%		80-120	11-SEP-17
Zinc (Zn)-Dissolved			91.6		%		80-120	11-SEP-17
WG2611560-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Boron (B)-Dissolved			<10		ug/L		10	11-SEP-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	11-SEP-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Sodium (Na)-Dissolved			<500		ug/L		500	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3824202								
WG2611560-1 MB								
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	11-SEP-17
WG2612645-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Boron (B)-Dissolved			<10		ug/L		10	11-SEP-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	11-SEP-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	11-SEP-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	11-SEP-17
Sodium (Na)-Dissolved			<500		ug/L		500	11-SEP-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	11-SEP-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	11-SEP-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	11-SEP-17
WG2611560-5 MS		**WG2611560-3**						
Antimony (Sb)-Dissolved			99.9		%		70-130	11-SEP-17
Arsenic (As)-Dissolved			107.6		%		70-130	11-SEP-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	11-SEP-17
Beryllium (Be)-Dissolved			108.9		%		70-130	11-SEP-17
Boron (B)-Dissolved			N/A	MS-B	%		-	11-SEP-17
Cadmium (Cd)-Dissolved			95.7		%		70-130	11-SEP-17
Chromium (Cr)-Dissolved			103.1		%		70-130	11-SEP-17
Cobalt (Co)-Dissolved			97.7		%		70-130	11-SEP-17
Copper (Cu)-Dissolved			90.9		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3824202								
WG2611560-5 MS		**WG2611560-3**						
Lead (Pb)-Dissolved			94.4		%		70-130	11-SEP-17
Molybdenum (Mo)-Dissolved			101.7		%		70-130	11-SEP-17
Nickel (Ni)-Dissolved			91.8		%		70-130	11-SEP-17
Selenium (Se)-Dissolved			104.8		%		70-130	11-SEP-17
Silver (Ag)-Dissolved			74.7		%		70-130	12-SEP-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	11-SEP-17
Thallium (Tl)-Dissolved			92.4		%		70-130	11-SEP-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	11-SEP-17
Vanadium (V)-Dissolved			108.6		%		70-130	11-SEP-17
Zinc (Zn)-Dissolved			91.0		%		70-130	11-SEP-17
WG2612645-5 MS		**WG2612645-3**						
Antimony (Sb)-Dissolved			94.9		%		70-130	11-SEP-17
Arsenic (As)-Dissolved			103.7		%		70-130	11-SEP-17
Beryllium (Be)-Dissolved			101.0		%		70-130	11-SEP-17
Boron (B)-Dissolved			74.1		%		70-130	11-SEP-17
Cadmium (Cd)-Dissolved			97.6		%		70-130	11-SEP-17
Chromium (Cr)-Dissolved			90.6		%		70-130	11-SEP-17
Cobalt (Co)-Dissolved			94.2		%		70-130	11-SEP-17
Copper (Cu)-Dissolved			96.2		%		70-130	11-SEP-17
Lead (Pb)-Dissolved			98.9		%		70-130	11-SEP-17
Molybdenum (Mo)-Dissolved			97.5		%		70-130	11-SEP-17
Nickel (Ni)-Dissolved			92.8		%		70-130	11-SEP-17
Selenium (Se)-Dissolved			109.3		%		70-130	11-SEP-17
Silver (Ag)-Dissolved			94.5		%		70-130	11-SEP-17
Sodium (Na)-Dissolved			90.2		%		70-130	11-SEP-17
Thallium (Tl)-Dissolved			94.9		%		70-130	11-SEP-17
Vanadium (V)-Dissolved			95.3		%		70-130	11-SEP-17
Zinc (Zn)-Dissolved			110.8		%		70-130	11-SEP-17
PAH-511-WT	**Water**							
Batch R3824208								
WG2612759-2 LCS								
1-Methylnaphthalene			90.9		%		50-140	12-SEP-17
2-Methylnaphthalene			91.5		%		50-140	12-SEP-17
Acenaphthene			90.9		%		50-140	12-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3824208								
WG2612759-2 LCS								
Acenaphthylene			97.6		%		50-140	12-SEP-17
Anthracene			90.2		%		50-140	12-SEP-17
Benzo(a)anthracene			96.8		%		50-140	12-SEP-17
Benzo(a)pyrene			98.7		%		50-140	12-SEP-17
Benzo(b)fluoranthene			90.8		%		50-140	12-SEP-17
Benzo(g,h,i)perylene			96.2		%		50-140	12-SEP-17
Benzo(k)fluoranthene			106.9		%		50-140	12-SEP-17
Chrysene			97.0		%		50-140	12-SEP-17
Dibenzo(ah)anthracene			101.7		%		50-140	12-SEP-17
Fluoranthene			101.2		%		50-140	12-SEP-17
Fluorene			95.2		%		50-140	12-SEP-17
Indeno(1,2,3-cd)pyrene			89.2		%		50-140	12-SEP-17
Naphthalene			96.4		%		50-140	12-SEP-17
Phenanthrene			99.1		%		50-140	12-SEP-17
Pyrene			101.0		%		50-140	12-SEP-17
WG2612759-3 LCSD		**WG2612759-2**						
1-Methylnaphthalene		90.9	89.5		%	1.5	50	07-SEP-17
2-Methylnaphthalene		91.5	90.6		%	1.1	50	07-SEP-17
Acenaphthene		90.9	88.9		%	2.2	50	07-SEP-17
Acenaphthylene		97.6	95.5		%	2.2	50	07-SEP-17
Anthracene		90.2	86.7		%	3.9	50	07-SEP-17
Benzo(a)anthracene		96.8	89.3		%	8.1	50	07-SEP-17
Benzo(a)pyrene		98.7	96.5		%	2.3	50	07-SEP-17
Benzo(b)fluoranthene		90.8	91.4		%	0.6	50	07-SEP-17
Benzo(g,h,i)perylene		96.2	93.0		%	3.5	50	07-SEP-17
Benzo(k)fluoranthene		106.9	101.9		%	4.8	50	07-SEP-17
Chrysene		97.0	86.6		%	11	50	07-SEP-17
Dibenzo(ah)anthracene		101.7	100.2		%	1.5	50	07-SEP-17
Fluoranthene		101.2	91.4		%	10	50	07-SEP-17
Fluorene		95.2	92.6		%	2.7	50	07-SEP-17
Indeno(1,2,3-cd)pyrene		89.2	83.4		%	6.7	50	07-SEP-17
Naphthalene		96.4	95.3		%	1.2	50	07-SEP-17
Phenanthrene		99.1	96.2		%	2.9	50	07-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3824208								
WG2612759-3 LCSD		**WG2612759-2**						
Pyrene		101.0	93.9		%	7.2	50	07-SEP-17
WG2612759-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	12-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	12-SEP-17
Acenaphthene			<0.020		ug/L		0.02	12-SEP-17
Acenaphthylene			<0.020		ug/L		0.02	12-SEP-17
Anthracene			<0.020		ug/L		0.02	12-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	12-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	12-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	12-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	12-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	12-SEP-17
Chrysene			<0.020		ug/L		0.02	12-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	12-SEP-17
Fluoranthene			<0.020		ug/L		0.02	12-SEP-17
Fluorene			<0.020		ug/L		0.02	12-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	12-SEP-17
Naphthalene			<0.050		ug/L		0.05	12-SEP-17
Phenanthrene			<0.020		ug/L		0.02	12-SEP-17
Pyrene			<0.020		ug/L		0.02	12-SEP-17
Surrogate: d8-Naphthalene			91.7		%		60-140	12-SEP-17
Surrogate: d10-Phenanthrene			99.0		%		60-140	12-SEP-17
Surrogate: d12-Chrysene			100.5		%		60-140	12-SEP-17
Surrogate: d10-Acenaphthene			90.5		%		60-140	12-SEP-17
Batch R3826603								
WG2613465-2 LCS								
1-Methylnaphthalene			72.8		%		50-140	13-SEP-17
2-Methylnaphthalene			73.2		%		50-140	13-SEP-17
Acenaphthene			76.3		%		50-140	13-SEP-17
Acenaphthylene			84.2		%		50-140	13-SEP-17
Anthracene			84.4		%		50-140	13-SEP-17
Benzo(a)anthracene			104.1		%		50-140	13-SEP-17
Benzo(a)pyrene			89.2		%		50-140	13-SEP-17
Benzo(b)fluoranthene			78.6		%		50-140	13-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3826603								
WG2613465-2 LCS								
Benzo(g,h,i)perylene			84.1		%		50-140	13-SEP-17
Benzo(k)fluoranthene			88.6		%		50-140	13-SEP-17
Chrysene			92.3		%		50-140	13-SEP-17
Dibenzo(ah)anthracene			89.8		%		50-140	13-SEP-17
Fluoranthene			82.9		%		50-140	13-SEP-17
Fluorene			83.8		%		50-140	13-SEP-17
Indeno(1,2,3-cd)pyrene			83.2		%		50-140	13-SEP-17
Naphthalene			75.8		%		50-140	13-SEP-17
Phenanthrene			86.1		%		50-140	13-SEP-17
Pyrene			85.3		%		50-140	13-SEP-17
WG2613465-3 LCSD		**WG2613465-2**						
1-Methylnaphthalene		72.8	77.6		%	6.4	50	13-SEP-17
2-Methylnaphthalene		73.2	78.5		%	7.0	50	13-SEP-17
Acenaphthene		76.3	79.8		%	4.4	50	13-SEP-17
Acenaphthylene		84.2	87.0		%	3.3	50	13-SEP-17
Anthracene		84.4	96.9		%	14	50	13-SEP-17
Benzo(a)anthracene		104.1	102.5		%	1.5	50	13-SEP-17
Benzo(a)pyrene		89.2	92.2		%	3.4	50	13-SEP-17
Benzo(b)fluoranthene		78.6	85.0		%	7.9	50	13-SEP-17
Benzo(g,h,i)perylene		84.1	84.6		%	0.6	50	13-SEP-17
Benzo(k)fluoranthene		88.6	94.4		%	6.4	50	13-SEP-17
Chrysene		92.3	99.9		%	7.9	50	13-SEP-17
Dibenzo(ah)anthracene		89.8	97.4		%	8.2	50	13-SEP-17
Fluoranthene		82.9	91.2		%	9.6	50	13-SEP-17
Fluorene		83.8	87.4		%	4.2	50	13-SEP-17
Indeno(1,2,3-cd)pyrene		83.2	86.3		%	3.7	50	13-SEP-17
Naphthalene		75.8	82.2		%	8.1	50	13-SEP-17
Phenanthrene		86.1	91.4		%	6.0	50	13-SEP-17
Pyrene		85.3	92.4		%	8.0	50	13-SEP-17
WG2613465-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	13-SEP-17
2-Methylnaphthalene			<0.020		ug/L		0.02	13-SEP-17
Acenaphthene			<0.020		ug/L		0.02	13-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3826603								
WG2613465-1 MB								
Acenaphthylene			<0.020		ug/L		0.02	13-SEP-17
Anthracene			<0.020		ug/L		0.02	13-SEP-17
Benzo(a)anthracene			<0.020		ug/L		0.02	13-SEP-17
Benzo(a)pyrene			<0.010		ug/L		0.01	13-SEP-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	13-SEP-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	13-SEP-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	13-SEP-17
Chrysene			<0.020		ug/L		0.02	13-SEP-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	13-SEP-17
Fluoranthene			<0.020		ug/L		0.02	13-SEP-17
Fluorene			<0.020		ug/L		0.02	13-SEP-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	13-SEP-17
Naphthalene			<0.050		ug/L		0.05	13-SEP-17
Phenanthrene			<0.020		ug/L		0.02	13-SEP-17
Pyrene			<0.020		ug/L		0.02	13-SEP-17
Surrogate: d8-Naphthalene			90.0		%		60-140	13-SEP-17
Surrogate: d10-Phenanthrene			99.4		%		60-140	13-SEP-17
Surrogate: d12-Chrysene			104.0		%		60-140	13-SEP-17
Surrogate: d10-Acenaphthene			88.9		%		60-140	13-SEP-17
PCB-511-WT	**Water**							
Batch R3829539								
WG2614619-2 LCS								
Aroclor 1242			85.8		%		60-140	15-SEP-17
Aroclor 1248			96.6		%		60-140	15-SEP-17
Aroclor 1254			98.7		%		60-140	15-SEP-17
Aroclor 1260			89.3		%		60-140	15-SEP-17
WG2614619-3 LCSD		**WG2614619-2**						
Aroclor 1242		85.8	95.7		%	11	50	15-SEP-17
Aroclor 1248		96.6	96.6		%	0.0	50	15-SEP-17
Aroclor 1254		98.7	115.4		%	16	50	15-SEP-17
Aroclor 1260		89.3	111.3		%	22	50	15-SEP-17
WG2614619-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	15-SEP-17
Aroclor 1248			<0.020		ug/L		0.02	15-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Water**							
Batch R3829539								
WG2614619-1 MB								
Aroclor 1254			<0.020		ug/L		0.02	15-SEP-17
Aroclor 1260			<0.020		ug/L		0.02	15-SEP-17
Surrogate: 2-fluorobiphenyl			103.9		%		50-150	15-SEP-17
PH-WT	**Water**							
Batch R3822482								
WG2611419-20 DUP		**WG2611419-19**						
pH		6.90	6.92	J	pH units	0.01	0.2	08-SEP-17
WG2611419-24 DUP		**WG2611419-23**						
pH		7.56	7.57	J	pH units	0.01	0.2	08-SEP-17
WG2611419-18 LCS								
pH			6.99		pH units		6.9-7.1	08-SEP-17
WG2611419-22 LCS								
pH			6.99		pH units		6.9-7.1	08-SEP-17
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-4 DUP		**WG2611290-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	11-SEP-17
Benzene		1.10	1.12		ug/L	1.8	30	11-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-4 DUP		**WG2611290-3**						
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,2-Dichloroethylene		25.4	26.4		ug/L	3.9	30	11-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,2-Dichloroethylene		0.55	0.57		ug/L	3.6	30	11-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichloroethylene		2.23	2.21		ug/L	0.9	30	11-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Vinyl chloride		7.26	7.46		ug/L	2.7	30	11-SEP-17
WG2611290-1 LCS								
1,1,1,2-Tetrachloroethane			88.7		%		70-130	11-SEP-17
1,1,2,2-Tetrachloroethane			96.4		%		70-130	11-SEP-17
1,1,1-Trichloroethane			94.3		%		70-130	11-SEP-17
1,1,2-Trichloroethane			94.2		%		70-130	11-SEP-17
1,1-Dichloroethane			99.3		%		70-130	11-SEP-17
1,1-Dichloroethylene			90.4		%		70-130	11-SEP-17
1,2-Dibromoethane			95.2		%		70-130	11-SEP-17
1,2-Dichlorobenzene			91.8		%		70-130	11-SEP-17
1,2-Dichloroethane			104.0		%		70-130	11-SEP-17
1,2-Dichloropropane			98.8		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-1 LCS								
1,3-Dichlorobenzene			89.9		%		70-130	11-SEP-17
1,4-Dichlorobenzene			93.9		%		70-130	11-SEP-17
Acetone			124.5		%		60-140	11-SEP-17
Benzene			99.5		%		70-130	11-SEP-17
Bromodichloromethane			96.7		%		70-130	11-SEP-17
Bromoform			92.3		%		70-130	11-SEP-17
Bromomethane			102.8		%		60-140	11-SEP-17
Carbon tetrachloride			93.9		%		70-130	11-SEP-17
Chlorobenzene			91.7		%		70-130	11-SEP-17
Chloroform			99.5		%		70-130	11-SEP-17
cis-1,2-Dichloroethylene			96.7		%		70-130	11-SEP-17
cis-1,3-Dichloropropene			100.7		%		70-130	11-SEP-17
Dibromochloromethane			98.1		%		70-130	11-SEP-17
Dichlorodifluoromethane			82.0		%		50-140	11-SEP-17
Ethylbenzene			87.4		%		70-130	11-SEP-17
n-Hexane			105.4		%		70-130	11-SEP-17
m+p-Xylenes			90.4		%		70-130	11-SEP-17
Methyl Ethyl Ketone			111.6		%		60-140	11-SEP-17
Methyl Isobutyl Ketone			106.5		%		60-140	11-SEP-17
Methylene Chloride			107.5		%		70-130	11-SEP-17
MTBE			94.2		%		70-130	11-SEP-17
o-Xylene			89.6		%		70-130	11-SEP-17
Styrene			91.5		%		70-130	11-SEP-17
Tetrachloroethylene			84.4		%		70-130	11-SEP-17
Toluene			83.4		%		70-130	11-SEP-17
trans-1,2-Dichloroethylene			99.2		%		70-130	11-SEP-17
trans-1,3-Dichloropropene			103.1		%		70-130	11-SEP-17
Trichloroethylene			93.1		%		70-130	11-SEP-17
Trichlorofluoromethane			96.7		%		60-140	11-SEP-17
Vinyl chloride			90.0		%		60-140	11-SEP-17
WG2611290-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-2 MB								
1,1,2-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	11-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	11-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Acetone			<30		ug/L		30	11-SEP-17
Benzene			<0.50		ug/L		0.5	11-SEP-17
Bromodichloromethane			<2.0		ug/L		2	11-SEP-17
Bromoform			<5.0		ug/L		5	11-SEP-17
Bromomethane			<0.50		ug/L		0.5	11-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	11-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Chloroform			<1.0		ug/L		1	11-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Dibromochloromethane			<2.0		ug/L		2	11-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	11-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	11-SEP-17
n-Hexane			<0.50		ug/L		0.5	11-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	11-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	11-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	11-SEP-17
Methylene Chloride			<5.0		ug/L		5	11-SEP-17
MTBE			<2.0		ug/L		2	11-SEP-17
o-Xylene			<0.30		ug/L		0.3	11-SEP-17
Styrene			<0.50		ug/L		0.5	11-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	11-SEP-17
Toluene			<0.50		ug/L		0.5	11-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-2 MB								
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	11-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	11-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	11-SEP-17
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	11-SEP-17
Surrogate: 4-Bromofluorobenzene			94.1		%		70-130	11-SEP-17
WG2611290-5 MS		**WG2611290-3**						
1,1,1,2-Tetrachloroethane			89.8		%		50-140	11-SEP-17
1,1,2,2-Tetrachloroethane			97.3		%		50-140	11-SEP-17
1,1,1-Trichloroethane			94.1		%		50-140	11-SEP-17
1,1,2-Trichloroethane			94.9		%		50-140	11-SEP-17
1,1-Dichloroethane			101.2		%		50-140	11-SEP-17
1,1-Dichloroethylene			84.8		%		50-140	11-SEP-17
1,2-Dibromoethane			95.7		%		50-140	11-SEP-17
1,2-Dichlorobenzene			91.9		%		50-140	11-SEP-17
1,2-Dichloroethane			107.1		%		50-140	11-SEP-17
1,2-Dichloropropane			102.4		%		50-140	11-SEP-17
1,3-Dichlorobenzene			88.9		%		50-140	11-SEP-17
1,4-Dichlorobenzene			93.5		%		50-140	11-SEP-17
Acetone			123.1		%		50-140	11-SEP-17
Benzene			100.5		%		50-140	11-SEP-17
Bromodichloromethane			100.0		%		50-140	11-SEP-17
Bromoform			92.5		%		50-140	11-SEP-17
Bromomethane			94.4		%		50-140	11-SEP-17
Carbon tetrachloride			92.3		%		50-140	11-SEP-17
Chlorobenzene			91.3		%		50-140	11-SEP-17
Chloroform			102.2		%		50-140	11-SEP-17
cis-1,2-Dichloroethylene			94.9		%		50-140	11-SEP-17
cis-1,3-Dichloropropene			97.4		%		50-140	11-SEP-17
Dibromochloromethane			99.4		%		50-140	11-SEP-17
Dichlorodifluoromethane			60.1		%		50-140	11-SEP-17
Ethylbenzene			84.2		%		50-140	11-SEP-17
n-Hexane			91.2		%		50-140	11-SEP-17
m+p-Xylenes			88.6		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823436								
WG2611290-5 MS		**WG2611290-3**						
Methyl Ethyl Ketone			113.8		%		50-140	11-SEP-17
Methyl Isobutyl Ketone			106.9		%		50-140	11-SEP-17
Methylene Chloride			108.8		%		50-140	11-SEP-17
MTBE			93.8		%		50-140	11-SEP-17
o-Xylene			87.7		%		50-140	11-SEP-17
Styrene			89.0		%		50-140	11-SEP-17
Tetrachloroethylene			80.1		%		50-140	11-SEP-17
Toluene			80.5		%		50-140	11-SEP-17
trans-1,2-Dichloroethylene			96.4		%		50-140	11-SEP-17
trans-1,3-Dichloropropene			95.5		%		50-140	11-SEP-17
Trichloroethylene			91.9		%		50-140	11-SEP-17
Trichlorofluoromethane			87.6		%		50-140	11-SEP-17
Vinyl chloride			77.1		%		50-140	11-SEP-17
Batch R3823489								
WG2609244-4 DUP		**WG2609244-3**						
Trichloroethylene		N/A	<0.50	RPD-NA	ug/L	N/A	30	12-SEP-17
WG2609244-1 LCS								
Trichloroethylene			90.3		%		70-130	11-SEP-17
WG2609244-2 MB								
Trichloroethylene			<0.50		ug/L		0.5	11-SEP-17
WG2609244-5 MS		**WG2609244-3**						
Trichloroethylene			85.7		%		50-140	12-SEP-17
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	11-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
1,1,1,2-Tetrachloroethane			91.5		%		70-130	11-SEP-17
1,1,2,2-Tetrachloroethane			85.1		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-1 LCS								
1,1,1-Trichloroethane			91.2		%		70-130	11-SEP-17
1,1,2-Trichloroethane			93.5		%		70-130	11-SEP-17
1,1-Dichloroethane			92.1		%		70-130	11-SEP-17
1,1-Dichloroethylene			83.7		%		70-130	11-SEP-17
1,2-Dibromoethane			92.1		%		70-130	11-SEP-17
1,2-Dichlorobenzene			90.0		%		70-130	11-SEP-17
1,2-Dichloroethane			91.2		%		70-130	11-SEP-17
1,2-Dichloropropane			95.6		%		70-130	11-SEP-17
1,3-Dichlorobenzene			87.1		%		70-130	11-SEP-17
1,4-Dichlorobenzene			89.8		%		70-130	11-SEP-17
Acetone			102.9		%		60-140	11-SEP-17
Benzene			94.7		%		70-130	11-SEP-17
Bromodichloromethane			92.3		%		70-130	11-SEP-17
Bromoform			88.0		%		70-130	11-SEP-17
Bromomethane			90.5		%		60-140	11-SEP-17
Carbon tetrachloride			90.5		%		70-130	11-SEP-17
Chlorobenzene			91.5		%		70-130	11-SEP-17
Chloroform			94.2		%		70-130	11-SEP-17
cis-1,2-Dichloroethylene			92.2		%		70-130	11-SEP-17
cis-1,3-Dichloropropene			83.1		%		70-130	11-SEP-17
Dibromochloromethane			96.5		%		70-130	11-SEP-17
Dichlorodifluoromethane			94.5		%		50-140	11-SEP-17
Ethylbenzene			88.7		%		70-130	11-SEP-17
n-Hexane			102.2		%		70-130	11-SEP-17
m+p-Xylenes			89.9		%		70-130	11-SEP-17
Methyl Ethyl Ketone			82.8		%		60-140	11-SEP-17
Methyl Isobutyl Ketone			82.1		%		60-140	11-SEP-17
Methylene Chloride			94.5		%		70-130	11-SEP-17
MTBE			93.2		%		70-130	11-SEP-17
o-Xylene			90.3		%		70-130	11-SEP-17
Styrene			88.0		%		70-130	11-SEP-17
Tetrachloroethylene			87.6		%		70-130	11-SEP-17
Toluene			90.4		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-1 LCS								
trans-1,2-Dichloroethylene			90.1		%		70-130	11-SEP-17
trans-1,3-Dichloropropene			83.4		%		70-130	11-SEP-17
Trichloroethylene			91.6		%		70-130	11-SEP-17
Trichlorofluoromethane			91.7		%		60-140	11-SEP-17
Vinyl chloride			85.7		%		60-140	11-SEP-17
WG2594560-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	11-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	11-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Acetone			<30		ug/L		30	11-SEP-17
Benzene			<0.50		ug/L		0.5	11-SEP-17
Bromodichloromethane			<2.0		ug/L		2	11-SEP-17
Bromoform			<5.0		ug/L		5	11-SEP-17
Bromomethane			<0.50		ug/L		0.5	11-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	11-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Chloroform			<1.0		ug/L		1	11-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Dibromochloromethane			<2.0		ug/L		2	11-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	11-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	11-SEP-17
n-Hexane			<0.50		ug/L		0.5	11-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	11-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-2 MB								
Methyl Isobutyl Ketone			<20		ug/L		20	11-SEP-17
Methylene Chloride			<5.0		ug/L		5	11-SEP-17
MTBE			<2.0		ug/L		2	11-SEP-17
o-Xylene			<0.30		ug/L		0.3	11-SEP-17
Styrene			<0.50		ug/L		0.5	11-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	11-SEP-17
Toluene			<0.50		ug/L		0.5	11-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	11-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	11-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	11-SEP-17
Surrogate: 1,4-Difluorobenzene			101.8		%		70-130	11-SEP-17
Surrogate: 4-Bromofluorobenzene			98.6		%		70-130	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
1,1,1,2-Tetrachloroethane			90.1		%		50-140	11-SEP-17
1,1,2,2-Tetrachloroethane			89.6		%		50-140	11-SEP-17
1,1,1-Trichloroethane			88.0		%		50-140	11-SEP-17
1,1,2-Trichloroethane			94.6		%		50-140	11-SEP-17
1,1-Dichloroethane			91.4		%		50-140	11-SEP-17
1,1-Dichloroethylene			79.0		%		50-140	11-SEP-17
1,2-Dibromoethane			93.9		%		50-140	11-SEP-17
1,2-Dichlorobenzene			90.0		%		50-140	11-SEP-17
1,2-Dichloroethane			95.5		%		50-140	11-SEP-17
1,2-Dichloropropane			98.1		%		50-140	11-SEP-17
1,3-Dichlorobenzene			87.8		%		50-140	11-SEP-17
1,4-Dichlorobenzene			91.0		%		50-140	11-SEP-17
Acetone			100.2		%		50-140	11-SEP-17
Benzene			94.6		%		50-140	11-SEP-17
Bromodichloromethane			94.9		%		50-140	11-SEP-17
Bromoform			89.2		%		50-140	11-SEP-17
Bromomethane			89.1		%		50-140	11-SEP-17
Carbon tetrachloride			86.4		%		50-140	11-SEP-17
Chlorobenzene			90.8		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-5 MS		**WG2594560-3**						
Chloroform			94.8		%		50-140	11-SEP-17
cis-1,2-Dichloroethylene			92.9		%		50-140	11-SEP-17
cis-1,3-Dichloropropene			92.9		%		50-140	11-SEP-17
Dibromochloromethane			96.6		%		50-140	11-SEP-17
Dichlorodifluoromethane			79.0		%		50-140	11-SEP-17
Ethylbenzene			85.6		%		50-140	11-SEP-17
n-Hexane			91.7		%		50-140	11-SEP-17
m+p-Xylenes			88.0		%		50-140	11-SEP-17
Methyl Ethyl Ketone			87.7		%		50-140	11-SEP-17
Methyl Isobutyl Ketone			89.1		%		50-140	11-SEP-17
Methylene Chloride			95.9		%		50-140	11-SEP-17
MTBE			93.0		%		50-140	11-SEP-17
o-Xylene			87.7		%		50-140	11-SEP-17
Styrene			87.1		%		50-140	11-SEP-17
Tetrachloroethylene			84.9		%		50-140	11-SEP-17
Toluene			87.2		%		50-140	11-SEP-17
trans-1,2-Dichloroethylene			91.0		%		50-140	11-SEP-17
trans-1,3-Dichloropropene			91.7		%		50-140	11-SEP-17
Trichloroethylene			91.8		%		50-140	11-SEP-17
Trichlorofluoromethane			83.3		%		50-140	11-SEP-17
Vinyl chloride			77.7		%		50-140	11-SEP-17

Quality Control Report

Workorder: L1988005 Report Date: 18-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

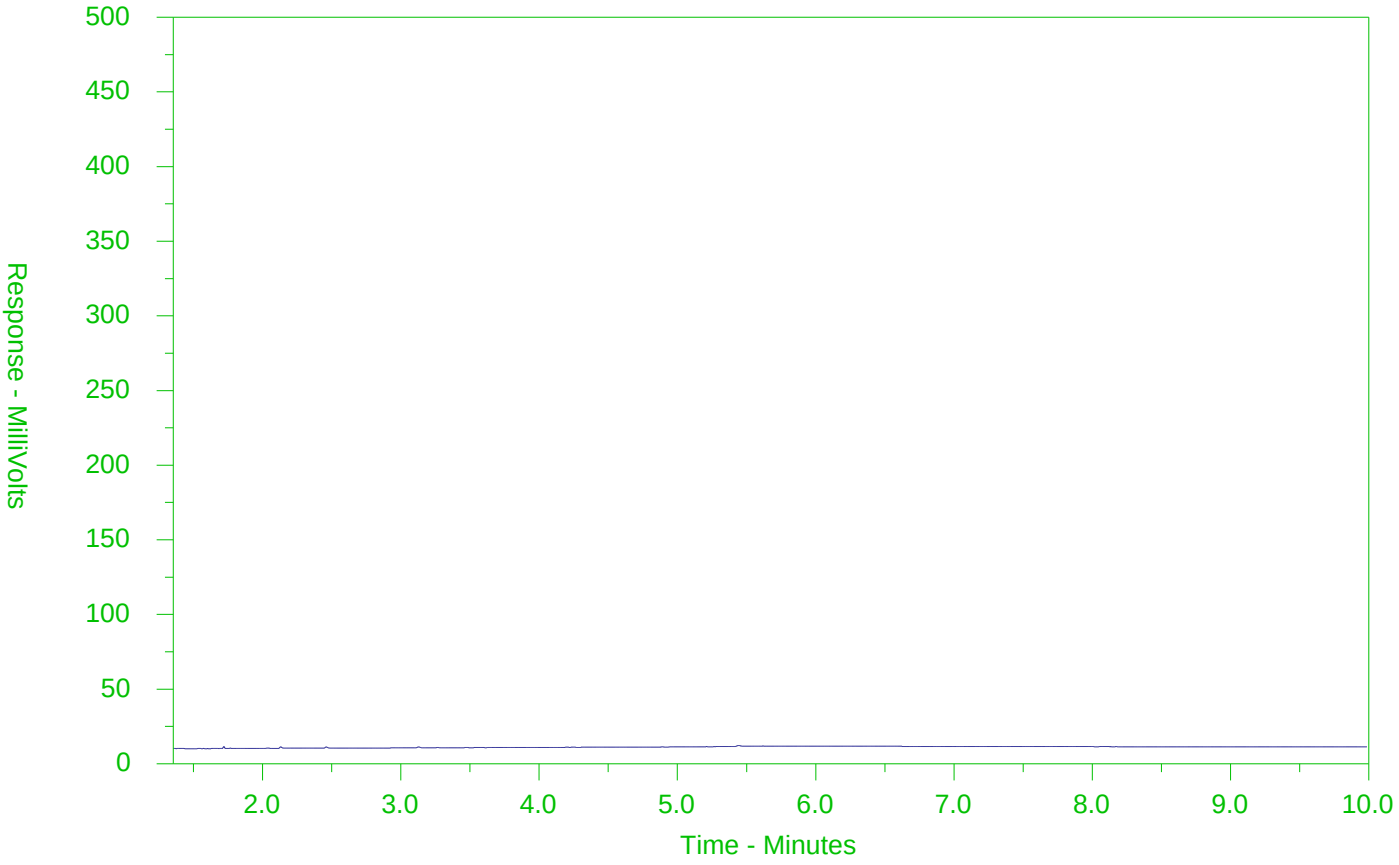
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-1
Client Sample ID: OW07-37



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

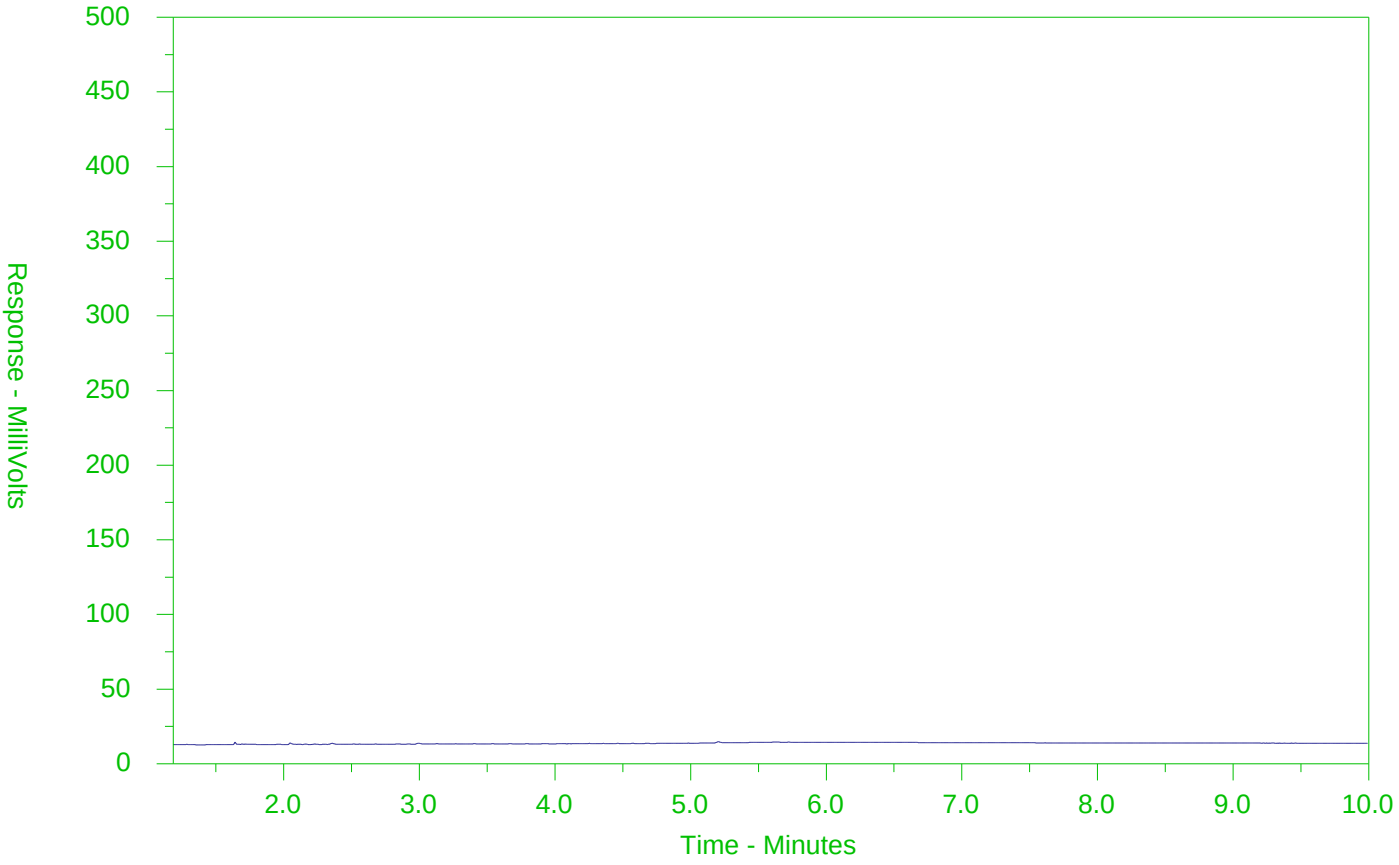
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-2
Client Sample ID: OW07-32



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

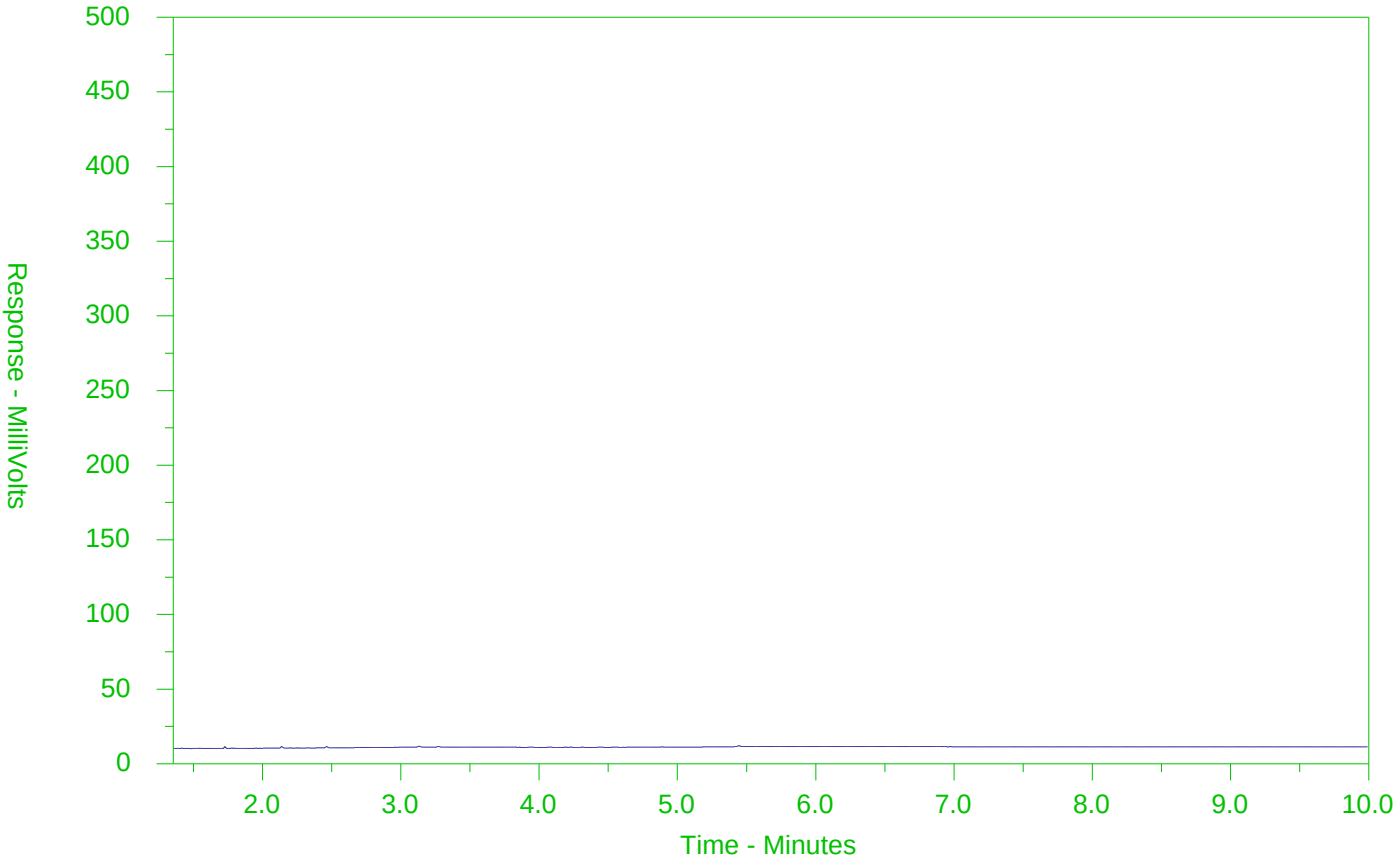
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-3
Client Sample ID: OW03-I



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

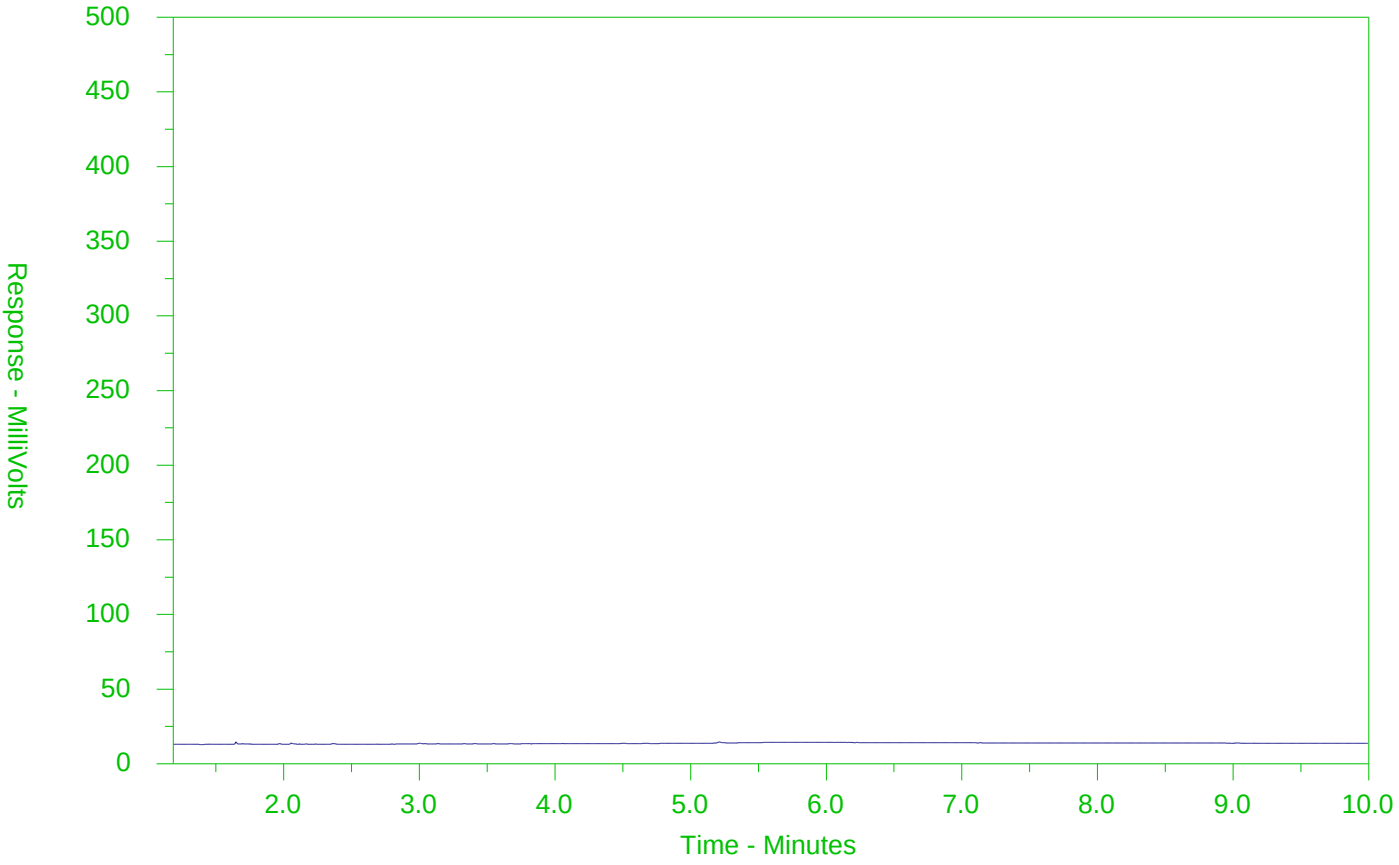
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-4
Client Sample ID: OW03-II



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

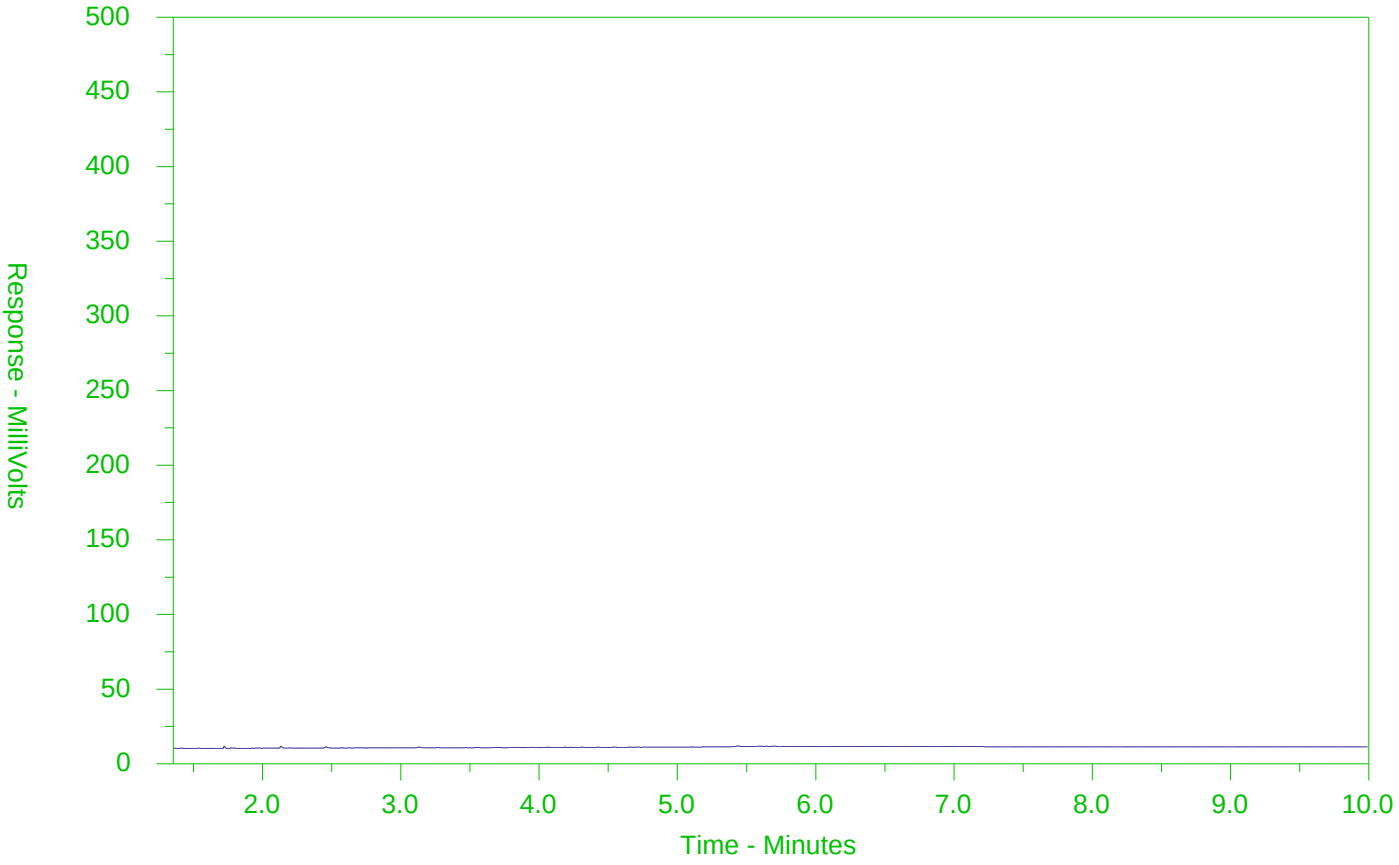
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-5
Client Sample ID: OW07-38S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

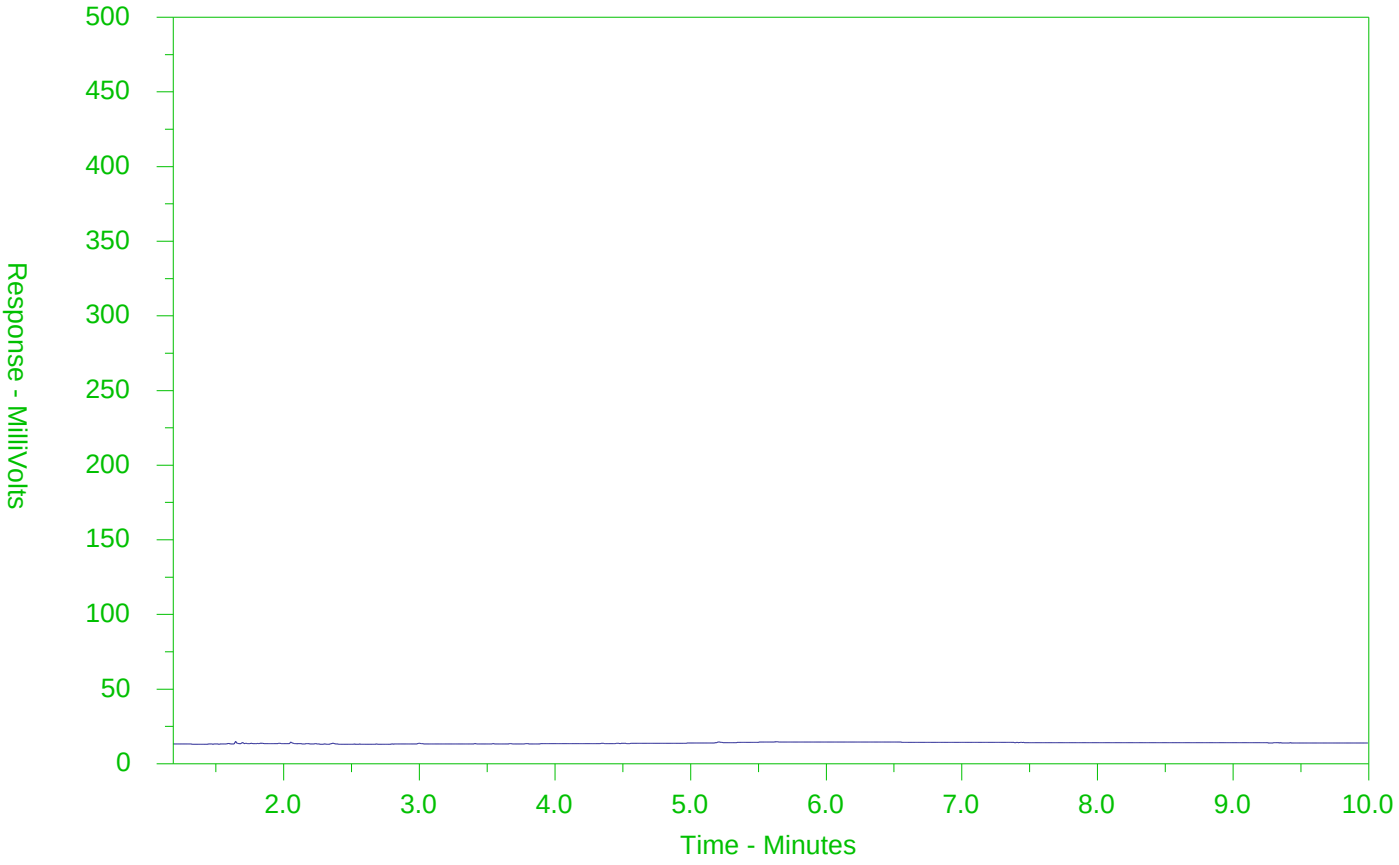
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-6
Client Sample ID: OW22D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

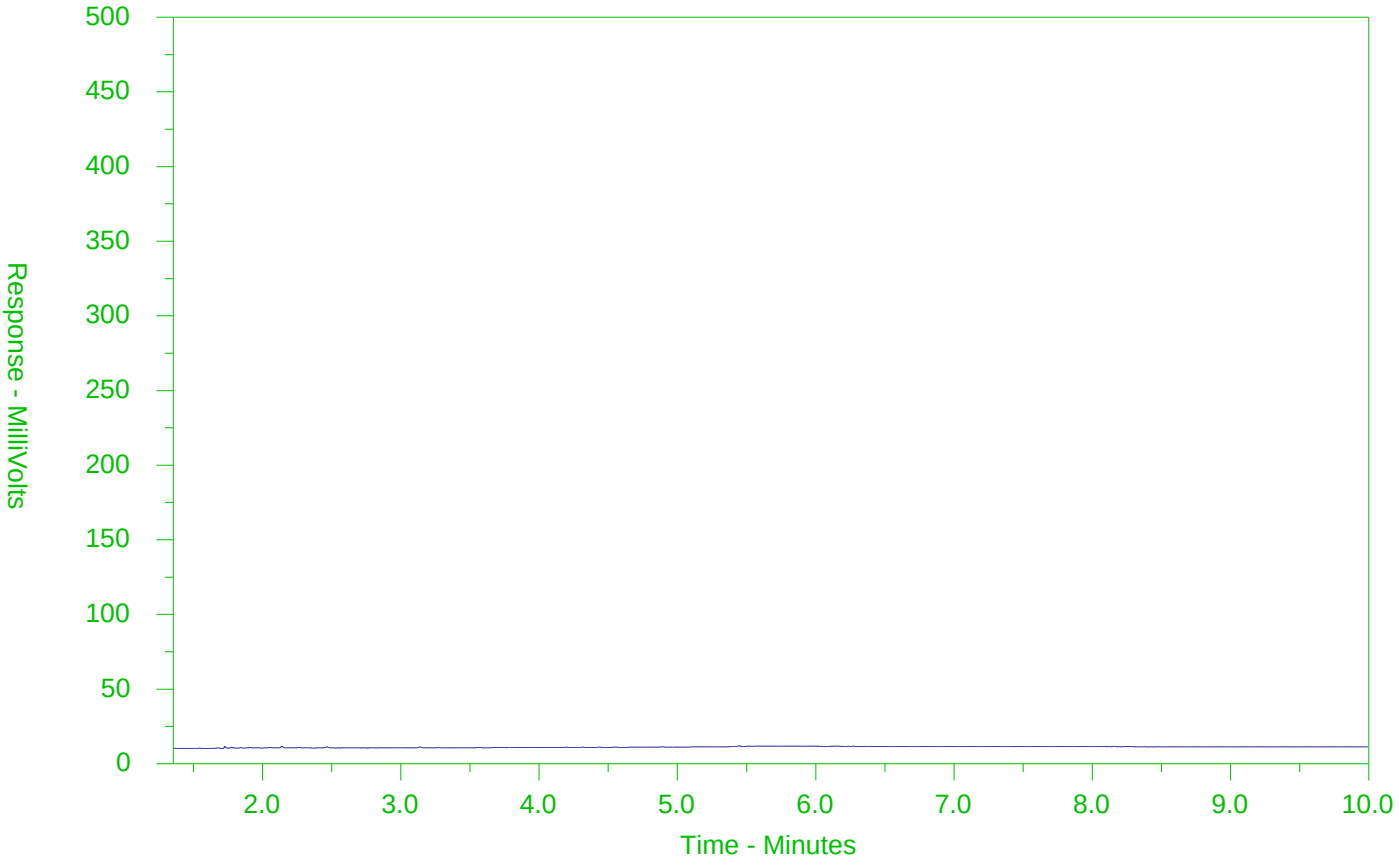
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-7
Client Sample ID: DUP 4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

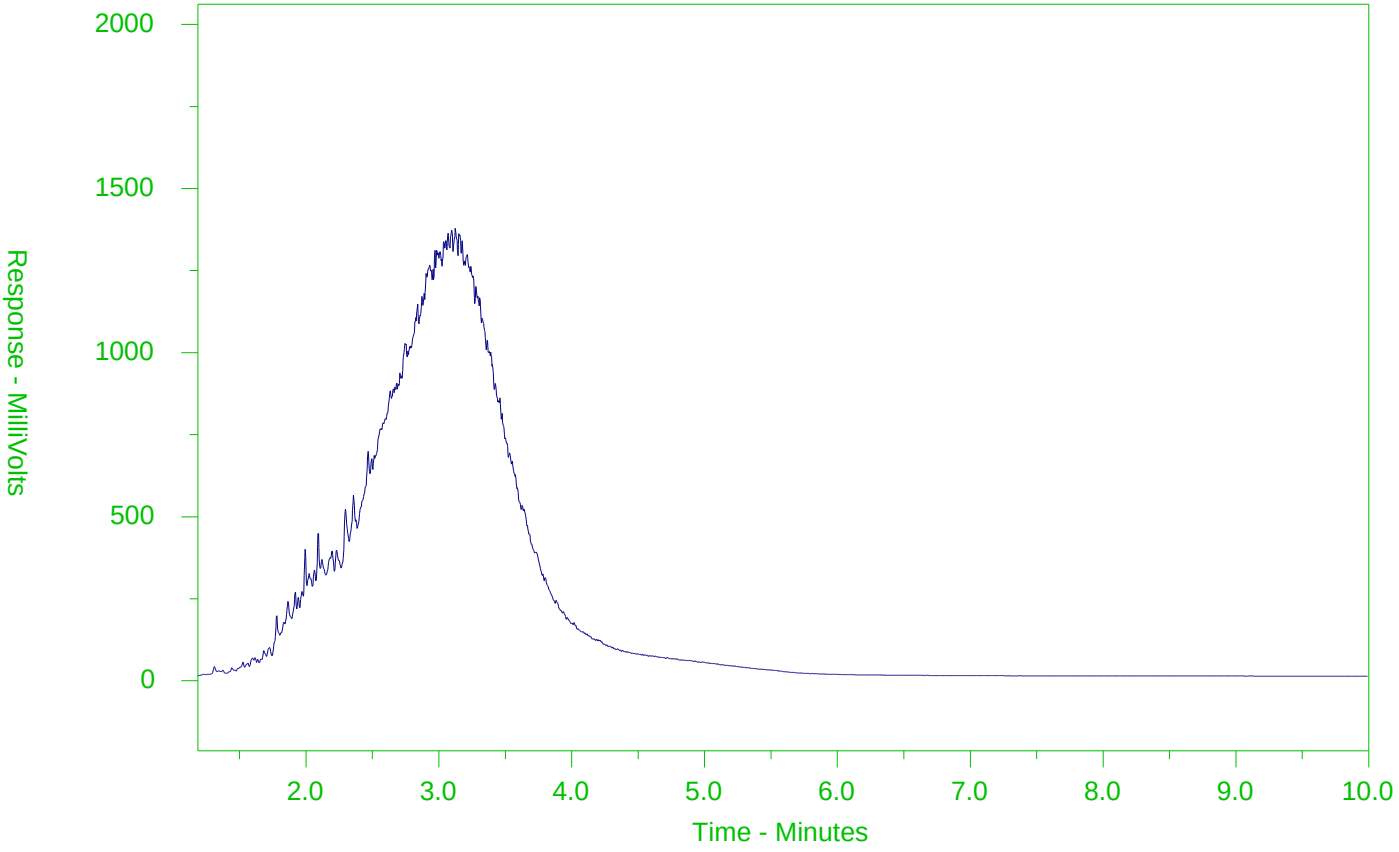
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-8
Client Sample ID: OW22S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

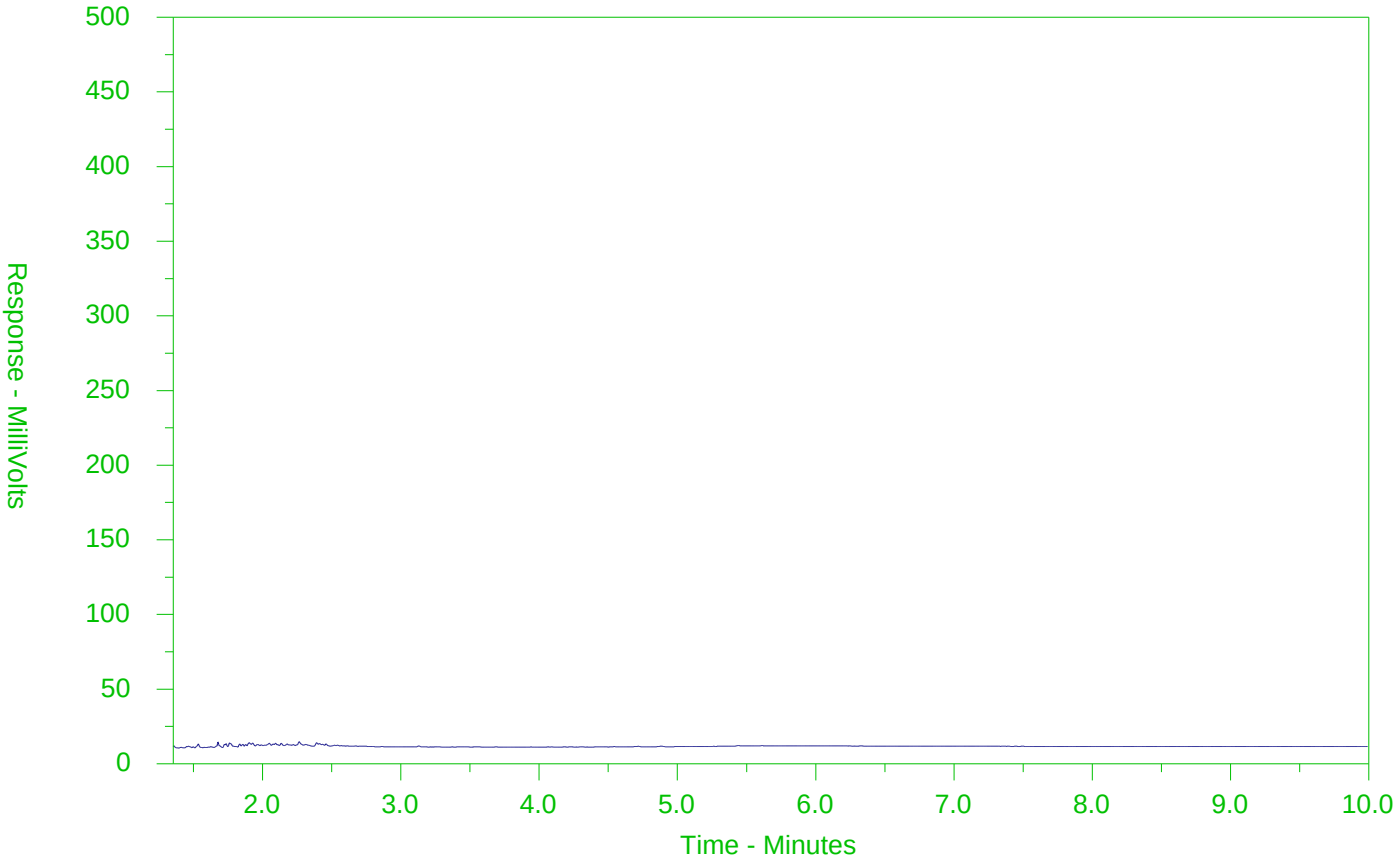
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-9
Client Sample ID: OW19



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

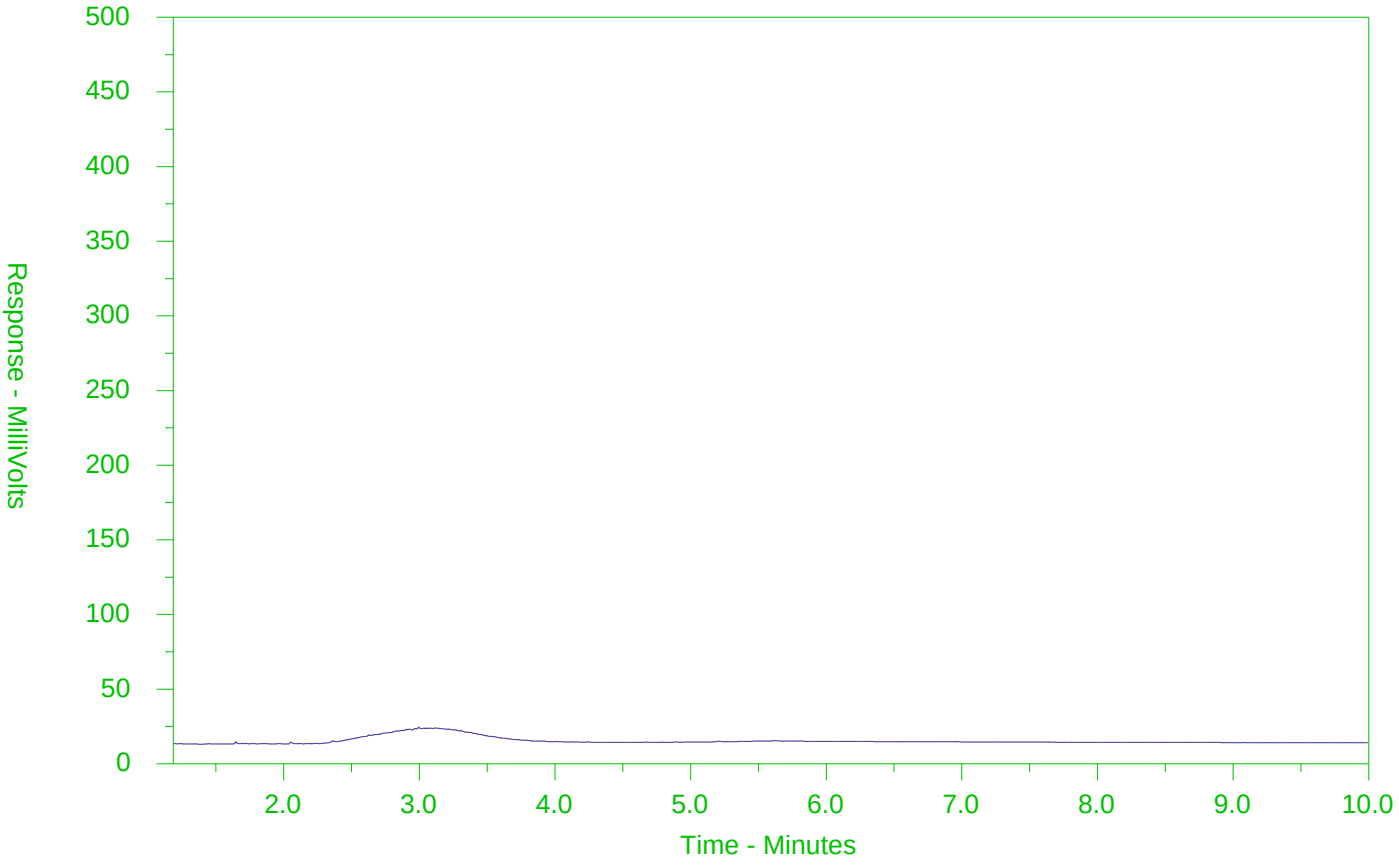
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-10
Client Sample ID: OW23D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

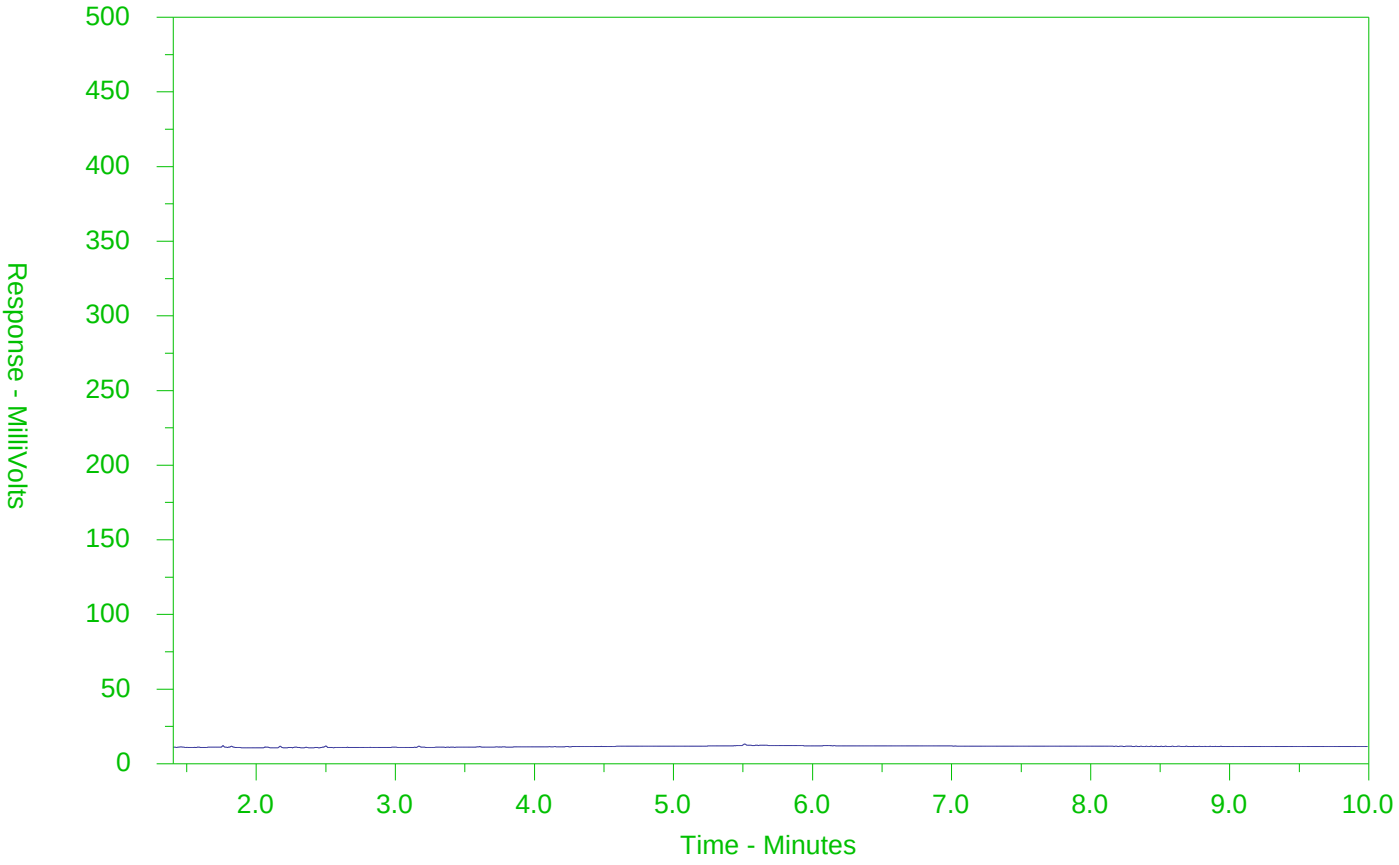
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-11
Client Sample ID: OW13-39D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

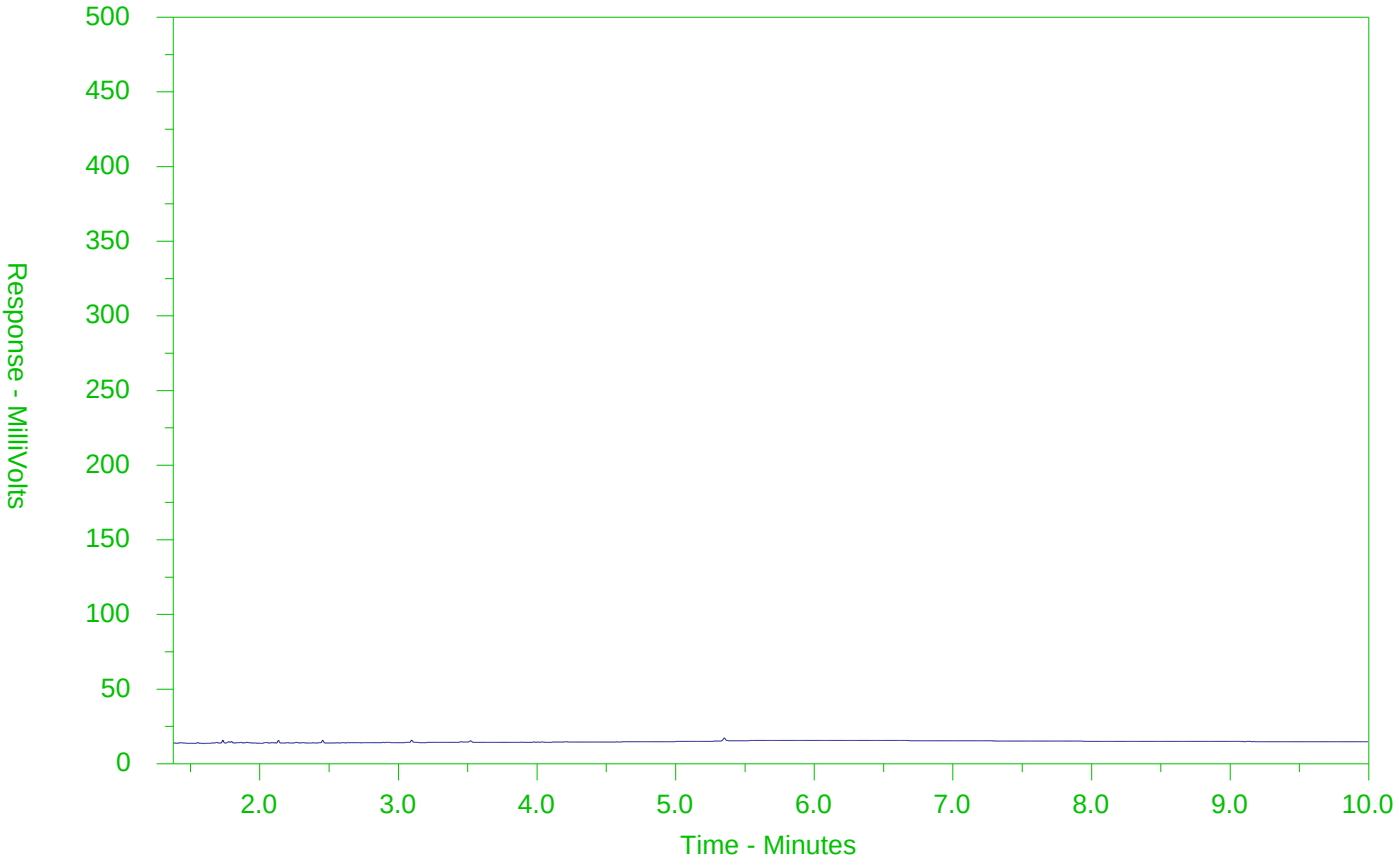
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-12
Client Sample ID: OW13-39S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

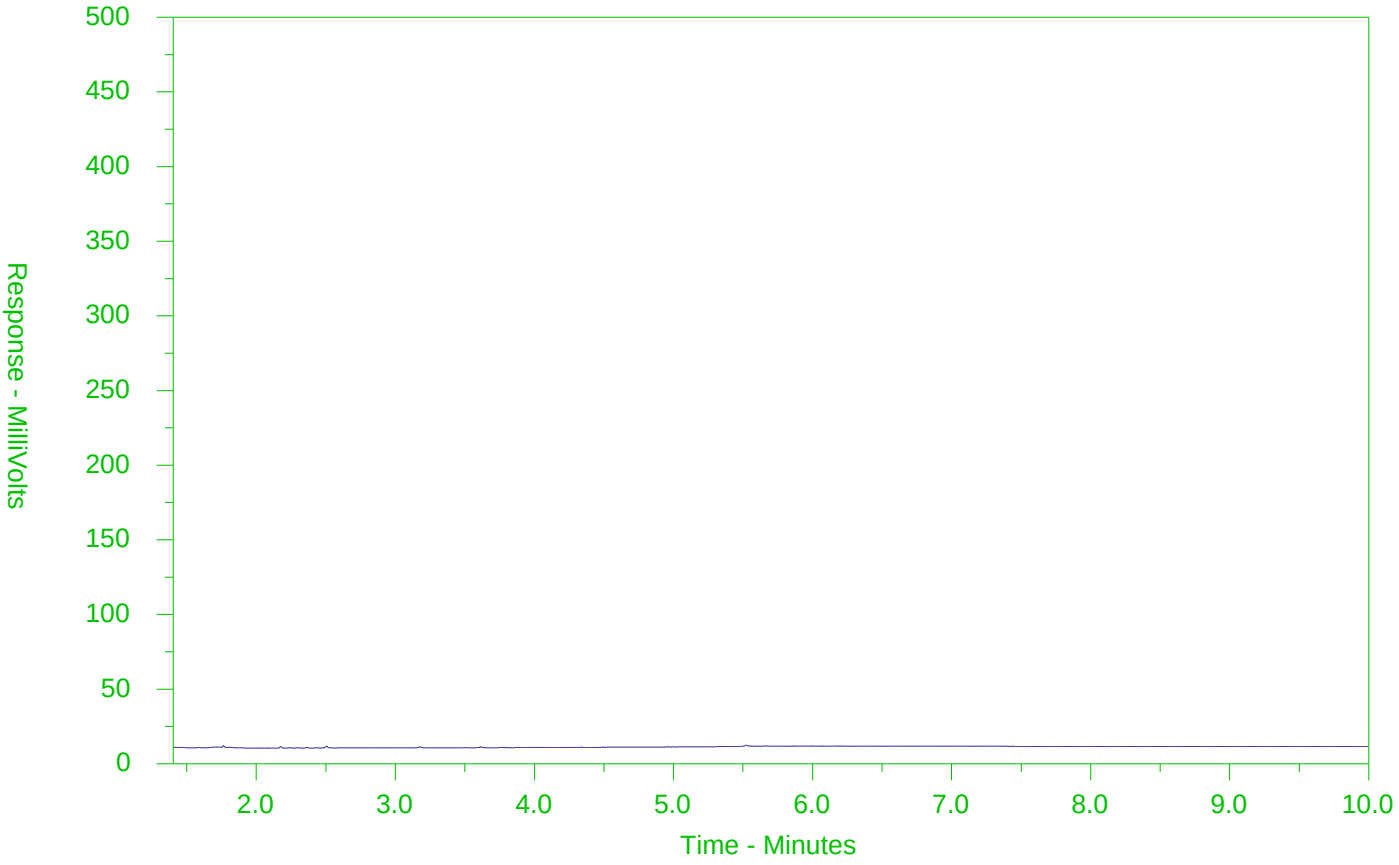
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-13
Client Sample ID: OW24S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

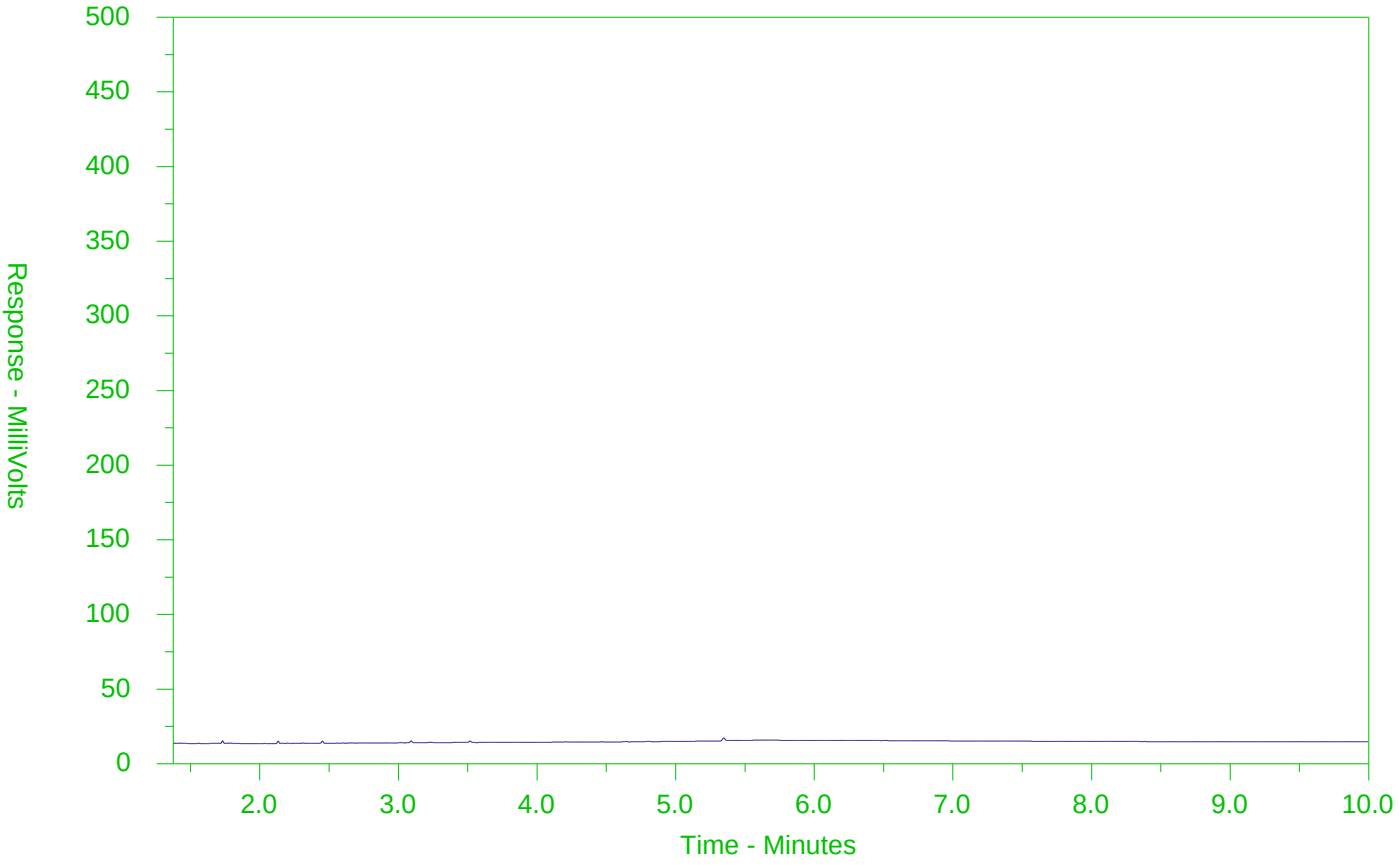
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988005-14
Client Sample ID: OW24D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1986005-COFC

COC Number: 15 -

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill Kitchener	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report: ☑ YES ☐ NO	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	For E&P TATs: Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	300-72 Victoria St. South	Email 1 or Fax: Michael.Shiry@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2: Peter.Mamo@ch2m.com	
Postal Code:	N2G 4Y9	Email 3:	

Invoice To		Invoice Distribution
	Same as Report To ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
	Copy of Invoice with Report ☐ YES ☐ NO	
Company:	CH2M Hill Kitchener	Email 1 or Fax:
Contact:	Accounts Payable	Email 2:

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62158	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	SEPSA	Location:	
ALS Lab Work Order # (lab use only):	L1986005	ALS Contact: Mathy	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4 - DW	1,4 Dioxane	PCB	VOC,F1 (Trip Blank)	Number of Containers
1	OW07-37	6-Sep-17	09:22	Water	✓	✓		✓	✓				13
2	OW07-32		10:35		✓		✓	✓	✓				12
3	OW03-1		11:57		✓	✓		✓	✓				13
4	OW03-11		12:55		✓		✓	✓	✓				12
5	OW07-385		14:00		✓		✓	✓	✓		✓		14
6	OW22D		15:08		✓		✓	✓	✓	✓			15
7	Dup 4		—		✓		✓	✓	✓	✓			15
8	OW22S	06-Sep-17	16:45	Water	✓		✓	✓	✓				12

Drinking Water (DW) Samples* (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations: Yes ☐ No ☐	
Ice Packs ☐	Ice Cubes ☑	Custody seal intact: Yes ☐ No ☐	
Cooling Initiated ☑			

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.9	9.2	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Mamo	Date: 17/09/07	Time: 18:15	Received by:	Date:	Time:	Received by: DK	Date: 6/09/17	Time: 18:10

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1988005-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill Kitchener
Contact:	Michael Shiry / Peter Mamo
Phone:	289 971 1779
	Company address below will appear on the final report
Street:	300-72 Victoria St South
City/Province:	Kitchener, ON
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill Kitchener
Contact:	Accounts Payable

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Michael.Shiry@ch2m.com
Email 2	Peter.Mamo@ch2m.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	Q82156
Job #:	694757
PO / AFE:	
LSD:	Sep 8A

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner	
Location	

ALS Lab Work Order # (lab use only): L1988005 COC

ALS Contact: Mathy Sampler:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Pre-booked Days)		Emergency	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2-F4 - DW	1,4 Dioxane	PCB	VOC, F1 (Trip Blank)	Number of Containers
9	OW19	07-Sep-17	9:23	Water	✓		✓	✓	✓				12
10	OW23D		10:25		✓		✓	✓	✓	✓			15
11	OW13-39D		12:06		✓			✓	✓	✓			13
12	OW13-39S		13:21		✓			✓	✓				10
13	OW24S		15:05		✓	✓		✓	✓		✓		15
14	OW24D		16:08		✓			✓	✓	✓			13
15	Trip Blank 5		—									✓	2
16	Trip Blank 6	07-Sep-17	—	Water								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐ No ☐
Ice Packs	☐	Ice Cubes ☑	Custody seal intact Yes ☐ No ☐
Cooling Initiated	☐		

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.4	9.2	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Mamo	Date: 17/09/07	Time: 1915	Received by:	Date:	Time:	Received by: DA	Date: 07/09/17	Time: 14:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 08-SEP-17
Report Date: 14-SEP-17 14:48 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1988476

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 15-GW0908
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-1 OW31 Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	0.64		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	1.98		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823509
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-1 OW31 Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	99.6		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828732
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828732
Surrogate: 2-Bromobenzotrifluoride	80.4		60-140	%	14-SEP-17	14-SEP-17	R3828732
Surrogate: 3,4-Dichlorotoluene	88.6		60-140	%		11-SEP-17	R3823509
L1988476-2 DUP Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	0.67		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	2.01		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-2 DUP Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	98.4		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828732
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828732
Surrogate: 2-Bromobenzotrifluoride	86.6		60-140	%	14-SEP-17	14-SEP-17	R3828732
Surrogate: 3,4-Dichlorotoluene	85.9		60-140	%		11-SEP-17	R3823509
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	97.3		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Hydrocarbons							
Surrogate: 3,4-Dichlorotoluene	89.0		60-140	%		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
CINT	Cooling initiated. Samples were received packed with ice or ice packs and were sampled the same day as received.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3398/CCME TIER 1
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

15-GW0908

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1988476 Report Date: 14-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
1,4-Dioxane			96.8		%		60-140	11-SEP-17
WG2594560-2 MB								
1,4-Dioxane			<20		ug/L		20	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
1,4-Dioxane			94.6		%		50-140	11-SEP-17
F1-HS-511-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
F1 (C6-C10)			103.1		%		80-120	11-SEP-17
WG2594560-2 MB								
F1 (C6-C10)			<25		ug/L		25	11-SEP-17
Surrogate: 3,4-Dichlorotoluene			87.8		%		60-140	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
F1 (C6-C10)			88.7		%		60-140	11-SEP-17
F2-F4-UW-WT	**Water**							
Batch R3828732								
WG2615892-2 LCS								
F2 (C10-C16)			98.3		%		70-130	14-SEP-17
F3a (C16-C22)			96.6		%		70-130	14-SEP-17
F3b (C22-C34)			94.0		%		70-130	14-SEP-17
F3 (C16-C34)			95.5		%		70-130	14-SEP-17
F4 (C34-C50)			108.7		%		70-130	14-SEP-17
WG2615892-3 LCSD		**WG2615892-2**						
F2 (C10-C16)		98.3	107.1		%	8.6	50	14-SEP-17
F3a (C16-C22)		96.6	105.4		%	8.6	50	14-SEP-17
F3b (C22-C34)		94.0	106.7		%	13	50	14-SEP-17
F3 (C16-C34)		95.5	105.9		%	10	50	14-SEP-17
F4 (C34-C50)		108.7	114.5		%	5.2	50	14-SEP-17
WG2615892-1 MB								
F2 (C10-C16)			<100		ug/L		100	14-SEP-17
F3a (C16-C22)			<130		ug/L		125	14-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Water**							
Batch R3828732								
WG2615892-1 MB								
F3b (C22-C34)			<130		ug/L		125	14-SEP-17
F3 (C16-C34)			<250		ug/L		250	14-SEP-17
F4 (C34-C50)			<250		ug/L		250	14-SEP-17
Surrogate: 2-Bromobenzotrifluoride			84.2		%		60-140	14-SEP-17
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	11-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
1,1,1,2-Tetrachloroethane			91.5		%		70-130	11-SEP-17
1,1,2,2-Tetrachloroethane			85.1		%		70-130	11-SEP-17
1,1,1-Trichloroethane			91.2		%		70-130	11-SEP-17
1,1,2-Trichloroethane			93.5		%		70-130	11-SEP-17
1,1-Dichloroethane			92.1		%		70-130	11-SEP-17
1,1-Dichloroethylene			83.7		%		70-130	11-SEP-17
1,2-Dibromoethane			92.1		%		70-130	11-SEP-17
1,2-Dichlorobenzene			90.0		%		70-130	11-SEP-17
1,2-Dichloroethane			91.2		%		70-130	11-SEP-17
1,2-Dichloropropane			95.6		%		70-130	11-SEP-17
1,3-Dichlorobenzene			87.1		%		70-130	11-SEP-17
1,4-Dichlorobenzene			89.8		%		70-130	11-SEP-17
Acetone			102.9		%		60-140	11-SEP-17
Benzene			94.7		%		70-130	11-SEP-17
Bromodichloromethane			92.3		%		70-130	11-SEP-17
Bromoform			88.0		%		70-130	11-SEP-17
Bromomethane			90.5		%		60-140	11-SEP-17
Carbon tetrachloride			90.5		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-1 LCS								
Chlorobenzene			91.5		%		70-130	11-SEP-17
Chloroform			94.2		%		70-130	11-SEP-17
cis-1,2-Dichloroethylene			92.2		%		70-130	11-SEP-17
cis-1,3-Dichloropropene			83.1		%		70-130	11-SEP-17
Dibromochloromethane			96.5		%		70-130	11-SEP-17
Dichlorodifluoromethane			94.5		%		50-140	11-SEP-17
Ethylbenzene			88.7		%		70-130	11-SEP-17
n-Hexane			102.2		%		70-130	11-SEP-17
m+p-Xylenes			89.9		%		70-130	11-SEP-17
Methyl Ethyl Ketone			82.8		%		60-140	11-SEP-17
Methyl Isobutyl Ketone			82.1		%		60-140	11-SEP-17
Methylene Chloride			94.5		%		70-130	11-SEP-17
MTBE			93.2		%		70-130	11-SEP-17
o-Xylene			90.3		%		70-130	11-SEP-17
Styrene			88.0		%		70-130	11-SEP-17
Tetrachloroethylene			87.6		%		70-130	11-SEP-17
Toluene			90.4		%		70-130	11-SEP-17
trans-1,2-Dichloroethylene			90.1		%		70-130	11-SEP-17
trans-1,3-Dichloropropene			83.4		%		70-130	11-SEP-17
Trichloroethylene			91.6		%		70-130	11-SEP-17
Trichlorofluoromethane			91.7		%		60-140	11-SEP-17
Vinyl chloride			85.7		%		60-140	11-SEP-17
WG2594560-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	11-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	11-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Acetone			<30		ug/L		30	11-SEP-17
Benzene			<0.50		ug/L		0.5	11-SEP-17
Bromodichloromethane			<2.0		ug/L		2	11-SEP-17
Bromoform			<5.0		ug/L		5	11-SEP-17
Bromomethane			<0.50		ug/L		0.5	11-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	11-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Chloroform			<1.0		ug/L		1	11-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Dibromochloromethane			<2.0		ug/L		2	11-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	11-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	11-SEP-17
n-Hexane			<0.50		ug/L		0.5	11-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	11-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	11-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	11-SEP-17
Methylene Chloride			<5.0		ug/L		5	11-SEP-17
MTBE			<2.0		ug/L		2	11-SEP-17
o-Xylene			<0.30		ug/L		0.3	11-SEP-17
Styrene			<0.50		ug/L		0.5	11-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	11-SEP-17
Toluene			<0.50		ug/L		0.5	11-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	11-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	11-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	11-SEP-17
Surrogate: 1,4-Difluorobenzene			101.8		%		70-130	11-SEP-17
Surrogate: 4-Bromofluorobenzene			98.6		%		70-130	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
1,1,1,2-Tetrachloroethane			90.1		%		50-140	11-SEP-17
1,1,2,2-Tetrachloroethane			89.6		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-5 MS		**WG2594560-3**						
1,1,1-Trichloroethane			88.0		%		50-140	11-SEP-17
1,1,2-Trichloroethane			94.6		%		50-140	11-SEP-17
1,1-Dichloroethane			91.4		%		50-140	11-SEP-17
1,1-Dichloroethylene			79.0		%		50-140	11-SEP-17
1,2-Dibromoethane			93.9		%		50-140	11-SEP-17
1,2-Dichlorobenzene			90.0		%		50-140	11-SEP-17
1,2-Dichloroethane			95.5		%		50-140	11-SEP-17
1,2-Dichloropropane			98.1		%		50-140	11-SEP-17
1,3-Dichlorobenzene			87.8		%		50-140	11-SEP-17
1,4-Dichlorobenzene			91.0		%		50-140	11-SEP-17
Acetone			100.2		%		50-140	11-SEP-17
Benzene			94.6		%		50-140	11-SEP-17
Bromodichloromethane			94.9		%		50-140	11-SEP-17
Bromoform			89.2		%		50-140	11-SEP-17
Bromomethane			89.1		%		50-140	11-SEP-17
Carbon tetrachloride			86.4		%		50-140	11-SEP-17
Chlorobenzene			90.8		%		50-140	11-SEP-17
Chloroform			94.8		%		50-140	11-SEP-17
cis-1,2-Dichloroethylene			92.9		%		50-140	11-SEP-17
cis-1,3-Dichloropropene			92.9		%		50-140	11-SEP-17
Dibromochloromethane			96.6		%		50-140	11-SEP-17
Dichlorodifluoromethane			79.0		%		50-140	11-SEP-17
Ethylbenzene			85.6		%		50-140	11-SEP-17
n-Hexane			91.7		%		50-140	11-SEP-17
m+p-Xylenes			88.0		%		50-140	11-SEP-17
Methyl Ethyl Ketone			87.7		%		50-140	11-SEP-17
Methyl Isobutyl Ketone			89.1		%		50-140	11-SEP-17
Methylene Chloride			95.9		%		50-140	11-SEP-17
MTBE			93.0		%		50-140	11-SEP-17
o-Xylene			87.7		%		50-140	11-SEP-17
Styrene			87.1		%		50-140	11-SEP-17
Tetrachloroethylene			84.9		%		50-140	11-SEP-17
Toluene			87.2		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-5 MS		**WG2594560-3**						
trans-1,2-Dichloroethylene			91.0		%		50-140	11-SEP-17
trans-1,3-Dichloropropene			91.7		%		50-140	11-SEP-17
Trichloroethylene			91.8		%		50-140	11-SEP-17
Trichlorofluoromethane			83.3		%		50-140	11-SEP-17
Vinyl chloride			77.7		%		50-140	11-SEP-17

Quality Control Report

Workorder: L1988476 Report Date: 14-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

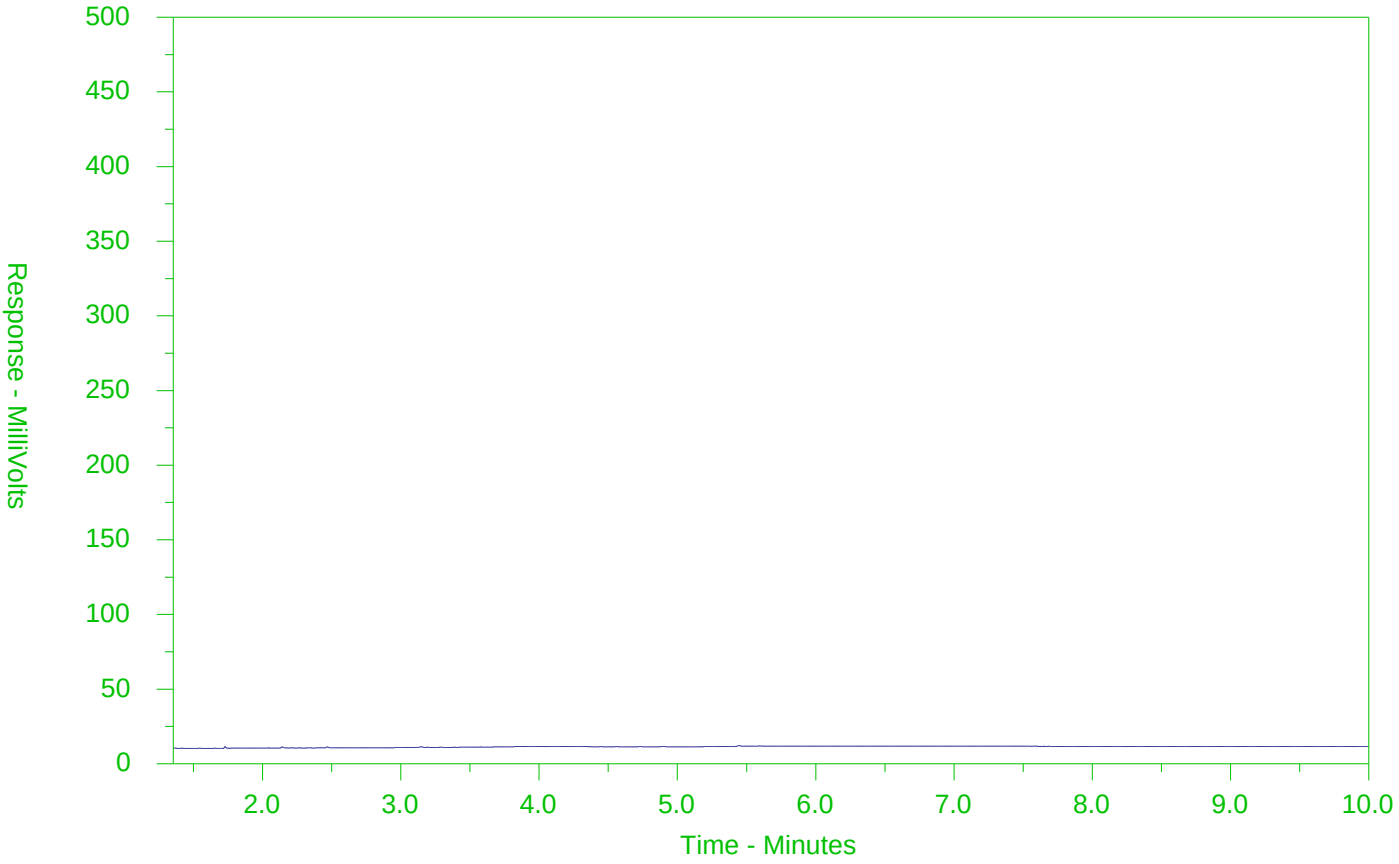
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988476-1
Client Sample ID: OW31



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

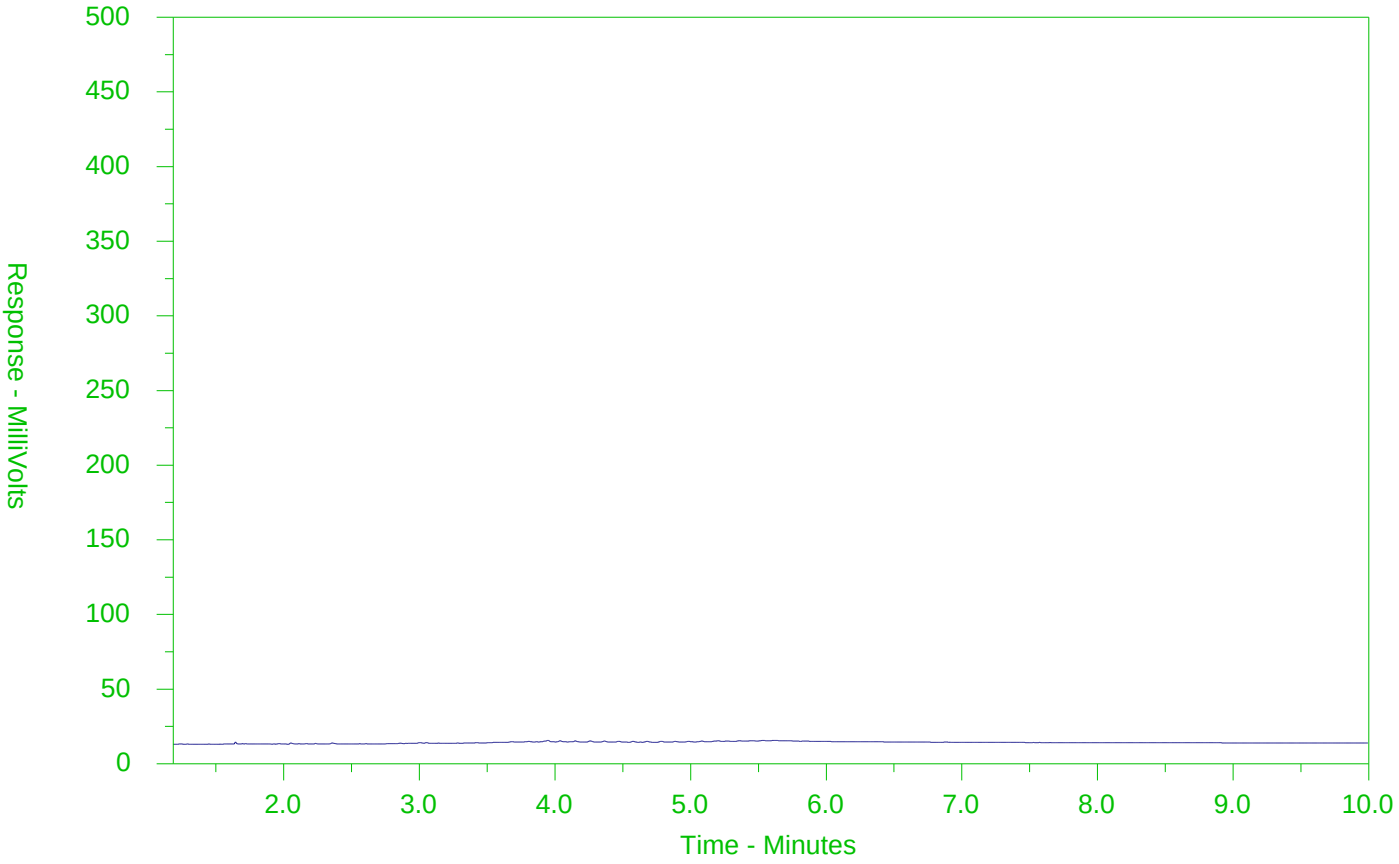
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988476-2
Client Sample ID: DUP



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L1988476-COFC

COC Number: 15 - GW 09 08

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	
Company:	CH2M Hill Kitchener	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report	☑ YES ☐ NO
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Street:	300-72 Victoria St. South	Email 1 or Fax	Michael.Shiry@ch2m.com
City/Province:	Kitchener, ON	Email 2	Peter.Mamo@ch2m.com
Postal Code:	N2G 4Y9	Email 3	
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Company:	CH2M Hill Kitchener	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q82156	AFE/Cost Center:	PO#:
Job #:	604757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L1988476	ALS Contact: Mathy	Sampler: M. Shiry

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days)		Emergency	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2/F4 - SUB	1,4 Dioxane	PCB	VOC, F1 (Trip Blank)	Number of Containers
1	GW3	08-Sep-17	10:50	Water				✓	✓	✓			5
2	DUP	↓	—	↓				✓	✓			—	5
3	Trip Blank	↓	—	↓								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☑ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M. Shiry	Date: 2017/9/8	Time: 1347	Received by:	Date:	Time:	Received by:	Date: 08-Sep-17	Time: 1347

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all sections of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 08-SEP-17
Report Date: 14-SEP-17 14:48 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L1988476

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 15-GW0908
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-1 OW31 Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	0.64		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	1.98		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
1,4-Dioxane	<20		20	ug/L		11-SEP-17	R3823509
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-1 OW31 Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	99.6		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828732
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828732
Surrogate: 2-Bromobenzotrifluoride	80.4		60-140	%	14-SEP-17	14-SEP-17	R3828732
Surrogate: 3,4-Dichlorotoluene	88.6		60-140	%		11-SEP-17	R3823509
L1988476-2 DUP Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	0.67		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	2.01		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-2 DUP Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	98.4		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	
F2 (C10-C16)	<100		100	ug/L	14-SEP-17	14-SEP-17	R3828732
F3a (C16-C22)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F3 (C16-C34)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
F3b (C22-C34)	<130		130	ug/L	14-SEP-17	14-SEP-17	R3828732
F4 (C34-C50)	<250		250	ug/L	14-SEP-17	14-SEP-17	R3828732
Chrom. to baseline at nC50	YES				14-SEP-17	14-SEP-17	R3828732
Surrogate: 2-Bromobenzotrifluoride	86.6		60-140	%	14-SEP-17	14-SEP-17	R3828732
Surrogate: 3,4-Dichlorotoluene	85.9		60-140	%		11-SEP-17	R3823509
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		11-SEP-17	R3823509
Benzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Bromodichloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Bromoform	<5.0		5.0	ug/L		11-SEP-17	R3823509
Bromomethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Carbon tetrachloride	<0.20		0.20	ug/L		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Volatile Organic Compounds							
Chlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dibromochloromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
Chloroform	<1.0		1.0	ug/L		11-SEP-17	R3823509
1,2-Dibromoethane	<0.20		0.20	ug/L		11-SEP-17	R3823509
1,2-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,3-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,4-Dichlorobenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Dichlorodifluoromethane	<2.0		2.0	ug/L		11-SEP-17	R3823509
1,1-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,2-Dichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methylene Chloride	<5.0		5.0	ug/L		11-SEP-17	R3823509
1,2-Dichloropropane	<0.50		0.50	ug/L		11-SEP-17	R3823509
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		11-SEP-17	R3823509
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		11-SEP-17	
Ethylbenzene	<0.50		0.50	ug/L		11-SEP-17	R3823509
n-Hexane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Methyl Ethyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
Methyl Isobutyl Ketone	<20		20	ug/L		11-SEP-17	R3823509
MTBE	<2.0		2.0	ug/L		11-SEP-17	R3823509
Styrene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Tetrachloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Toluene	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,1-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
1,1,2-Trichloroethane	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichloroethylene	<0.50		0.50	ug/L		11-SEP-17	R3823509
Trichlorofluoromethane	<5.0		5.0	ug/L		11-SEP-17	R3823509
Vinyl chloride	<0.50		0.50	ug/L		11-SEP-17	R3823509
o-Xylene	<0.30		0.30	ug/L		11-SEP-17	R3823509
m+p-Xylenes	<0.40		0.40	ug/L		11-SEP-17	R3823509
Xylenes (Total)	<0.50		0.50	ug/L		11-SEP-17	
Surrogate: 4-Bromofluorobenzene	97.3		70-130	%		11-SEP-17	R3823509
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%		11-SEP-17	R3823509
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		11-SEP-17	R3823509
F1-BTEX	<25		25	ug/L		11-SEP-17	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L1988476-3 TRIP BLANK Sampled By: M.S. on 08-SEP-17 @ 10:50 Matrix: WATER							
Hydrocarbons							
Surrogate: 3,4-Dichlorotoluene	89.0		60-140	%		11-SEP-17	R3823509

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
CINT	Cooling initiated. Samples were received packed with ice or ice packs and were sampled the same day as received.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3398/CCME TIER 1
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

15-GW0908

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L1988476 Report Date: 14-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
1,4-Dioxane			96.8		%		60-140	11-SEP-17
WG2594560-2 MB								
1,4-Dioxane			<20		ug/L		20	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
1,4-Dioxane			94.6		%		50-140	11-SEP-17
F1-HS-511-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
F1 (C6-C10)			103.1		%		80-120	11-SEP-17
WG2594560-2 MB								
F1 (C6-C10)			<25		ug/L		25	11-SEP-17
Surrogate: 3,4-Dichlorotoluene			87.8		%		60-140	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
F1 (C6-C10)			88.7		%		60-140	11-SEP-17
F2-F4-UW-WT	**Water**							
Batch R3828732								
WG2615892-2 LCS								
F2 (C10-C16)			98.3		%		70-130	14-SEP-17
F3a (C16-C22)			96.6		%		70-130	14-SEP-17
F3b (C22-C34)			94.0		%		70-130	14-SEP-17
F3 (C16-C34)			95.5		%		70-130	14-SEP-17
F4 (C34-C50)			108.7		%		70-130	14-SEP-17
WG2615892-3 LCSD		**WG2615892-2**						
F2 (C10-C16)		98.3	107.1		%	8.6	50	14-SEP-17
F3a (C16-C22)		96.6	105.4		%	8.6	50	14-SEP-17
F3b (C22-C34)		94.0	106.7		%	13	50	14-SEP-17
F3 (C16-C34)		95.5	105.9		%	10	50	14-SEP-17
F4 (C34-C50)		108.7	114.5		%	5.2	50	14-SEP-17
WG2615892-1 MB								
F2 (C10-C16)			<100		ug/L		100	14-SEP-17
F3a (C16-C22)			<130		ug/L		125	14-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Water**							
Batch R3828732								
WG2615892-1 MB								
F3b (C22-C34)			<130		ug/L		125	14-SEP-17
F3 (C16-C34)			<250		ug/L		250	14-SEP-17
F4 (C34-C50)			<250		ug/L		250	14-SEP-17
Surrogate: 2-Bromobenzotrifluoride			84.2		%		60-140	14-SEP-17
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	11-SEP-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	11-SEP-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-4 DUP		**WG2594560-3**						
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	11-SEP-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	11-SEP-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	11-SEP-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	11-SEP-17
WG2594560-1 LCS								
1,1,1,2-Tetrachloroethane			91.5		%		70-130	11-SEP-17
1,1,2,2-Tetrachloroethane			85.1		%		70-130	11-SEP-17
1,1,1-Trichloroethane			91.2		%		70-130	11-SEP-17
1,1,2-Trichloroethane			93.5		%		70-130	11-SEP-17
1,1-Dichloroethane			92.1		%		70-130	11-SEP-17
1,1-Dichloroethylene			83.7		%		70-130	11-SEP-17
1,2-Dibromoethane			92.1		%		70-130	11-SEP-17
1,2-Dichlorobenzene			90.0		%		70-130	11-SEP-17
1,2-Dichloroethane			91.2		%		70-130	11-SEP-17
1,2-Dichloropropane			95.6		%		70-130	11-SEP-17
1,3-Dichlorobenzene			87.1		%		70-130	11-SEP-17
1,4-Dichlorobenzene			89.8		%		70-130	11-SEP-17
Acetone			102.9		%		60-140	11-SEP-17
Benzene			94.7		%		70-130	11-SEP-17
Bromodichloromethane			92.3		%		70-130	11-SEP-17
Bromoform			88.0		%		70-130	11-SEP-17
Bromomethane			90.5		%		60-140	11-SEP-17
Carbon tetrachloride			90.5		%		70-130	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-1 LCS								
Chlorobenzene			91.5		%		70-130	11-SEP-17
Chloroform			94.2		%		70-130	11-SEP-17
cis-1,2-Dichloroethylene			92.2		%		70-130	11-SEP-17
cis-1,3-Dichloropropene			83.1		%		70-130	11-SEP-17
Dibromochloromethane			96.5		%		70-130	11-SEP-17
Dichlorodifluoromethane			94.5		%		50-140	11-SEP-17
Ethylbenzene			88.7		%		70-130	11-SEP-17
n-Hexane			102.2		%		70-130	11-SEP-17
m+p-Xylenes			89.9		%		70-130	11-SEP-17
Methyl Ethyl Ketone			82.8		%		60-140	11-SEP-17
Methyl Isobutyl Ketone			82.1		%		60-140	11-SEP-17
Methylene Chloride			94.5		%		70-130	11-SEP-17
MTBE			93.2		%		70-130	11-SEP-17
o-Xylene			90.3		%		70-130	11-SEP-17
Styrene			88.0		%		70-130	11-SEP-17
Tetrachloroethylene			87.6		%		70-130	11-SEP-17
Toluene			90.4		%		70-130	11-SEP-17
trans-1,2-Dichloroethylene			90.1		%		70-130	11-SEP-17
trans-1,3-Dichloropropene			83.4		%		70-130	11-SEP-17
Trichloroethylene			91.6		%		70-130	11-SEP-17
Trichlorofluoromethane			91.7		%		60-140	11-SEP-17
Vinyl chloride			85.7		%		60-140	11-SEP-17
WG2594560-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dibromoethane			<0.20		ug/L		0.2	11-SEP-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloroethane			<0.50		ug/L		0.5	11-SEP-17
1,2-Dichloropropane			<0.50		ug/L		0.5	11-SEP-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Acetone			<30		ug/L		30	11-SEP-17
Benzene			<0.50		ug/L		0.5	11-SEP-17
Bromodichloromethane			<2.0		ug/L		2	11-SEP-17
Bromoform			<5.0		ug/L		5	11-SEP-17
Bromomethane			<0.50		ug/L		0.5	11-SEP-17
Carbon tetrachloride			<0.20		ug/L		0.2	11-SEP-17
Chlorobenzene			<0.50		ug/L		0.5	11-SEP-17
Chloroform			<1.0		ug/L		1	11-SEP-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Dibromochloromethane			<2.0		ug/L		2	11-SEP-17
Dichlorodifluoromethane			<2.0		ug/L		2	11-SEP-17
Ethylbenzene			<0.50		ug/L		0.5	11-SEP-17
n-Hexane			<0.50		ug/L		0.5	11-SEP-17
m+p-Xylenes			<0.40		ug/L		0.4	11-SEP-17
Methyl Ethyl Ketone			<20		ug/L		20	11-SEP-17
Methyl Isobutyl Ketone			<20		ug/L		20	11-SEP-17
Methylene Chloride			<5.0		ug/L		5	11-SEP-17
MTBE			<2.0		ug/L		2	11-SEP-17
o-Xylene			<0.30		ug/L		0.3	11-SEP-17
Styrene			<0.50		ug/L		0.5	11-SEP-17
Tetrachloroethylene			<0.50		ug/L		0.5	11-SEP-17
Toluene			<0.50		ug/L		0.5	11-SEP-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	11-SEP-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	11-SEP-17
Trichloroethylene			<0.50		ug/L		0.5	11-SEP-17
Trichlorofluoromethane			<5.0		ug/L		5	11-SEP-17
Vinyl chloride			<0.50		ug/L		0.5	11-SEP-17
Surrogate: 1,4-Difluorobenzene			101.8		%		70-130	11-SEP-17
Surrogate: 4-Bromofluorobenzene			98.6		%		70-130	11-SEP-17
WG2594560-5 MS		**WG2594560-3**						
1,1,1,2-Tetrachloroethane			90.1		%		50-140	11-SEP-17
1,1,2,2-Tetrachloroethane			89.6		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-5 MS		**WG2594560-3**						
1,1,1-Trichloroethane			88.0		%		50-140	11-SEP-17
1,1,2-Trichloroethane			94.6		%		50-140	11-SEP-17
1,1-Dichloroethane			91.4		%		50-140	11-SEP-17
1,1-Dichloroethylene			79.0		%		50-140	11-SEP-17
1,2-Dibromoethane			93.9		%		50-140	11-SEP-17
1,2-Dichlorobenzene			90.0		%		50-140	11-SEP-17
1,2-Dichloroethane			95.5		%		50-140	11-SEP-17
1,2-Dichloropropane			98.1		%		50-140	11-SEP-17
1,3-Dichlorobenzene			87.8		%		50-140	11-SEP-17
1,4-Dichlorobenzene			91.0		%		50-140	11-SEP-17
Acetone			100.2		%		50-140	11-SEP-17
Benzene			94.6		%		50-140	11-SEP-17
Bromodichloromethane			94.9		%		50-140	11-SEP-17
Bromoform			89.2		%		50-140	11-SEP-17
Bromomethane			89.1		%		50-140	11-SEP-17
Carbon tetrachloride			86.4		%		50-140	11-SEP-17
Chlorobenzene			90.8		%		50-140	11-SEP-17
Chloroform			94.8		%		50-140	11-SEP-17
cis-1,2-Dichloroethylene			92.9		%		50-140	11-SEP-17
cis-1,3-Dichloropropene			92.9		%		50-140	11-SEP-17
Dibromochloromethane			96.6		%		50-140	11-SEP-17
Dichlorodifluoromethane			79.0		%		50-140	11-SEP-17
Ethylbenzene			85.6		%		50-140	11-SEP-17
n-Hexane			91.7		%		50-140	11-SEP-17
m+p-Xylenes			88.0		%		50-140	11-SEP-17
Methyl Ethyl Ketone			87.7		%		50-140	11-SEP-17
Methyl Isobutyl Ketone			89.1		%		50-140	11-SEP-17
Methylene Chloride			95.9		%		50-140	11-SEP-17
MTBE			93.0		%		50-140	11-SEP-17
o-Xylene			87.7		%		50-140	11-SEP-17
Styrene			87.1		%		50-140	11-SEP-17
Tetrachloroethylene			84.9		%		50-140	11-SEP-17
Toluene			87.2		%		50-140	11-SEP-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3823509								
WG2594560-5 MS		**WG2594560-3**						
trans-1,2-Dichloroethylene			91.0		%		50-140	11-SEP-17
trans-1,3-Dichloropropene			91.7		%		50-140	11-SEP-17
Trichloroethylene			91.8		%		50-140	11-SEP-17
Trichlorofluoromethane			83.3		%		50-140	11-SEP-17
Vinyl chloride			77.7		%		50-140	11-SEP-17

Quality Control Report

Workorder: L1988476 Report Date: 14-SEP-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

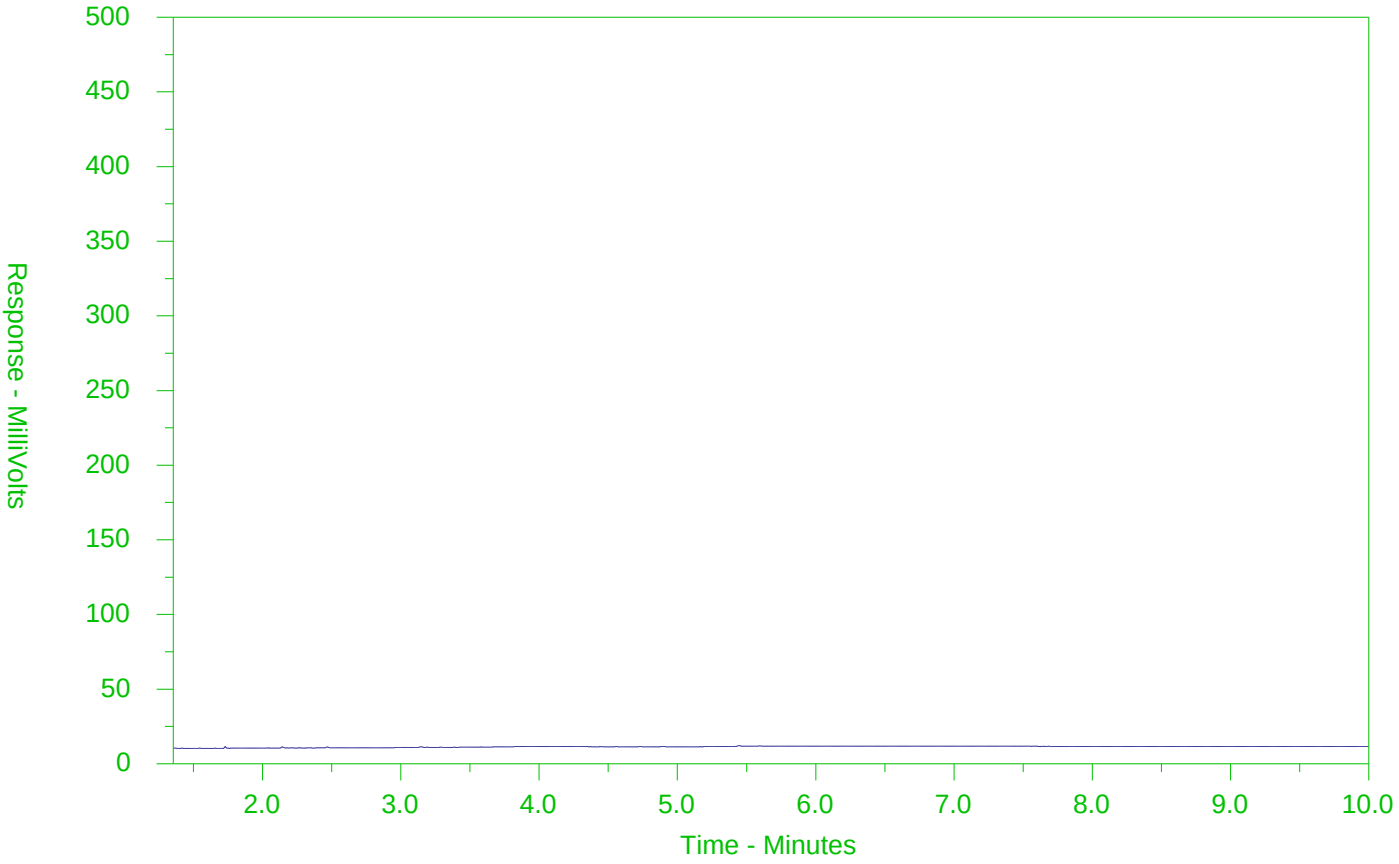
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988476-1
Client Sample ID: OW31



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

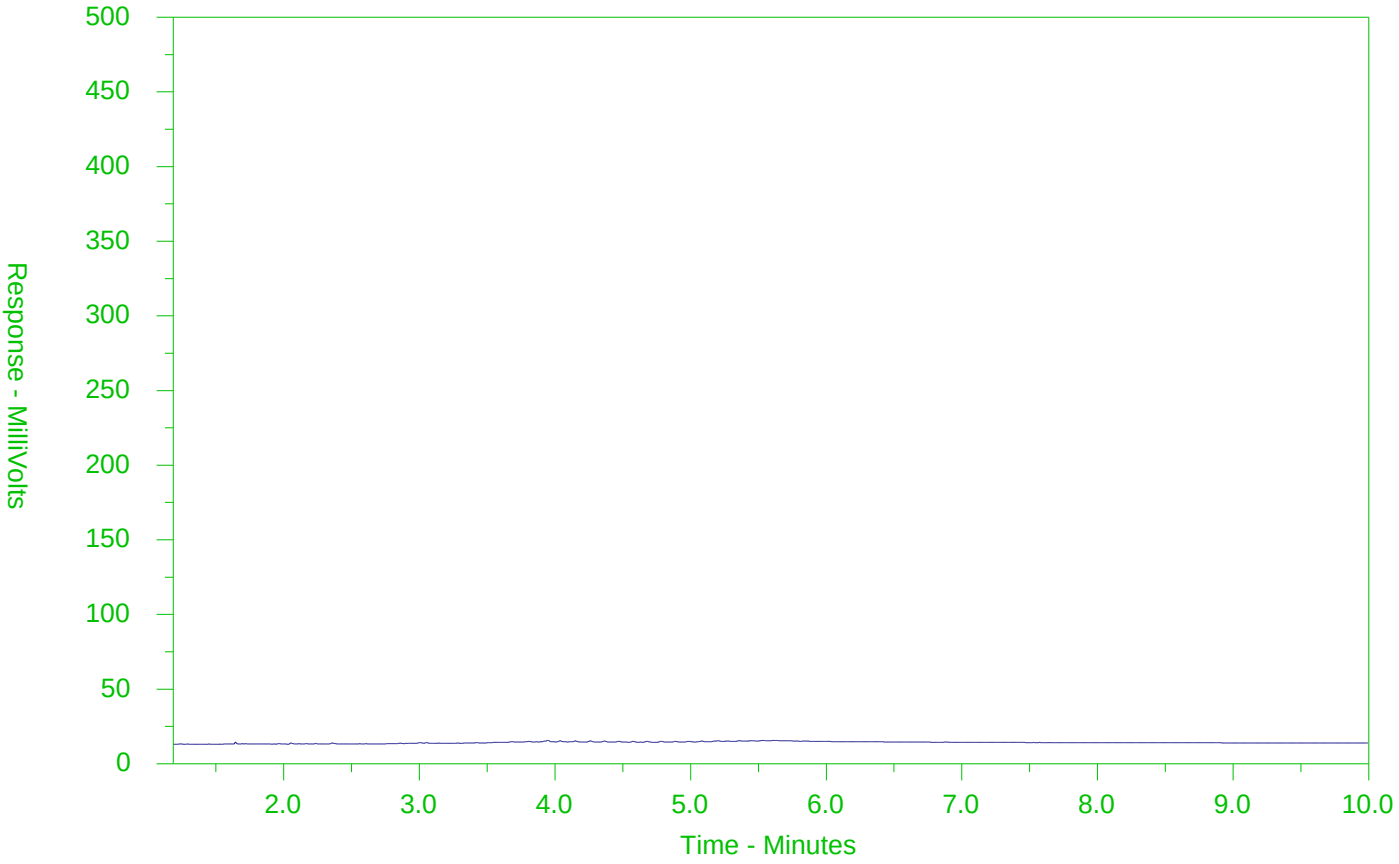
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L1988476-2
Client Sample ID: DUP



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L1988476-COFC

COC Number: 15 - GW 09 08

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	
Company:	CH2M Hill Kitchener	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Contact:	Michael Shiry / Peter Mamo	Quality Control (QC) Report with Report	☑ YES ☐ NO
Phone:	289 971 1779	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Street:	300-72 Victoria St. South	Email 1 or Fax	Michael.Shiry@ch2m.com
City/Province:	Kitchener, ON	Email 2	Peter.Mamo@ch2m.com
Postal Code:	N2G 4Y9	Email 3	
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Company:	CH2M Hill Kitchener	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q82156	AFE/Cost Center:	PO#:
Job #:	604757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L1988476	ALS Contact: Mathy	Sampler: M. Shiry

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days)		Emergency	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	SVOC	PAH	VOC, BTX, F1	F2/F4 - SUB	1,4 Dioxane	PCB	VOC, F1 (Trip Blank)	Number of Containers
1	GW3	08-Sep-17	10:50	Water				✓	✓	✓			5
2	DUP	↓	—	↓				✓	✓			—	5
3	Trip Blank	↓	—	↓								✓	2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☑ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M. Shiry	Date: 2017/9/8	Time: 1347	Received by:	Date:	Time:	Received by:	Date: 08-Sep-17	Time: 1347

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all sections of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 05-OCT-17
Report Date: 12-APR-21 14:10 (MT)
Version: FINAL REV. 5

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2003037

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-616667, 17-616668, 17-616669
Legal Site Desc:

Comments: 12-APR-21:
L2003037-2, 3, 4, 5, 7, 8, 9, 12, 13, 14, 15,16 ,17, 18, 20, 23, 24 - results for Bismuth, Iron, Calcium and Magnesium included.

22-NOV-17: F2-F4-UW added. Results included.

16-NOV-17: Grain size results attached at the end of the report.

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-2 TP17-305-5-6									
Sampled By: M. SHIRY on 04-OCT-17 @ 10:30									
Matrix: SOIL									
Physical Tests									
Conductivity	0.121		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.26		0.10	%	10-OCT-17				
pH	7.24		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.18	SAR:DL	0.18	SAR	11-OCT-17	12	12	5	5
Calcium (Ca)	2.3		1.0	mg/L	11-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	11-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	11-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	9.3		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	48.9		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	6.4		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.14		0.10	ug/g	11-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	0.77		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	48100		50	ug/g	12-APR-21				
Chromium (Cr)	28.7		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	13.3		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	95.9		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	45600		50	ug/g	12-APR-21				
Lead (Pb)	110		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	34300		20	ug/g	12-APR-21				
Mercury (Hg)	0.0327		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	27.9		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	47.9		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	3440	DLHC	40	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	0.22		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-2 TP17-305-5-6									
Sampled By: M. SHIRY on 04-OCT-17 @ 10:30									
Matrix: SOIL									
Volatile Organic Compounds									
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	10-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	91.8		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	94.6		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	13-OCT-17	55	65	55	65
F2 (C10-C16)	21		10	ug/g	13-OCT-17	230	250	98	150
F3a (C16-C22)	154		25	ug/g	13-OCT-17				
F3 (C16-C34)	451		50	ug/g	13-OCT-17	1700	2500	*300	1300
F3b (C22-C34)	296		25	ug/g	13-OCT-17				
F4 (C34-C50)	72		50	ug/g	13-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	300		250	ug/g	13-OCT-17	3300	6600	2800	5600

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-2 TP17-305-5-6									
Sampled By: M. SHIRY on 04-OCT-17 @ 10:30									
Matrix: SOIL									
Hydrocarbons						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	543		72	ug/g	13-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	13-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	76.1		60-140	%	13-OCT-17				
Surrogate: 3,4-Dichlorotoluene	86.5		60-140	%	10-OCT-17				
L2003037-3 TP17-304-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:05									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.266		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	7.02		0.10	%	10-OCT-17				
pH	7.74		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.10	SAR:DL	0.10	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	18.9		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	1.6		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	5.7		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	50.2		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	10.1		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	11-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	2.46		0.50	ug/g	11-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	105000		50	ug/g	12-APR-21				
Chromium (Cr)	15.3		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	8.8		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	36.3		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	24800		50	ug/g	12-APR-21				
Lead (Pb)	205		1.0	ug/g	11-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	47500		20	ug/g	12-APR-21				
Mercury (Hg)	0.0510		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	23.3		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	30.3		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	2600	DLHC	40	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-3 TP17-304-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:05									
Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	10-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	96.5		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	98.7		50-140	%	10-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-3 TP17-304-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:05									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	13-OCT-17	55	65	55	65
F2 (C10-C16)	31		10	ug/g	13-OCT-17	230	250	98	150
F3a (C16-C22)	94		25	ug/g	13-OCT-17				
F3 (C16-C34)	204		50	ug/g	13-OCT-17	1700	2500	300	1300
F3b (C22-C34)	110		25	ug/g	13-OCT-17				
F4 (C34-C50)	59		50	ug/g	13-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	250		250	ug/g	13-OCT-17	3300	6600	2800	5600
						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	294		72	ug/g	13-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	13-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	96.3		60-140	%	13-OCT-17				
Surrogate: 3,4-Dichlorotoluene	95.6		60-140	%	10-OCT-17				
L2003037-4 TP17-304-6-7									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:10									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.295		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	11.6		0.10	%	10-OCT-17				
pH	7.55		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.10	SAR:DL	0.10	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	20.6		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	1.6		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	1.4		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	13.4		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	91.9		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	16.2		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.11		0.10	ug/g	11-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	2.57		0.50	ug/g	11-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	91800		50	ug/g	12-APR-21				
Chromium (Cr)	18.6		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	9.5		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	45.1		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	34000		50	ug/g	12-APR-21				
Lead (Pb)	188		1.0	ug/g	11-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	49000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0622		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	2.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-4 TP17-304-6-7									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:10									
Matrix: SOIL									
Metals									
Nickel (Ni)	24.9		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	1.1		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	35.2		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	2660	DLHC	40	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-4	TP17-304-6-7									
Sampled By:	M. SHIRY on 04-OCT-17 @ 11:10									
Matrix:	SOIL									
Volatile Organic Compounds										
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	10-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	96.8		50-140	%	10-OCT-17				
	Surrogate: 1,4-Difluorobenzene	99.9		50-140	%	10-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
	F2 (C10-C16)	18		10	ug/g	16-OCT-17	230	250	98	150
	F3a (C16-C22)	63		25	ug/g	16-OCT-17				
	F3 (C16-C34)	177		50	ug/g	16-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	113		25	ug/g	16-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	194		72	ug/g	16-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	82.7		60-140	%	16-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	80.3		60-140	%	10-OCT-17				
L2003037-5	TP17-302-1-3									
Sampled By:	M. SHIRY on 04-OCT-17 @ 11:50									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.223		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	11.1		0.10	%	10-OCT-17				
	pH	7.58		0.10	pH units	12-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	<0.10	SAR:DL	0.10	SAR	12-OCT-17	12	12	5	5
	Calcium (Ca)	13.0		1.0	mg/L	12-OCT-17				
	Magnesium (Mg)	1.5		1.0	mg/L	12-OCT-17				
	Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
	Arsenic (As)	3.6		1.0	ug/g	11-OCT-17	18	18	18	18
	Barium (Ba)	31.7		1.0	ug/g	11-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	5.8		5.0	ug/g	11-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.18		0.10	ug/g	11-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	16400		50	ug/g	12-APR-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-5 TP17-302-1-3 Sampled By: M. SHIRY on 04-OCT-17 @ 11:50 Matrix: SOIL									
Metals									
Chromium (Cr)	13.4		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	3.8		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	18.1		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	18900		50	ug/g	12-APR-21				
Lead (Pb)	26.0		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	5780		20	ug/g	12-APR-21				
Mercury (Hg)	0.0139		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	9.5		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	22.5		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	99.1		5.0	ug/g	11-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-5 TP17-302-1-3 Sampled By: M. SHIRY on 04-OCT-17 @ 11:50 Matrix: SOIL									
Volatile Organic Compounds									
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.082		0.020	ug/g	10-OCT-17				
m+p-Xylenes	0.072		0.030	ug/g	10-OCT-17				
Xylenes (Total)	0.154		0.050	ug/g	10-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	100.5		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	105.5		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	16-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	<50		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	31		25	ug/g	16-OCT-17				
F3-PAH	<50		50	ug/g	16-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	16-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	89.8		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	88.9		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.114		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.073		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	0.051		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-5 TP17-302-1-3									
Sampled By: M. SHIRY on 04-OCT-17 @ 11:50									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
2-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	93.6		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	94.4		50-140	%	16-OCT-17				
L2003037-7 TP17-302-5-7									
Sampled By: M. SHIRY on 04-OCT-17 @ 12:45									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.109		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	12.1		0.10	%	10-OCT-17				
pH	7.62		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.11		0.10	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	4.3		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	1.5		1.0	mg/L	12-OCT-17				
Sodium (Na)	1.1		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	12-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.2		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	48.1		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.8		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	1.06		0.50	ug/g	12-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	82300		50	ug/g	12-APR-21				
Chromium (Cr)	14.0		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	4.7		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	27.0		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	12100		50	ug/g	12-APR-21				
Lead (Pb)	87.4		1.0	ug/g	12-OCT-17	120	120	120	120
Magnesium (Mg)	36400		20	ug/g	12-APR-21				
Mercury (Hg)	0.0203		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	12-OCT-17	40	40	6.9	6.9
Nickel (Ni)	14.1		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	23.5		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	1070		5.0	ug/g	12-OCT-17	*340	*340	*340	*340

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-7 TP17-302-5-7									
Sampled By: M. SHIRY on 04-OCT-17 @ 12:45									
Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	10-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	91.7		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	94.2		50-140	%	10-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-7 TP17-302-5-7									
Sampled By: M. SHIRY on 04-OCT-17 @ 12:45									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	16-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	<50		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	16-OCT-17				
F3-PAH	<50		50	ug/g	16-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	16-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	87.4		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	95.8		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	92.0		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	95.7		50-140	%	16-OCT-17				
L2003037-8 TP17-301-1-3									
Sampled By: M. SHIRY on 04-OCT-17 @ 13:20									
Matrix: SOIL									
Physical Tests									
Conductivity	0.143		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	8.66		0.10	%	10-OCT-17				
pH	7.29		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon									

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-8	TP17-301-1-3									
Sampled By:	M. SHIRY on 04-OCT-17 @ 13:20									
Matrix:	SOIL									
Organic / Inorganic Carbon										
	Fraction Organic Carbon	0.0539		0.0010	No Unit	13-OCT-17				
	Fraction Organic Carbon	0.0548		0.0010	No Unit	13-OCT-17				
	Fraction Organic Carbon	0.0553		0.0010	No Unit	13-OCT-17				
	Average Fraction Organic Carbon	0.0546		0.0010	No Unit	13-OCT-17				
	Total Organic Carbon	5.39		0.10	%	13-OCT-17				
	Total Organic Carbon	5.48		0.10	%	13-OCT-17				
	Total Organic Carbon	5.53		0.10	%	13-OCT-17				
Saturated Paste Extractables										
	SAR	<0.13	SAR:DL	0.13	SAR	12-OCT-17	12	12	5	5
	Calcium (Ca)	4.5		1.0	mg/L	12-OCT-17				
	Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
	Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals										
	Antimony (Sb)	2.3		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
	Arsenic (As)	9.5		1.0	ug/g	11-OCT-17	18	18	18	18
	Barium (Ba)	58.6		1.0	ug/g	11-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	6.9		5.0	ug/g	11-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.27		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	6670		50	ug/g	12-APR-21				
	Chromium (Cr)	21.6		1.0	ug/g	11-OCT-17	160	160	160	160
	Cobalt (Co)	5.6		1.0	ug/g	11-OCT-17	80	100	22	22
	Copper (Cu)	219		1.0	ug/g	11-OCT-17	230	300	*140	*180
	Iron (Fe)	34200		50	ug/g	12-APR-21				
	Lead (Pb)	72.9		1.0	ug/g	11-OCT-17	120	120	120	120
	Magnesium (Mg)	3630		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0582		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	1.3		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	15.1		1.0	ug/g	11-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
	Vanadium (V)	34.2		1.0	ug/g	11-OCT-17	86	86	86	86
	Zinc (Zn)	116		5.0	ug/g	11-OCT-17	340	340	340	340

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-8 TP17-301-1-3 Sampled By: M. SHIRY on 04-OCT-17 @ 13:20 Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Benzene	0.0246		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Ethylbenzene	0.052		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
Toluene	0.184		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
o-Xylene	0.245		0.020	ug/g	10-OCT-17				
m+p-Xylenes	0.318		0.030	ug/g	10-OCT-17				
Xylenes (Total)	0.563		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	100.2		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	94.5		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	7.9		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	7.1		5.0	ug/g	17-OCT-17	55	65	55	65
F2 (C10-C16)	15		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	14		10	ug/g	17-OCT-17				
F3a (C16-C22)	33		25	ug/g	16-OCT-17				
F3 (C16-C34)	158		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	124		25	ug/g	16-OCT-17				
F3-PAH	145		50	ug/g	17-OCT-17				
F4 (C34-C50)	58		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	238		72	ug/g	17-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	82.7		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	86.5		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	2.00		0.11	ug/g	17-OCT-17	30	42	*0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.13	DLM	0.13	ug/g	17-OCT-17	21	29	7.9	29
Acenaphthylene	0.38	DLM	0.13	ug/g	17-OCT-17	*0.15	*0.17	*0.15	*0.17
Anthracene	0.17	DLM	0.13	ug/g	17-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.92	R	0.13	ug/g	17-OCT-17	0.96	0.96	*0.5	*0.63
Benzo(a)pyrene	1.76	DLM	0.13	ug/g	17-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	2.44	DLM	0.13	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	1.48	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	1.64	DLM	0.13	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	0.13	DLM	0.13	ug/g	17-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	3.1	3.9	1.6	2
Chrysene	1.75	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	0.44	DLM	0.13	ug/g	17-OCT-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<0.25	DLM	0.25	ug/g	17-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	**0.19	0.27	**0.19	0.27
Diethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-8 TP17-301-1-3									
Sampled By: M. SHIRY on 04-OCT-17 @ 13:20									
Matrix: SOIL									
Semi-Volatile Organics									
2,4-Dimethylphenol	<0.25	DLM	0.25	ug/g	17-OCT-17	38	53	38	53
2,4-Dinitrophenol	<2.5	DLM	2.5	ug/g	17-OCT-17	**2	2.9	**2	2.9
2,4-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<0.35		0.35	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	0.89	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.13	DLM	0.13	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	1.61	DLM	0.13	ug/g	17-OCT-17	*0.76	*0.95	*0.38	*0.48
1-Methylnaphthalene	1.08	DUPH	0.075	ug/g	17-OCT-17	30	42	*0.99	3.4
2-Methylnaphthalene	0.918	DUPH	0.075	ug/g	17-OCT-17	30	42	0.99	3.4
Naphthalene	0.46	DUPH	0.13	ug/g	17-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
Phenanthrene	1.15	DLM	0.13	ug/g	17-OCT-17	12	16	6.2	7.8
Phenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
Pyrene	1.49	DLM	0.13	ug/g	17-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.13	DLM	0.13	ug/g	17-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	104.3		50-140	%	17-OCT-17				
Surrogate: Nitrobenzene d5	101.1		50-140	%	17-OCT-17				
Surrogate: Phenol d5	95.2		30-130	%	17-OCT-17				
Surrogate: p-Terphenyl d14	106.0		50-140	%	17-OCT-17				
Surrogate: 2,4,6-Tribromophenol	76.3		50-140	%	17-OCT-17				
L2003037-9 TP17-301-4-5									
Sampled By: M. SHIRY on 04-OCT-17 @ 13:40									
Matrix: SOIL									
Physical Tests									
Conductivity	0.121		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	10.1		0.10	%	10-OCT-17				
pH	7.57		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	11-OCT-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon									
Fraction Organic Carbon	0.0267		0.0010	No Unit	13-OCT-17				
Fraction Organic Carbon	0.0274		0.0010	No Unit	13-OCT-17				
Fraction Organic Carbon	0.0277		0.0010	No Unit	13-OCT-17				
Average Fraction Organic Carbon	0.0273		0.0010	No Unit	13-OCT-17				
Total Organic Carbon	2.67		0.10	%	13-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-9 TP17-301-4-5 Sampled By: M. SHIRY on 04-OCT-17 @ 13:40 Matrix: SOIL									
Organic / Inorganic Carbon									
Total Organic Carbon	2.74		0.10	%	13-OCT-17				
Total Organic Carbon	2.77		0.10	%	13-OCT-17				
Saturated Paste Extractables									
SAR	<0.13	SAR:DL	0.13	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	4.4		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	1.7		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	31.9		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.5		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.16		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	0.57		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	156000		50	ug/g	12-APR-21				
Chromium (Cr)	14.1		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	5.0		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	9.6		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	11800		50	ug/g	12-APR-21				
Lead (Pb)	68.2		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	109000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0405		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	13.9		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	23.2		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	843		5.0	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	93.7		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	92.2		50-140	%	10-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-9 TP17-301-4-5									
Sampled By: M. SHIRY on 04-OCT-17 @ 13:40									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	17-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	52		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	39		25	ug/g	16-OCT-17				
F3-PAH	52		50	ug/g	17-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	17-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	86.1		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	86.6		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.11		0.11	ug/g	17-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.13	DLM	0.13	ug/g	17-OCT-17	21	29	7.9	29
Acenaphthylene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.13	DLM	0.13	ug/g	17-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	3.1	3.9	1.6	2
Chrysene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	**0.1	**0.1	**0.1	**0.1
3,3'-Dichlorobenzidine	<0.25	DLM	0.25	ug/g	17-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	**0.19	0.27	**0.19	0.27
Diethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.25	DLM	0.25	ug/g	17-OCT-17	38	53	38	53
2,4-Dinitrophenol	<2.5	DLM	2.5	ug/g	17-OCT-17	**2	2.9	**2	2.9
2,4-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<0.35		0.35	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.13	DLM	0.13	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.075	DLM	0.075	ug/g	17-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.075	DLM	0.075	ug/g	17-OCT-17	30	42	0.99	3.4

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-9	TP17-301-4-5									
Sampled By:	M. SHIRY on 04-OCT-17 @ 13:40									
Matrix:	SOIL									
Semi-Volatile Organics										
	Naphthalene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	28	0.6	0.75
	Pentachlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
	Phenanthrene	<0.13	DLM	0.13	ug/g	17-OCT-17	12	16	6.2	7.8
	Phenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
	Pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	96	96	78	78
	1,2,4-Trichlorobenzene	<0.13	DLM	0.13	ug/g	17-OCT-17	3.2	16	0.36	1.4
	2,4,5-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.1	10	4.4	5.5
	2,4,6-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	108.9		50-140	%	17-OCT-17				
	Surrogate: Nitrobenzene d5	106.6		50-140	%	17-OCT-17				
	Surrogate: Phenol d5	97.8		30-130	%	17-OCT-17				
	Surrogate: p-Terphenyl d14	114.6		50-140	%	17-OCT-17				
	Surrogate: 2,4,6-Tribromophenol	93.0		50-140	%	17-OCT-17				
L2003037-10	TP17-300-0-1									
Sampled By:	M. SHIRY on 04-OCT-17 @ 14:15									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	2.09		0.10	%	10-OCT-17				
	% Moisture	2.20		0.10	%	07-NOV-17				
Polychlorinated Biphenyls										
	Aroclor 1242	<0.550	DLM	0.55	ug/g	13-OCT-17				
	Aroclor 1248	1.28	PRAR	0.050	ug/g	13-OCT-17				
	Aroclor 1254	<0.40	DLM	0.40	ug/g	13-OCT-17				
	Aroclor 1260	<0.050	DLM	0.050	ug/g	13-OCT-17				
	Total PCBs	1.28	DLM	0.70	ug/g	13-OCT-17	*1.1	*1.1	*0.35	*0.35
	Surrogate: d14-Terphenyl	99.1		60-140	%	13-OCT-17				
Dioxins and Furans										
	2,3,7,8-TCDD	0.157	M,J	0.067	pg/g	11-NOV-17				
	1,2,3,7,8-PeCDD	0.966	M,J	0.043	pg/g	11-NOV-17				
	1,2,3,4,7,8-HxCDD	0.81	M,J	0.11	pg/g	11-NOV-17				
	1,2,3,6,7,8-HxCDD	2.70	[M]	0.11	pg/g	11-NOV-17				
	1,2,3,7,8,9-HxCDD	2.12	M,J	0.11	pg/g	11-NOV-17				
	1,2,3,4,6,7,8-HpCDD	58.2		0.37	pg/g	11-NOV-17				
	OCDD	470		0.25	pg/g	11-NOV-17				
	Total-TCDD	3.31		0.067	pg/g	11-NOV-17				
	Total TCDD # Homologues	7			No Unit	11-NOV-17				
	Total-PeCDD	13.9		0.043	pg/g	11-NOV-17				
	Total PeCDD # Homologues	8			No Unit	11-NOV-17				
	Total-HxCDD	24.5		0.11	pg/g	11-NOV-17				
	Total HxCDD # Homologues	6			No Unit	11-NOV-17				
	Total-HpCDD	107		0.37	pg/g	11-NOV-17				
	Total HpCDD # Homologues	2			No Unit	11-NOV-17				
	2,3,7,8-TCDF	1.38	[M]	0.091	pg/g	11-NOV-17				
	1,2,3,7,8-PeCDF	0.68	M,J	0.38	pg/g	11-NOV-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-10 TP17-300-0-1									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:15									
Matrix: SOIL									
Dioxins and Furans									
2,3,4,7,8-PeCDF	5.40		0.33	pg/g	11-NOV-17				
1,2,3,4,7,8-HxCDF	2.01	[J]	0.11	pg/g	11-NOV-17				
1,2,3,6,7,8-HxCDF	1.83	[J]	0.10	pg/g	11-NOV-17				
1,2,3,7,8,9-HxCDF	0.61	M,J	0.14	pg/g	11-NOV-17				
2,3,4,6,7,8-HxCDF	3.17		0.10	pg/g	11-NOV-17				
1,2,3,4,6,7,8-HpCDF	22.0		0.083	pg/g	11-NOV-17				
1,2,3,4,7,8,9-HpCDF	0.94	M,J	0.13	pg/g	11-NOV-17				
OCDF	29.2		0.088	pg/g	11-NOV-17				
Total-TCDF	82.1		0.091	pg/g	11-NOV-17				
Total TCDF # Homologues	22			No Unit	11-NOV-17				
Total-PeCDF	79.0		0.38	pg/g	11-NOV-17				
Total PeCDF # Homologues	12			No Unit	11-NOV-17				
Total-HxCDF	53.6		0.14	pg/g	11-NOV-17				
Total HxCDF # Homologues	8			No Unit	11-NOV-17				
Total-HpCDF	52.7		0.13	pg/g	11-NOV-17				
Total HpCDF # Homologues	4			No Unit	11-NOV-17				
Surrogate: 13C12-2,3,7,8-TCDD	82.0		40-130	%	11-NOV-17				
Surrogate: 13C12-1,2,3,7,8-PeCDD	78.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,4,7,8-HxCDD	65.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,6,7,8-HxCDD	86.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD	70.0		40-140	%	11-NOV-17				
Surrogate: 13C12-OCDD	67.0		40-140	%	11-NOV-17				
Surrogate: 13C12-2,3,7,8-TCDF	78.0		40-130	%	11-NOV-17				
Surrogate: 13C12-1,2,3,7,8-PeCDF	80.0		40-140	%	11-NOV-17				
Surrogate: 13C12-2,3,4,7,8-PeCDF	82.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,4,7,8-HxCDF	66.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,6,7,8-HxCDF	75.0		40-140	%	11-NOV-17				
Surrogate: 13C12-2,3,4,6,7,8-HxCDF	74.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,7,8,9-HxCDF	67.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF	66.0		40-140	%	11-NOV-17				
Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF	62.0		40-140	%	11-NOV-17				
Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)	71.0		40-130	%	11-NOV-17				
Lower Bound PCDD/F TEQ (WHO 2005)	5.19			pg/g	11-NOV-17				
Mid Point PCDD/F TEQ (WHO 2005)	5.19			pg/g	11-NOV-17				
Upper Bound PCDD/F TEQ (WHO 2005)	5.19			pg/g	11-NOV-17				
L2003037-11 TP17-300-1-2A									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:20									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	7.46		0.10	%	26-OCT-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.010		0.010	ug/g	01-NOV-17				
Aroclor 1248	<0.010		0.010	ug/g	01-NOV-17				
Aroclor 1254	<0.010		0.010	ug/g	01-NOV-17				
Aroclor 1260	<0.010		0.010	ug/g	01-NOV-17				
Total PCBs	<0.020		0.020	ug/g	01-NOV-17	1.1	1.1	0.35	0.35

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-11 TP17-300-1-2A Sampled By: M. SHIRY on 04-OCT-17 @ 14:20 Matrix: SOIL									
Polychlorinated Biphenyls									
Surrogate: d14-Terphenyl	100.8		60-140	%	01-NOV-17				
L2003037-12 TP17-300-1-2 Sampled By: M. SHIRY on 04-OCT-17 @ 14:25 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.124		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.62		0.10	%	10-OCT-17				
pH	7.47		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.15	SAR:DL	0.15	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	3.6		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	1.9		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	6.5		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	53.3		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.16		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	0.62		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	25400		50	ug/g	12-APR-21				
Chromium (Cr)	13.4		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	3.8		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	42.7		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	37600		50	ug/g	12-APR-21				
Lead (Pb)	108		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	15100		20	ug/g	12-APR-21				
Mercury (Hg)	0.0670		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	12.0		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	18.8		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	259		5.0	ug/g	11-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-12 TP17-300-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:25									
Matrix: SOIL									
Volatile Organic Compounds									
Benzene	0.156		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	10-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	0.092		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.089		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	0.606		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.168		0.020	ug/g	10-OCT-17				
m+p-Xylenes	0.538		0.030	ug/g	10-OCT-17				
Xylenes (Total)	0.706		0.050	ug/g	10-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	89.7		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	96.2		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	5.3		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-12 TP17-300-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:25									
Matrix: SOIL									
Hydrocarbons									
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	17-OCT-17				
F3a (C16-C22)	28		25	ug/g	16-OCT-17				
F3 (C16-C34)	477		50	ug/g	16-OCT-17	1700	2500	*300	1300
F3b (C22-C34)	449		25	ug/g	16-OCT-17				
F3-PAH	405		50	ug/g	17-OCT-17				
F4 (C34-C50)	865		50	ug/g	16-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	1680		250	ug/g	12-OCT-17	3300	6600	2800	5600
						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	1350		72	ug/g	17-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	67.9		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	95.0		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	4.47		0.53	ug/g	17-OCT-17	30	42	*0.99	*3.4
Semi-Volatile Organics									
Acenaphthene	<0.63	DLM	0.63	ug/g	17-OCT-17	21	29	7.9	29
Acenaphthylene	<0.63	DLM	0.63	ug/g	17-OCT-17	**0.15	**0.17	**0.15	**0.17
Anthracene	1.77	DLM	0.63	ug/g	17-OCT-17	*0.67	*0.74	*0.67	*0.74
Benzo(a)anthracene	14.6	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	14.3	DLM	0.63	ug/g	17-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	9.26	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	18.8	DLM	0.63	ug/g	17-OCT-17	*9.6	*9.6	*6.6	*7.8
Benzo(k)fluoranthene	3.52	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	<0.63	DLM	0.63	ug/g	17-OCT-17	52	210	**0.31	1.1
4-Chloroaniline	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.53	**0.5	**0.53
Bis(2-chloroethyl)ether	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Bis(2-chloroisopropyl)ether	<1.3	DLM	1.3	ug/g	17-OCT-17	11	13	**0.67	1.8
2-Chlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	3.1	3.9	1.6	2
Chrysene	22.2	DLM	0.63	ug/g	17-OCT-17	*9.6	*9.6	*7	*7.8
Dibenzo(a,h)anthracene	11.9	DLM	0.63	ug/g	17-OCT-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<1.3	DLM	1.3	ug/g	17-OCT-17	**1	**1	**1	**1
2,4-Dichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.19	**0.27	**0.19	**0.27
Diethylphthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Dimethylphthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
2,4-Dimethylphenol	<1.3	DLM	1.3	ug/g	17-OCT-17	38	53	38	53
2,4-Dinitrophenol	<13	DLM	13	ug/g	17-OCT-17	**2	**2.9	**2	**2.9
2,4-Dinitrotoluene	<1.3	DLM	1.3	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<1.3	DLM	1.3	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<1.8		1.8	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Bis(2-ethylhexyl)phthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	1.42	DLM	0.63	ug/g	17-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.63	DLM	0.63	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	6.48	DLM	0.63	ug/g	17-OCT-17	*0.76	*0.95	*0.38	*0.48
1-Methylnaphthalene	1.04	DLM	0.38	ug/g	17-OCT-17	30	42	*0.99	3.4
2-Methylnaphthalene	3.44	DLM	0.38	ug/g	17-OCT-17	30	42	*0.99	*3.4

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-12 TP17-300-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:25									
Matrix: SOIL									
Semi-Volatile Organics									
Naphthalene	2.46	DLM	0.63	ug/g	17-OCT-17	9.6	28	*0.6	*0.75
Pentachlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
Phenanthrene	5.50	DLM	0.63	ug/g	17-OCT-17	12	16	6.2	7.8
Phenol	<1.3	DLM	1.3	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
Pyrene	4.77	DLM	0.63	ug/g	17-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.63	DLM	0.63	ug/g	17-OCT-17	3.2	16	**0.36	1.4
2,4,5-Trichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	108.8		50-140	%	17-OCT-17				
Surrogate: Nitrobenzene d5	103.4		50-140	%	17-OCT-17				
Surrogate: Phenol d5	86.5		30-130	%	17-OCT-17				
Surrogate: p-Terphenyl d14	92.4		50-140	%	17-OCT-17				
Surrogate: 2,4,6-Tribromophenol	87.0		50-140	%	17-OCT-17				
L2003037-13 TP17-300-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:35									
Matrix: SOIL									
Physical Tests									
Conductivity	0.0898		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	6.51		0.10	%	10-OCT-17				
pH	7.27		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.17	SAR:DL	0.17	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	2.6		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.2		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	29.9		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.9		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.10		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	0.56		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	122000		50	ug/g	12-APR-21				
Chromium (Cr)	13.9		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	4.5		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	12.4		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	9520		50	ug/g	12-APR-21				
Lead (Pb)	73.4		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	85900		20	ug/g	12-APR-21				
Mercury (Hg)	0.0447		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-13 TP17-300-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:35									
Matrix: SOIL									
Metals									
Nickel (Ni)	12.4		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23
Vanadium (V)	20.6		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	803		5.0	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-13	TP17-300-3-4									
Sampled By:	M. SHIRY on 04-OCT-17 @ 14:35									
Matrix:	SOIL									
Volatile Organic Compounds										
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	99.1		50-140	%	10-OCT-17				
	Surrogate: 1,4-Difluorobenzene	103.1		50-140	%	10-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
	F2-Naphth	<10		10	ug/g	17-OCT-17				
	F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
	F3 (C16-C34)	66		50	ug/g	16-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	54		25	ug/g	16-OCT-17				
	F3-PAH	66		50	ug/g	17-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	17-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	86.7		60-140	%	16-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	76.2		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons										
	1+2-Methylnaphthalenes	<0.11		0.11	ug/g	17-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics										
	Acenaphthene	<0.13	DLM	0.13	ug/g	17-OCT-17	21	29	7.9	29
	Acenaphthylene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.15	0.17	0.15	0.17
	Anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.3	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.78	0.78
	Benzo(ghi)perylene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.96	0.96	0.78	0.78
	Biphenyl	<0.13	DLM	0.13	ug/g	17-OCT-17	52	210	0.31	1.1
	4-Chloroaniline	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.53	0.5	0.53
	Bis(2-chloroethyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
	Bis(2-chloroisopropyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	11	13	0.67	1.8
	2-Chlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	3.1	3.9	1.6	2
	Chrysene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	7	7.8
	Dibenzo(a,h)anthracene	<0.13	DLM	0.13	ug/g	17-OCT-17	**0.1	**0.1	**0.1	**0.1
	3,3'-Dichlorobenzidine	<0.25	DLM	0.25	ug/g	17-OCT-17	1	1	1	1
	2,4-Dichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	**0.19	0.27	**0.19	0.27
	Diethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
	Dimethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
	2,4-Dimethylphenol	<0.25	DLM	0.25	ug/g	17-OCT-17	38	53	38	53

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-13 TP17-300-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 14:35									
Matrix: SOIL									
Semi-Volatile Organics									
2,4-Dinitrophenol	<2.5	DLM	2.5	ug/g	17-OCT-17	**2	2.9	**2	2.9
2,4-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<0.35		0.35	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.13	DLM	0.13	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.075	DLM	0.075	ug/g	17-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.075	DLM	0.075	ug/g	17-OCT-17	30	42	0.99	3.4
Naphthalene	<0.13	DLM	0.13	ug/g	17-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
Phenanthrene	<0.13	DLM	0.13	ug/g	17-OCT-17	12	16	6.2	7.8
Phenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
Pyrene	<0.13	DLM	0.13	ug/g	17-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.13	DLM	0.13	ug/g	17-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	103.5		50-140	%	17-OCT-17				
Surrogate: Nitrobenzene d5	100.7		50-140	%	17-OCT-17				
Surrogate: Phenol d5	93.8		30-130	%	17-OCT-17				
Surrogate: p-Terphenyl d14	90.9		50-140	%	17-OCT-17				
Surrogate: 2,4,6-Tribromophenol	88.1		50-140	%	17-OCT-17				
L2003037-14 TP17-303-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:20									
Matrix: SOIL									
Physical Tests									
Conductivity	0.127		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.57		0.10	%	10-OCT-17				
pH	7.67		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.14	SAR:DL	0.14	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	3.8		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	12-OCT-17	40	50	7.5	7.5
Arsenic (As)	3.7		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	44.1		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.0		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.15		0.10	ug/g	12-OCT-17	2	2	1.5	1.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-14 TP17-303-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:20									
Matrix: SOIL									
Metals									
Cadmium (Cd)	<0.50		0.50	ug/g	12-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	19400		50	ug/g	12-APR-21				
Chromium (Cr)	10.5		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	4.0		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	10.7		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	13300		50	ug/g	12-APR-21				
Lead (Pb)	19.6		1.0	ug/g	12-OCT-17	120	120	120	120
Magnesium (Mg)	3430		20	ug/g	12-APR-21				
Mercury (Hg)	0.0085		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	12-OCT-17	40	40	6.9	6.9
Nickel (Ni)	7.6		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	23.5		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	41.4		5.0	ug/g	12-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-14 TP17-303-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:20									
Matrix: SOIL									
Volatile Organic Compounds									
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	98.3		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	102.3		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	16-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	<50		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	16-OCT-17				
F3-PAH	<50		50	ug/g	16-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	16-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	89.3		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	105.3		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-14 TP17-303-1-2									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:20									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	86.1		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	88.1		50-140	%	16-OCT-17				
L2003037-15 TP17-303-4-5									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:40									
Matrix: SOIL									
Physical Tests									
Conductivity	0.0763		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	11.2		0.10	%	10-OCT-17				
pH	7.41		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.20	SAR:DL	0.20	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	1.8		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	11-OCT-17	40	50	7.5	7.5
Arsenic (As)	5.4		1.0	ug/g	11-OCT-17	18	18	18	18
Barium (Ba)	93.0		1.0	ug/g	11-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	11-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.4		5.0	ug/g	11-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.14		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	0.78		0.50	ug/g	11-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	40600		50	ug/g	12-APR-21				
Chromium (Cr)	6.2		1.0	ug/g	11-OCT-17	160	160	160	160
Cobalt (Co)	8.0		1.0	ug/g	11-OCT-17	80	100	22	22
Copper (Cu)	25.9		1.0	ug/g	11-OCT-17	230	300	140	180
Iron (Fe)	47000		50	ug/g	12-APR-21				
Lead (Pb)	46.8		1.0	ug/g	11-OCT-17	120	120	120	120
Magnesium (Mg)	35000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0146		0.0050	ug/g	11-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	11-OCT-17	40	40	6.9	6.9
Nickel (Ni)	9.4		1.0	ug/g	11-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	11-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	11-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	11-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	11-OCT-17	33	33	23	23

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-15 TP17-303-4-5									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:40									
Matrix: SOIL									
Metals									
Vanadium (V)	48.0		1.0	ug/g	11-OCT-17	86	86	86	86
Zinc (Zn)	665		5.0	ug/g	11-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-15 TP17-303-4-5									
Sampled By: M. SHIRY on 04-OCT-17 @ 15:40									
Matrix: SOIL									
Volatile Organic Compounds									
Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	96.4		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	101.0		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	16-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	<50		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	16-OCT-17				
F3-PAH	<50		50	ug/g	16-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	16-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	85.0		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	98.0		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	87.7		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	87.9		50-140	%	16-OCT-17				
L2003037-16 TP17-308-8-8.5									
Sampled By: M. SHIRY on 04-OCT-17 @ 16:35									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.0764		0.0040	mS/cm	18-OCT-17	1.4	1.4	0.7	0.7
% Moisture	4.71		0.10	%	16-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-16 TP17-308-8-8.5									
Sampled By: M. SHIRY on 04-OCT-17 @ 16:35									
Matrix: SOIL									
Physical Tests									
pH	8.15		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	17-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.23	SAR:DL	0.23	SAR	18-OCT-17	12	12	5	5
Calcium (Ca)	1.5		1.0	mg/L	18-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	18-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	18-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	18-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.9		1.0	ug/g	18-OCT-17	18	18	18	18
Barium (Ba)	19.8		1.0	ug/g	18-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	18-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	18-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	18-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	18-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	98900		50	ug/g	12-APR-21				
Chromium (Cr)	9.6		1.0	ug/g	18-OCT-17	160	160	160	160
Cobalt (Co)	3.5		1.0	ug/g	18-OCT-17	80	100	22	22
Copper (Cu)	15.1		1.0	ug/g	18-OCT-17	230	300	140	180
Iron (Fe)	11600		50	ug/g	12-APR-21				
Lead (Pb)	25.7		1.0	ug/g	18-OCT-17	120	120	120	120
Magnesium (Mg)	27100		20	ug/g	12-APR-21				
Mercury (Hg)	0.0152		0.0050	ug/g	18-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	18-OCT-17	40	40	6.9	6.9
Nickel (Ni)	7.9		1.0	ug/g	18-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	18-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	18-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	18-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	18-OCT-17	33	33	23	23
Vanadium (V)	21.7		1.0	ug/g	18-OCT-17	86	86	86	86
Zinc (Zn)	160		5.0	ug/g	18-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	17-OCT-17	8	10	8	10
L2003037-17 TP17-306-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:05									
Matrix: SOIL									
Physical Tests									
Conductivity	0.135		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	6.65		0.10	%	10-OCT-17				
pH	7.74		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-17 TP17-306-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:05									
Matrix: SOIL									
Saturated Paste Extractables									
SAR	<0.13	SAR:DL	0.13	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	4.3		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	8.5		1.0	ug/g	12-OCT-17	40	50	*7.5	*7.5
Arsenic (As)	14.0		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	109		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5
Bismuth (Bi)	10.7		1.0	ug/g	12-APR-21				
Boron (B)	9.0		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.30		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	1.22		0.50	ug/g	12-OCT-17	1.9	1.9	*1.2	*1.2
Calcium (Ca)	68100		50	ug/g	12-APR-21				
Chromium (Cr)	20.7		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	4.9		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	105		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	20900		50	ug/g	12-APR-21				
Lead (Pb)	471		1.0	ug/g	12-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	27400		20	ug/g	12-APR-21				
Mercury (Hg)	0.0522		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.2		1.0	ug/g	12-OCT-17	40	40	6.9	6.9
Nickel (Ni)	14.6		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	0.24		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	24.2		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	562		5.0	ug/g	12-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	0.0108		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-17 TP17-306-3-4 Sampled By: M. SHIRY on 04-OCT-17 @ 17:05 Matrix: SOIL									
Volatile Organic Compounds									
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	0.020		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.079		0.020	ug/g	10-OCT-17				
m+p-Xylenes	0.081		0.030	ug/g	10-OCT-17				
Xylenes (Total)	0.160		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	95.2		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	99.4		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	16-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	16-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	74		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	59		25	ug/g	16-OCT-17				
F3-PAH	66		50	ug/g	16-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	74		72	ug/g	16-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	87.3		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	77.5		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	0.058		0.050	ug/g	16-OCT-17	21	29	7.9	29

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-17 TP17-306-3-4									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:05									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	0.113		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	1.00		0.050	ug/g	16-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	1.33		0.050	ug/g	16-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	1.85		0.050	ug/g	16-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(g,h,i)perylene	0.757		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.678		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	1.24		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	0.236		0.050	ug/g	16-OCT-17	*0.1	*0.1	*0.1	*0.1
Fluoranthene	1.19		0.050	ug/g	16-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.769		0.050	ug/g	16-OCT-17	*0.76	0.95	*0.38	*0.48
1+2-Methylnaphthalenes	0.280		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	0.129		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.151		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	0.114		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	0.527		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	1.12		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	80.7		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	84.8		50-140	%	16-OCT-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.350	DLM	0.35	ug/g	01-NOV-17				
Aroclor 1248	0.945	PRAR	0.010	ug/g	01-NOV-17				
Aroclor 1254	<0.30	DLM	0.30	ug/g	01-NOV-17				
Aroclor 1260	<0.0250	DLM	0.025	ug/g	01-NOV-17				
Total PCBs	0.945	DLM	0.50	ug/g	01-NOV-17	1.1	1.1	*0.35	*0.35
Surrogate: d14-Terphenyl	109.3		60-140	%	01-NOV-17				
L2003037-18 TP17-306-5-6									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:10									
Matrix: SOIL									
Physical Tests									
Conductivity	0.176		0.0040	mS/cm	31-OCT-17	1.4	1.4	0.7	0.7
% Moisture	6.96		0.10	%	26-OCT-17				
pH	7.81		0.10	pH units	28-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	26-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.15	SAR:M	0.10	SAR	30-OCT-17	12	12	5	5
Calcium (Ca)	3.6		1.0	mg/L	30-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	30-OCT-17				
Sodium (Na)	1.0		1.0	mg/L	30-OCT-17				
Metals									
Antimony (Sb)	8.5		1.0	ug/g	30-OCT-17	40	50	*7.5	*7.5
Arsenic (As)	20.2		1.0	ug/g	30-OCT-17	*18	*18	*18	*18
Barium (Ba)	119		1.0	ug/g	30-OCT-17	670	670	390	390

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-18 TP17-306-5-6									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:10									
Matrix: SOIL									
Metals									
Beryllium (Be)	<0.50		0.50	ug/g	30-OCT-17	8	10	4	5
Bismuth (Bi)	4.1		1.0	ug/g	12-APR-21				
Boron (B)	8.9		5.0	ug/g	30-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.41		0.10	ug/g	30-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	1.43		0.50	ug/g	30-OCT-17	1.9	1.9	*1.2	*1.2
Calcium (Ca)	68800		50	ug/g	12-APR-21				
Chromium (Cr)	19.0		1.0	ug/g	30-OCT-17	160	160	160	160
Cobalt (Co)	5.0		1.0	ug/g	30-OCT-17	80	100	22	22
Copper (Cu)	124		1.0	ug/g	30-OCT-17	230	300	140	180
Iron (Fe)	20200		50	ug/g	12-APR-21				
Lead (Pb)	504		1.0	ug/g	30-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	27000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0452		0.0050	ug/g	30-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.4		1.0	ug/g	30-OCT-17	40	40	6.9	6.9
Nickel (Ni)	15.2		1.0	ug/g	30-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	30-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	0.26		0.20	ug/g	30-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	30-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	30-OCT-17	33	33	23	23
Vanadium (V)	22.9		1.0	ug/g	30-OCT-17	86	86	86	86
Zinc (Zn)	565		5.0	ug/g	30-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	30-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	0.349	DUPH	0.050	ug/g	31-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	31-OCT-17	0.15	0.17	0.15	0.17
Anthracene	0.887	DUPH	0.050	ug/g	31-OCT-17	*0.67	*0.74	*0.67	*0.74
Benzo(a)anthracene	2.19	DUPH	0.050	ug/g	31-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	1.99		0.050	ug/g	31-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	2.38		0.050	ug/g	31-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(g,h,i)perylene	1.32		0.050	ug/g	31-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	1.16	DUPH	0.050	ug/g	31-OCT-17	*0.96	*0.96	*0.78	*0.78
Chrysene	2.10	DUPH	0.050	ug/g	31-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	0.399		0.050	ug/g	31-OCT-17	*0.1	*0.1	*0.1	*0.1
Fluoranthene	4.18	DUPH	0.050	ug/g	31-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	0.395	DUPH	0.050	ug/g	31-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	1.40		0.050	ug/g	31-OCT-17	*0.76	*0.95	*0.38	*0.48
1+2-Methylnaphthalenes	0.566		0.042	ug/g	31-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	0.256		0.030	ug/g	31-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.310		0.030	ug/g	31-OCT-17	30	42	0.99	3.4
Naphthalene	0.332		0.050	ug/g	31-OCT-17	9.6	28	0.6	0.75
Phenanthrene	3.75	DUPH	0.050	ug/g	31-OCT-17	12	16	6.2	7.8
Pyrene	3.31	DUPH	0.050	ug/g	31-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	91.4		50-140	%	31-OCT-17				
Surrogate: p-Terphenyl d14	94.6		50-140	%	31-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
							#1	#2	#3	#4
L2003037-19	TP17-307-7-8									
Sampled By:	M. SHIRY on 04-OCT-17 @ 17:50									
Matrix:	SOIL									
Physical Tests										
	% Moisture	5.45		0.10	%	16-OCT-17				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	17-OCT-17	16	28	16	28
	Benzene	<0.0068		0.0068	ug/g	17-OCT-17	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	17-OCT-17	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	17-OCT-17	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	17-OCT-17	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	17-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	17-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	17-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	17-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	17-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	17-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	17-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	17-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	17-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	17-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	17-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	17-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	17-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	17-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	17-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	17-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	17-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	17-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	17-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	17-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	17-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	17-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	17-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	17-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	17-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	17-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	17-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	17-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	17-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	17-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	17-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	17-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	17-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	17-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	17-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	17-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	17-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	101.2		50-140	%	17-OCT-17				
	Surrogate: 1,4-Difluorobenzene	103.6		50-140	%	17-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-19 TP17-307-7-8									
Sampled By: M. SHIRY on 04-OCT-17 @ 17:50									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	14		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	26		25	ug/g	20-OCT-17				
F3 (C16-C34)	69		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	43		25	ug/g	20-OCT-17				
F4 (C34-C50)	123		50	ug/g	20-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	360		250	ug/g	18-OCT-17	3300	6600	2800	5600
						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	207		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	73.9		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	80.3		60-140	%	17-OCT-17				
L2003037-20 DUP 1									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.165		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	9.52		0.10	%	10-OCT-17				
pH	7.48		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.11	SAR:DL	0.11	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	6.7		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	12-OCT-17	40	50	7.5	7.5
Arsenic (As)	3.1		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	26.5		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.1		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.17		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	12-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	14300		50	ug/g	12-APR-21				
Chromium (Cr)	9.9		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	3.3		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	12.9		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	17400		50	ug/g	12-APR-21				
Lead (Pb)	30.4		1.0	ug/g	12-OCT-17	120	120	120	120
Magnesium (Mg)	4330		20	ug/g	12-APR-21				
Mercury (Hg)	0.0110		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	12-OCT-17	40	40	6.9	6.9

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-20 DUP 1									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Metals									
Nickel (Ni)	7.2		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	21.1		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	68.1		5.0	ug/g	12-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-20 DUP 1									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Volatile Organic Compounds									
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	90.5		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	94.2		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	17-OCT-17				
F3a (C16-C22)	<25		25	ug/g	16-OCT-17				
F3 (C16-C34)	50		50	ug/g	16-OCT-17	1700	2500	300	1300
F3b (C22-C34)	41		25	ug/g	16-OCT-17				
F3-PAH	50		50	ug/g	17-OCT-17				
F4 (C34-C50)	<50		50	ug/g	16-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	17-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	88.1		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	87.4		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.122		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	0.062		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.074		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	0.205		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	0.093		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.112		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	0.082		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	0.070		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	87.4		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	88.6		50-140	%	16-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-21 DUP 2									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Physical Tests									
% Moisture	10.9		0.10	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	1.99		0.11	ug/g	17-OCT-17	30	42	*0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.13	DLM	0.13	ug/g	17-OCT-17	21	29	7.9	29
Acenaphthylene	0.59	DLM	0.13	ug/g	17-OCT-17	*0.15	*0.17	*0.15	*0.17
Anthracene	0.25	DLM	0.13	ug/g	17-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	1.27	R	0.13	ug/g	17-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	2.52	DLM	0.13	ug/g	17-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	3.03	DLM	0.13	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	2.22	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	1.96	DLM	0.13	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	<0.13	DLM	0.13	ug/g	17-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.25	DLM	0.25	ug/g	17-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	3.1	3.9	1.6	2
Chrysene	2.16	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	0.66	DLM	0.13	ug/g	17-OCT-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<0.25	DLM	0.25	ug/g	17-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	**0.19	0.27	**0.19	0.27
Diethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.25	DLM	0.25	ug/g	17-OCT-17	38	53	38	53
2,4-Dinitrophenol	<2.5	DLM	2.5	ug/g	17-OCT-17	**2	2.9	**2	2.9
2,4-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<0.25	DLM	0.25	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<0.35		0.35	ug/g	17-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.25	DLM	0.25	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	1.13	DLM	0.13	ug/g	17-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.13	DLM	0.13	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	2.47	DLM	0.13	ug/g	17-OCT-17	*0.76	*0.95	*0.38	*0.48
1-Methylnaphthalene	1.04	DLM	0.075	ug/g	17-OCT-17	30	42	*0.99	3.4
2-Methylnaphthalene	0.959	DLM	0.075	ug/g	17-OCT-17	30	42	0.99	3.4
Naphthalene	0.56	DLM	0.13	ug/g	17-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
Phenanthrene	1.09	DLM	0.13	ug/g	17-OCT-17	12	16	6.2	7.8
Phenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
Pyrene	1.91	DLM	0.13	ug/g	17-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.13	DLM	0.13	ug/g	17-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.25	DLM	0.25	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	104.9		50-140	%	17-OCT-17				
Surrogate: Nitrobenzene d5	98.9		50-140	%	17-OCT-17				
Surrogate: Phenol d5	92.0		30-130	%	17-OCT-17				
Surrogate: p-Terphenyl d14	92.6		50-140	%	17-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.

* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-21 DUP 2									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Semi-Volatile Organics									
Surrogate: 2,4,6-Tribromophenol	95.2		50-140	%	17-OCT-17				
L2003037-22 DUP 3									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Physical Tests									
% Moisture	1.84		0.10	%	10-OCT-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.70	DLM	0.70	ug/g	13-OCT-17				
Aroclor 1248	1.65	PRAR	0.050	ug/g	13-OCT-17				
Aroclor 1254	<0.450	DLM	0.45	ug/g	13-OCT-17				
Aroclor 1260	<0.050	DLM	0.050	ug/g	13-OCT-17				
Total PCBs	1.65	DLM	0.85	ug/g	13-OCT-17	*1.1	*1.1	*0.35	*0.35
Surrogate: d14-Terphenyl	98.7		60-140	%	13-OCT-17				
L2003037-23 DUP 4									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Physical Tests									
Conductivity	0.117		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	6.40		0.10	%	10-OCT-17				
pH	7.40		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.16	SAR:DL	0.16	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	3.1		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	1.7		1.0	ug/g	12-OCT-17	40	50	7.5	7.5
Arsenic (As)	5.8		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	47.4		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.14		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	12-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	24300		50	ug/g	12-APR-21				
Chromium (Cr)	12.0		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	3.5		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	40.0		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	43900		50	ug/g	12-APR-21				
Lead (Pb)	94.4		1.0	ug/g	12-OCT-17	120	120	120	120
Magnesium (Mg)	13400		20	ug/g	12-APR-21				
Mercury (Hg)	0.0626		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-23 DUP 4									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Metals									
Molybdenum (Mo)	<1.0		1.0	ug/g	12-OCT-17	40	40	6.9	6.9
Nickel (Ni)	10.7		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	17.6		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	210		5.0	ug/g	12-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	0.105		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	0.066		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.061		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	0.406		0.080	ug/g	10-OCT-17	6.4	9	2.3	6

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-23 DUP 4									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Volatile Organic Compounds									
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.115		0.020	ug/g	10-OCT-17				
m+p-Xylenes	0.360		0.030	ug/g	10-OCT-17				
Xylenes (Total)	0.475		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	100.0		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	105.3		50-140	%	10-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	17-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	16-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	17-OCT-17				
F3a (C16-C22)	29		25	ug/g	16-OCT-17				
F3 (C16-C34)	517		50	ug/g	16-OCT-17	1700	2500	*300	1300
F3b (C22-C34)	488		25	ug/g	16-OCT-17				
F3-PAH	436		50	ug/g	17-OCT-17				
F4 (C34-C50)	814		50	ug/g	16-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	1890		250	ug/g	12-OCT-17	3300 3300	6600 6600	2800 2800	5600 5600
Total Hydrocarbons (C6-C50)	1330		72	ug/g	17-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	16-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	70.8		60-140	%	16-OCT-17				
Surrogate: 3,4-Dichlorotoluene	101.9		60-140	%	10-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	4.93		0.53	ug/g	17-OCT-17	30	42	*0.99	*3.4
Semi-Volatile Organics									
Acenaphthene	<0.63	DLM	0.63	ug/g	17-OCT-17	21	29	7.9	29
Acenaphthylene	<0.63	DLM	0.63	ug/g	17-OCT-17	**0.15	**0.17	**0.15	**0.17
Anthracene	2.04	DLM	0.63	ug/g	17-OCT-17	*0.67	*0.74	*0.67	*0.74
Benzo(a)anthracene	16.2	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	16.1	DLM	0.63	ug/g	17-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	10.5	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	20.1	DLM	0.63	ug/g	17-OCT-17	*9.6	*9.6	*6.6	*7.8
Benzo(k)fluoranthene	3.71	DLM	0.63	ug/g	17-OCT-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	<0.63	DLM	0.63	ug/g	17-OCT-17	52	210	**0.31	1.1
4-Chloroaniline	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.53	**0.5	**0.53
Bis(2-chloroethyl)ether	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Bis(2-chloroisopropyl)ether	<1.3	DLM	1.3	ug/g	17-OCT-17	11	13	**0.67	1.8
2-Chlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	3.1	3.9	1.6	2
Chrysene	25.7	DLM	0.63	ug/g	17-OCT-17	*9.6	*9.6	*7	*7.8
Dibenzo(a,h)anthracene	13.2	DLM	0.63	ug/g	17-OCT-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<1.3	DLM	1.3	ug/g	17-OCT-17	**1	**1	**1	**1
2,4-Dichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.19	**0.27	**0.19	**0.27

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-23 DUP 4									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Semi-Volatile Organics									
Diethylphthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Dimethylphthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
2,4-Dimethylphenol	<1.3	DLM	1.3	ug/g	17-OCT-17	38	53	38	53
2,4-Dinitrophenol	<13	DLM	13	ug/g	17-OCT-17	**2	**2.9	**2	**2.9
2,4-Dinitrotoluene	<1.3	DLM	1.3	ug/g	17-OCT-17				
2,6-Dinitrotoluene	<1.3	DLM	1.3	ug/g	17-OCT-17				
2,4+2,6-Dinitrotoluene	<1.8		1.8	ug/g	17-OCT-17	**0.5	**0.5	**0.5	**0.5
Bis(2-ethylhexyl)phthalate	<1.3	DLM	1.3	ug/g	17-OCT-17	28	35	5	5
Fluoranthene	1.61	DLM	0.63	ug/g	17-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.63	DLM	0.63	ug/g	17-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	7.86	DLM	0.63	ug/g	17-OCT-17	*0.76	*0.95	*0.38	*0.48
1-Methylnaphthalene	1.26	DLM	0.38	ug/g	17-OCT-17	30	42	*0.99	3.4
2-Methylnaphthalene	3.67	DLM	0.38	ug/g	17-OCT-17	30	42	*0.99	*3.4
Naphthalene	2.75	DLM	0.63	ug/g	17-OCT-17	9.6	28	*0.6	*0.75
Pentachlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	2.9	3.3	**0.1	**0.1
Phenanthrene	6.18	DLM	0.63	ug/g	17-OCT-17	12	16	6.2	7.8
Phenol	<1.3	DLM	1.3	ug/g	17-OCT-17	9.4	9.4	9.4	9.4
Pyrene	5.11	DLM	0.63	ug/g	17-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.63	DLM	0.63	ug/g	17-OCT-17	3.2	16	**0.36	1.4
2,4,5-Trichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<1.3	DLM	1.3	ug/g	17-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	109.0		50-140	%	17-OCT-17				
Surrogate: Nitrobenzene d5	108.8		50-140	%	17-OCT-17				
Surrogate: Phenol d5	94.5		30-130	%	17-OCT-17				
Surrogate: p-Terphenyl d14	82.9		50-140	%	17-OCT-17				
Surrogate: 2,4,6-Tribromophenol	89.7		50-140	%	17-OCT-17				
L2003037-24 DUP 5									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.157		0.0040	mS/cm	12-OCT-17	1.4	1.4	0.7	0.7
% Moisture	6.27		0.10	%	10-OCT-17				
pH	7.60		0.10	pH units	12-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	12-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.11	SAR:DL	0.11	SAR	12-OCT-17	12	12	5	5
Calcium (Ca)	5.9		1.0	mg/L	12-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	12-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	12-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	12-OCT-17	40	50	7.5	7.5
Arsenic (As)	3.7		1.0	ug/g	12-OCT-17	18	18	18	18
Barium (Ba)	43.6		1.0	ug/g	12-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	12-OCT-17	8	10	4	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-24 DUP 5									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Metals									
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.1		5.0	ug/g	12-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.13		0.10	ug/g	12-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	12-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	17600		50	ug/g	12-APR-21				
Chromium (Cr)	10.6		1.0	ug/g	12-OCT-17	160	160	160	160
Cobalt (Co)	4.0		1.0	ug/g	12-OCT-17	80	100	22	22
Copper (Cu)	11.2		1.0	ug/g	12-OCT-17	230	300	140	180
Iron (Fe)	13600		50	ug/g	12-APR-21				
Lead (Pb)	20.4		1.0	ug/g	12-OCT-17	120	120	120	120
Magnesium (Mg)	3370		20	ug/g	12-APR-21				
Mercury (Hg)	0.0090		0.0050	ug/g	12-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	12-OCT-17	40	40	6.9	6.9
Nickel (Ni)	7.4		1.0	ug/g	12-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	12-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	12-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	12-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	12-OCT-17	33	33	23	23
Vanadium (V)	23.7		1.0	ug/g	12-OCT-17	86	86	86	86
Zinc (Zn)	43.8		5.0	ug/g	12-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	11-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	16-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	16-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	16-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.057		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	16-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.062		0.050	ug/g	16-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	16-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	16-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	16-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	16-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	16-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	16-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	16-OCT-17	9.6	28	0.6	0.75
Phenanthrene	0.051		0.050	ug/g	16-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	16-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	88.5		50-140	%	16-OCT-17				
Surrogate: p-Terphenyl d14	92.9		50-140	%	16-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-25 TRIP BLANK - TP Sampled By: M. SHIRY on 04-OCT-17 Matrix: SOIL									
Physical Tests									
% Moisture	<0.10		0.10	%	10-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	10-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	10-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	10-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	10-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	10-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	10-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	10-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	10-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	10-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	10-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	10-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	10-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	10-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	11-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	10-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	10-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	10-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	10-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	10-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	10-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	10-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	10-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	10-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	10-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	10-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	10-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	10-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	10-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	11-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	97.8		50-140	%	10-OCT-17				
Surrogate: 1,4-Difluorobenzene	102.0		50-140	%	10-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2003037-25 TRIP BLANK - TP									
Sampled By: M. SHIRY on 04-OCT-17									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	10-OCT-17	55	65	55	65
Surrogate: 3,4-Dichlorotoluene	103.3		60-140	%	10-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
PRAR	PCB Pattern Most Closely Resembles Aroclor Reported
[J]	The analyte was detected below the calibrated range but above the EDL.
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
DUPH	Duplicate results outside ALS DQO, due to sample heterogeneity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
M,J	A peak has been manually integrated, and the analyte was detected below the calibrated range but above the EDL.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
DX-R511-HRMS-BU	Soil	Dioxins and Furans	USEPA 1613B
EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F4G-ADD-WT	Soil	F4G-SG (O.Reg.153/04)	MOE DECPH-E3398/CCME TIER 1

Reference Information

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-BU	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)

This method is used to determine the percent moisture in a sample. Samples are homogenized, moisture is removed by heating at 105°C until constant mass is achieved. The residues are measured gravimetrically and the difference in weight between the wet sample and the dried sample is used to determine the moisture content. This percent moisture can be used, in conjunction with analytical results, to report data on a dry weight basis.

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

TOC-R511-WT	Soil	TOC & FOC-O.Reg 153/04 (July 2011)	CARTER 21.3.2

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-616667 17-616668 17-616669

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA	BU	ALS ENVIRONMENTAL - BURLINGTON, ONTARIO, CANADA

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3857759								
WG2638879-4 DUP		**WG2638879-3**						
1-Methylnaphthalene		1.08	2.65	DUP-H	ug/g	84	40	17-OCT-17
1,2,4-Trichlorobenzene		<0.13	<0.13	RPD-NA	ug/g	N/A	40	17-OCT-17
2-Chlorophenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2-Methylnaphthalene		0.918	3.17	DUP-H	ug/g	110	40	17-OCT-17
2,4-Dichlorophenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2,4-Dimethylphenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2,4-Dinitrophenol		<2.5	<2.5	RPD-NA	ug/g	N/A	40	17-OCT-17
2,4-Dinitrotoluene		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2,4,5-Trichlorophenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2,4,6-Trichlorophenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
2,6-Dinitrotoluene		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
3,3'-Dichlorobenzidine		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
4-Chloroaniline		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Acenaphthene		<0.13	<0.13	RPD-NA	ug/g	N/A	40	17-OCT-17
Acenaphthylene		0.38	0.31		ug/g	21	40	17-OCT-17
Anthracene		0.17	0.19		ug/g	9.2	40	17-OCT-17
Benzo(a)anthracene		0.92	0.98		ug/g	6.6	40	17-OCT-17
Benzo(a)pyrene		1.76	1.54		ug/g	14	40	17-OCT-17
Benzo(b)fluoranthene		2.44	2.18		ug/g	11	40	17-OCT-17
Benzo(ghi)perylene		1.48	1.39		ug/g	6.1	40	17-OCT-17
Benzo(k)fluoranthene		1.64	1.49		ug/g	9.6	40	17-OCT-17
Biphenyl		0.13	0.20		ug/g	38	40	17-OCT-17
Bis(2-chloroethyl)ether		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Bis(2-chloroisopropyl)ether		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Bis(2-ethylhexyl)phthalate		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Chrysene		1.75	1.76		ug/g	0.1	40	17-OCT-17
Dibenzo(a,h)anthracene		0.44	0.46		ug/g	4.2	40	17-OCT-17
Diethylphthalate		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Dimethylphthalate		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Fluoranthene		0.89	0.89		ug/g	0.4	40	17-OCT-17
Fluorene		<0.13	<0.13	RPD-NA	ug/g	N/A	40	17-OCT-17
Indeno(1,2,3-cd)pyrene		1.61	1.56		ug/g	3.3	40	17-OCT-17
Naphthalene		0.46	2.55		ug/g			17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3857759								
WG2638879-4 DUP		**WG2638879-3**						
Naphthalene		0.46	2.55	DUP-H	ug/g	139	40	17-OCT-17
Pentachlorophenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Phenanthrene		1.15	1.51		ug/g	27	40	17-OCT-17
Phenol		<0.25	<0.25	RPD-NA	ug/g	N/A	40	17-OCT-17
Pyrene		1.49	1.30		ug/g	13	40	17-OCT-17
WG2638879-2 LCS								
1-Methylnaphthalene			115.1		%		50-140	17-OCT-17
1,2,4-Trichlorobenzene			99.5		%		50-140	17-OCT-17
2-Chlorophenol			102.8		%		50-140	17-OCT-17
2-Methylnaphthalene			103.1		%		50-140	17-OCT-17
2,4-Dichlorophenol			100.4		%		50-140	17-OCT-17
2,4-Dimethylphenol			111.5		%		30-130	17-OCT-17
2,4-Dinitrophenol			106.6		%		30-130	17-OCT-17
2,4-Dinitrotoluene			113.4		%		50-140	17-OCT-17
2,4,5-Trichlorophenol			104.5		%		50-140	17-OCT-17
2,4,6-Trichlorophenol			106.9		%		50-140	17-OCT-17
2,6-Dinitrotoluene			113.9		%		50-140	17-OCT-17
3,3'-Dichlorobenzidine			88.0		%		30-130	17-OCT-17
4-Chloroaniline			91.4		%		30-130	17-OCT-17
Acenaphthene			98.5		%		50-140	17-OCT-17
Acenaphthylene			102.2		%		50-140	17-OCT-17
Anthracene			102.2		%		50-140	17-OCT-17
Benzo(a)anthracene			113.2		%		50-140	17-OCT-17
Benzo(a)pyrene			111.1		%		50-140	17-OCT-17
Benzo(b)fluoranthene			102.4		%		50-140	17-OCT-17
Benzo(ghi)perylene			114.4		%		50-140	17-OCT-17
Benzo(k)fluoranthene			107.9		%		50-140	17-OCT-17
Biphenyl			104.6		%		50-140	17-OCT-17
Bis(2-chloroethyl)ether			95.0		%		50-140	17-OCT-17
Bis(2-chloroisopropyl)ether			100.5		%		50-140	17-OCT-17
Bis(2-ethylhexyl)phthalate			109.7		%		50-140	17-OCT-17
Chrysene			112.0		%		50-140	17-OCT-17
Dibenzo(a,h)anthracene			110.4		%		50-140	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3857759								
WG2638879-2 LCS								
Diethylphthalate			96.2		%		50-140	17-OCT-17
Dimethylphthalate			94.8		%		50-140	17-OCT-17
Fluoranthene			105.9		%		50-140	17-OCT-17
Fluorene			101.7		%		50-140	17-OCT-17
Indeno(1,2,3-cd)pyrene			106.6		%		50-140	17-OCT-17
Naphthalene			100.1		%		50-140	17-OCT-17
Pentachlorophenol			119.0		%		50-140	17-OCT-17
Phenanthrene			101.5		%		50-140	17-OCT-17
Phenol			101.2		%		30-130	17-OCT-17
Pyrene			109.1		%		50-140	17-OCT-17
WG2638879-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	17-OCT-17
1,2,4-Trichlorobenzene			<0.050		ug/g		0.05	17-OCT-17
2-Chlorophenol			<0.10		ug/g		0.1	17-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	17-OCT-17
2,4-Dichlorophenol			<0.10		ug/g		0.1	17-OCT-17
2,4-Dimethylphenol			<0.10		ug/g		0.1	17-OCT-17
2,4-Dinitrophenol			<1.0		ug/g		1	17-OCT-17
2,4-Dinitrotoluene			<0.10		ug/g		0.1	17-OCT-17
2,4,5-Trichlorophenol			<0.10		ug/g		0.1	17-OCT-17
2,4,6-Trichlorophenol			<0.10		ug/g		0.1	17-OCT-17
2,6-Dinitrotoluene			<0.10		ug/g		0.1	17-OCT-17
3,3'-Dichlorobenzidine			<0.10		ug/g		0.1	17-OCT-17
4-Chloroaniline			<0.10		ug/g		0.1	17-OCT-17
Acenaphthene			<0.050		ug/g		0.05	17-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	17-OCT-17
Anthracene			<0.050		ug/g		0.05	17-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	17-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	17-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	17-OCT-17
Benzo(ghi)perylene			<0.050		ug/g		0.05	17-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	17-OCT-17
Biphenyl			<0.050		ug/g		0.05	17-OCT-17
Bis(2-chloroethyl)ether			<0.10		ug/g		0.1	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3857759								
WG2638879-1 MB								
Bis(2-chloroisopropyl)ether			<0.10		ug/g		0.1	17-OCT-17
Bis(2-ethylhexyl)phthalate			<0.10		ug/g		0.1	17-OCT-17
Chrysene			<0.050		ug/g		0.05	17-OCT-17
Dibenzo(a,h)anthracene			<0.050		ug/g		0.05	17-OCT-17
Diethylphthalate			<0.10		ug/g		0.1	17-OCT-17
Dimethylphthalate			<0.10		ug/g		0.1	17-OCT-17
Fluoranthene			<0.050		ug/g		0.05	17-OCT-17
Fluorene			<0.050		ug/g		0.05	17-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	17-OCT-17
Naphthalene			<0.050		ug/g		0.05	17-OCT-17
Pentachlorophenol			<0.10		ug/g		0.1	17-OCT-17
Phenanthrene			<0.050		ug/g		0.05	17-OCT-17
Phenol			<0.10		ug/g		0.1	17-OCT-17
Pyrene			<0.050		ug/g		0.05	17-OCT-17
Surrogate: 2-Fluorobiphenyl			105.6		%		50-140	17-OCT-17
Surrogate: 2,4,6-Tribromophenol			64.2		%		50-140	17-OCT-17
Surrogate: Nitrobenzene d5			104.3		%		50-140	17-OCT-17
Surrogate: p-Terphenyl d14			124.9		%		50-140	17-OCT-17
Surrogate: Phenol d5			94.0		%		30-130	17-OCT-17
WG2638879-5 MS		**WG2638879-3**						
1-Methylnaphthalene			115.3		%		50-140	17-OCT-17
1,2,4-Trichlorobenzene			104.2		%		50-140	17-OCT-17
2-Chlorophenol			108.6		%		50-140	17-OCT-17
2-Methylnaphthalene			110.0		%		50-140	17-OCT-17
2,4-Dichlorophenol			100.1		%		50-140	17-OCT-17
2,4-Dimethylphenol			111.7		%		30-150	17-OCT-17
2,4-Dinitrophenol			78.3		%		30-150	17-OCT-17
2,4-Dinitrotoluene			106.2		%		50-140	17-OCT-17
2,4,5-Trichlorophenol			111.5		%		50-140	17-OCT-17
2,4,6-Trichlorophenol			114.6		%		50-140	17-OCT-17
2,6-Dinitrotoluene			106.3		%		50-140	17-OCT-17
3,3'-Dichlorobenzidine			73.4		%		30-130	17-OCT-17
4-Chloroaniline			68.7		%		30-130	17-OCT-17
Acenaphthene			103.4		%		50-140	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3857759								
WG2638879-5 MS		**WG2638879-3**						
Acenaphthylene			109.0		%		50-140	17-OCT-17
Anthracene			108.4		%		50-140	17-OCT-17
Benzo(a)anthracene			116.7		%		50-140	17-OCT-17
Benzo(a)pyrene			105.4		%		50-140	17-OCT-17
Benzo(b)fluoranthene			N/A	MS-B	%		-	17-OCT-17
Benzo(ghi)perylene			114.5		%		50-140	17-OCT-17
Benzo(k)fluoranthene			88.4		%		50-140	17-OCT-17
Biphenyl			107.7		%		50-140	17-OCT-17
Bis(2-chloroethyl)ether			103.0		%		50-140	17-OCT-17
Bis(2-chloroisopropyl)ether			101.9		%		50-140	17-OCT-17
Bis(2-ethylhexyl)phthalate			97.9		%		50-140	17-OCT-17
Chrysene			104.6		%		50-140	17-OCT-17
Dibenzo(a,h)anthracene			126.0		%		50-140	17-OCT-17
Diethylphthalate			97.4		%		50-140	17-OCT-17
Dimethylphthalate			99.1		%		50-140	17-OCT-17
Fluoranthene			104.1		%		50-140	17-OCT-17
Fluorene			104.6		%		50-140	17-OCT-17
Indeno(1,2,3-cd)pyrene			119.6		%		50-140	17-OCT-17
Naphthalene			109.1		%		50-140	17-OCT-17
Pentachlorophenol			116.7		%		50-140	17-OCT-17
Phenanthrene			97.1		%		50-140	17-OCT-17
Phenol			105.6		%		30-130	17-OCT-17
Pyrene			108.3		%		50-140	17-OCT-17
B-HWS-R511-WT	**Soil**							
Batch R3852026								
WG2636183-4 DUP		**L2003249-4**						
Boron (B), Hot Water Ext.		0.29	0.28		ug/g	4.5	30	11-OCT-17
WG2636183-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			78.7		%		70-130	11-OCT-17
WG2636183-3 LCS								
Boron (B), Hot Water Ext.			98.7		%		70-130	11-OCT-17
WG2636183-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	11-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R3852969								
WG2637242-4 DUP		**L2003921-6**						
Boron (B), Hot Water Ext.		0.25	0.29		ug/g	13	30	12-OCT-17
WG2637242-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			96.2		%		70-130	12-OCT-17
WG2637242-3 LCS								
Boron (B), Hot Water Ext.			105.3		%		70-130	12-OCT-17
WG2637242-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	12-OCT-17
Batch R3858834								
WG2642060-4 DUP		**L2007170-3**						
Boron (B), Hot Water Ext.		0.21	0.21		ug/g	1.2	30	18-OCT-17
WG2642060-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			100.3		%		70-130	18-OCT-17
WG2642060-3 LCS								
Boron (B), Hot Water Ext.			104.8		%		70-130	18-OCT-17
WG2642060-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	18-OCT-17
Batch R3869496								
WG2651662-4 DUP		**L2012727-2**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	30-OCT-17
WG2651662-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			101.7		%		70-130	30-OCT-17
WG2651662-3 LCS								
Boron (B), Hot Water Ext.			90.7		%		70-130	30-OCT-17
WG2651662-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	30-OCT-17
BTX-511-HS-WT	**Soil**							
Batch R3848678								
WG2633606-4 DUP		**WG2633606-3**						
Benzene		0.0246	0.0230		ug/g	6.7	40	10-OCT-17
Ethylbenzene		0.052	0.049		ug/g	6.8	40	10-OCT-17
m+p-Xylenes		0.318	0.299		ug/g	6.2	40	10-OCT-17
o-Xylene		0.245	0.235		ug/g	4.1	40	10-OCT-17
Toluene		0.184	0.173		ug/g	6.1	40	10-OCT-17
WG2633606-2 LCS								
Benzene			95.9		%		70-130	06-OCT-17
Ethylbenzene			94.3		%		70-130	06-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R3848678								
WG2633606-2 LCS								
m+p-Xylenes			91.0		%		70-130	06-OCT-17
o-Xylene			97.5		%		70-130	06-OCT-17
Toluene			95.8		%		70-130	06-OCT-17
WG2633606-1 MB								
Benzene			<0.0068		ug/g		0.0068	06-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	06-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	06-OCT-17
o-Xylene			<0.020		ug/g		0.02	06-OCT-17
Toluene			<0.080		ug/g		0.08	06-OCT-17
Surrogate: 1,4-Difluorobenzene			100.5		%		50-140	06-OCT-17
Surrogate: 4-Bromofluorobenzene			99.5		%		50-140	06-OCT-17
WG2633606-5 MS		**WG2633606-3**						
Benzene			91.4		%		60-140	10-OCT-17
Ethylbenzene			95.1		%		60-140	10-OCT-17
m+p-Xylenes			88.0		%		60-140	10-OCT-17
o-Xylene			96.5		%		60-140	10-OCT-17
Toluene			95.5		%		60-140	10-OCT-17
CN-WAD-R511-WT	**Soil**							
Batch R3852958								
WG2635188-3 DUP		**L2002516-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	11-OCT-17
WG2635188-2 LCS								
Cyanide, Weak Acid Diss			99.4		%		80-120	11-OCT-17
WG2635188-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	11-OCT-17
WG2635188-4 MS		**L2002516-1**						
Cyanide, Weak Acid Diss			107.5		%		70-130	11-OCT-17
Batch R3853855								
WG2636249-3 DUP		**L2003037-12**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	12-OCT-17
WG2636249-2 LCS								
Cyanide, Weak Acid Diss			99.98		%		80-120	12-OCT-17
WG2636249-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	12-OCT-17
WG2636249-4 MS		**L2003037-12**						

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-WAD-R511-WT	**Soil**							
Batch R3853855								
WG2636249-4 MS		**L2003037-12**						
Cyanide, Weak Acid Diss			97.1		%		70-130	12-OCT-17
Batch R3858832								
WG2640031-3 DUP		**L2006981-17**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	17-OCT-17
WG2640031-2 LCS								
Cyanide, Weak Acid Diss			95.7		%		80-120	17-OCT-17
WG2640031-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	17-OCT-17
WG2640031-4 MS		**L2006981-17**						
Cyanide, Weak Acid Diss			103.4		%		70-130	17-OCT-17
Batch R3866891								
WG2648716-3 DUP		**L2003037-18**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	26-OCT-17
WG2648716-2 LCS								
Cyanide, Weak Acid Diss			96.1		%		80-120	26-OCT-17
WG2648716-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	26-OCT-17
WG2648716-4 MS		**L2003037-18**						
Cyanide, Weak Acid Diss			100.8		%		70-130	26-OCT-17
CR-CR6-IC-WT	**Soil**							
Batch R3852106								
WG2635207-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			90.3		%		70-130	11-OCT-17
WG2635564-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			87.9		%		70-130	11-OCT-17
WG2635207-3 DUP		**L2003037-2**						
Chromium, Hexavalent		0.22	<0.20	RPD-NA	ug/g	N/A	35	11-OCT-17
WG2635564-4 DUP		**L2003970-7**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	11-OCT-17
WG2635207-2 LCS								
Chromium, Hexavalent			95.4		%		80-120	11-OCT-17
WG2635564-2 LCS								
Chromium, Hexavalent			88.5		%		80-120	11-OCT-17
WG2635207-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	11-OCT-17
WG2635564-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	**Soil**							
Batch R3852106								
WG2635564-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	11-OCT-17
Batch R3857680								
WG2640389-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			88.8		%		70-130	17-OCT-17
WG2640389-4 DUP		**L2007190-5**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	17-OCT-17
WG2640389-2 LCS								
Chromium, Hexavalent			94.5		%		80-120	17-OCT-17
WG2640389-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	17-OCT-17
Batch R3869304								
WG2650137-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			81.9		%		70-130	30-OCT-17
WG2650137-4 DUP		**L2012539-1**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	30-OCT-17
WG2650137-2 LCS								
Chromium, Hexavalent			95.9		%		80-120	30-OCT-17
WG2650137-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	30-OCT-17
DX-R511-HRMS-BU	**Soil**							
Batch R3884799								
WG2649387-2 LCS								
2,3,7,8-TCDD			95.0		%		50-150	11-NOV-17
1,2,3,7,8-PeCDD			105.0		%		50-150	11-NOV-17
1,2,3,4,7,8-HxCDD			96.0		%		50-150	11-NOV-17
1,2,3,6,7,8-HxCDD			96.0		%		50-150	11-NOV-17
1,2,3,7,8,9-HxCDD			102.0		%		50-150	11-NOV-17
1,2,3,4,6,7,8-HpCDD			94.0		%		50-150	11-NOV-17
OCDD			93.0		%		50-150	11-NOV-17
2,3,7,8-TCDF			92.0		%		50-150	11-NOV-17
1,2,3,7,8-PeCDF			96.0		%		50-150	11-NOV-17
2,3,4,7,8-PeCDF			97.0		%		50-150	11-NOV-17
1,2,3,4,7,8-HxCDF			102.0		%		50-150	11-NOV-17
1,2,3,6,7,8-HxCDF			97.0		%		50-150	11-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-R511-HRMS-BU	**Soil**							
Batch R3884799								
WG2649387-2 LCS								
2,3,4,6,7,8-HxCDF			92.0		%		50-150	11-NOV-17
1,2,3,7,8,9-HxCDF			93.0		%		50-150	11-NOV-17
1,2,3,4,6,7,8-HpCDF			97.0		%		50-150	11-NOV-17
1,2,3,4,7,8,9-HpCDF			96.0		%		50-150	11-NOV-17
OCDF			92.0		%		50-150	11-NOV-17
WG2649387-1 MB								
2,3,7,8-TCDD			<0.13	[U]	pg/g		0.13	11-NOV-17
1,2,3,7,8-PeCDD			<0.087	[U]	pg/g		0.087	11-NOV-17
1,2,3,4,7,8-HxCDD			<0.16	[U]	pg/g		0.16	11-NOV-17
1,2,3,6,7,8-HxCDD			<0.14	[U]	pg/g		0.14	11-NOV-17
1,2,3,7,8,9-HxCDD			<0.15	[U]	pg/g		0.15	11-NOV-17
1,2,3,4,6,7,8-HpCDD			0.47	M,J,R	pg/g		0.15	11-NOV-17
OCDD			2.80	M,J,R	pg/g		0.24	11-NOV-17
2,3,7,8-TCDF			<0.17	[U]	pg/g		0.17	11-NOV-17
1,2,3,7,8-PeCDF			<0.11	[U]	pg/g		0.11	11-NOV-17
2,3,4,7,8-PeCDF			<0.11	[U]	pg/g		0.11	11-NOV-17
1,2,3,4,7,8-HxCDF			<0.14	[U]	pg/g		0.14	11-NOV-17
1,2,3,6,7,8-HxCDF			<0.13	[U]	pg/g		0.13	11-NOV-17
2,3,4,6,7,8-HxCDF			<0.12	[U]	pg/g		0.12	11-NOV-17
1,2,3,7,8,9-HxCDF			<0.21	[U]	pg/g		0.21	11-NOV-17
1,2,3,4,6,7,8-HpCDF			0.27	M,J	pg/g		0.13	11-NOV-17
1,2,3,4,7,8,9-HpCDF			<0.22	[U]	pg/g		0.22	11-NOV-17
OCDF			<0.27	[U]	pg/g		0.27	11-NOV-17
Total-TCDD			<0.13	[U]	pg/g		0.13	11-NOV-17
Total-PeCDD			<0.087	[U]	pg/g		0.087	11-NOV-17
Total-HxCDD			<0.16	[U]	pg/g		0.16	11-NOV-17
Total-HpCDD			0.47	A	pg/g		0.15	11-NOV-17
Total-TCDF			<0.17	[U]	pg/g		0.17	11-NOV-17
Total-PeCDF			0.34	A	pg/g		0.11	11-NOV-17
Total-HxCDF			<0.21	[U]	pg/g		0.21	11-NOV-17
Total-HpCDF			0.56	A	pg/g		0.22	11-NOV-17
Surrogate: 13C12-2,3,7,8-TCDD			78.0		%		40-130	11-NOV-17
Surrogate: 13C12-1,2,3,7,8-PeCDD			58.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,4,7,8-HxCDD			69.0		%		40-140	11-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-R511-HRMS-BU	**Soil**							
Batch R3884799								
WG2649387-1 MB								
Surrogate: 13C12-1,2,3,6,7,8-HxCDD			88.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD			61.0		%		40-140	11-NOV-17
Surrogate: 13C12-OCDD			52.0		%		40-140	11-NOV-17
Surrogate: 13C12-2,3,7,8-TCDF			72.0		%		40-130	11-NOV-17
Surrogate: 13C12-1,2,3,7,8-PeCDF			63.0		%		40-140	11-NOV-17
Surrogate: 13C12-2,3,4,7,8-PeCDF			60.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,4,7,8-HxCDF			69.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,6,7,8-HxCDF			85.0		%		40-140	11-NOV-17
Surrogate: 13C12-2,3,4,6,7,8-HxCDF			76.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,7,8,9-HxCDF			61.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF			63.0		%		40-140	11-NOV-17
Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF			52.0		%		40-140	11-NOV-17
Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)			67.0		%		40-130	11-NOV-17
COMMENTS: There were low levels of selected targets detected in the method blank that were within the reference method control limits. Low level sample results may be elevated where indicated								
EC-WT	**Soil**							
Batch R3852981								
WG2637243-4 DUP		**WG2637243-3**						
Conductivity		0.266	0.253		mS/cm	5.0	20	12-OCT-17
WG2637503-1 LCS								
Conductivity			100.1		%		90-110	12-OCT-17
WG2637243-1 MB								
Conductivity			<0.0040		mS/cm		0.004	12-OCT-17
Batch R3852990								
WG2636178-4 DUP		**WG2636178-3**						
Conductivity		0.179	0.180		mS/cm	0.4	20	12-OCT-17
WG2637500-1 LCS								
Conductivity			100.0		%		90-110	12-OCT-17
WG2636178-1 MB								
Conductivity			<0.0040		mS/cm		0.004	12-OCT-17
Batch R3858632								
WG2642063-8 DUP		**WG2642063-7**						
Conductivity		0.192	0.191		mS/cm	0.3	20	18-OCT-17
WG2642338-1 LCS								
Conductivity			99.6		%		90-110	18-OCT-17
WG2642063-5 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Soil**							
Batch R3858632								
WG2642063-5 MB								
Conductivity			<0.0040		mS/cm		0.004	18-OCT-17
Batch R3870991								
WG2651666-4 DUP		**WG2651666-3**						
Conductivity		0.190	0.191		mS/cm	0.7	20	31-OCT-17
WG2652728-2 LCS								
Conductivity			97.6		%		90-110	31-OCT-17
WG2651666-1 MB								
Conductivity			<0.0040		mS/cm		0.004	31-OCT-17
F1-HS-511-WT	**Soil**							
Batch R3848678								
WG2633606-4 DUP		**WG2633606-3**						
F1 (C6-C10)		7.9	8.2		ug/g	3.1	30	10-OCT-17
WG2633606-2 LCS								
F1 (C6-C10)			94.3		%		80-120	06-OCT-17
WG2633606-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	06-OCT-17
Surrogate: 3,4-Dichlorotoluene			111.9		%		60-140	06-OCT-17
WG2633606-7 MS		**WG2633606-6**						
F1 (C6-C10)			87.5		%		60-140	10-OCT-17
Batch R3851281								
WG2633641-4 DUP		**WG2633641-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	10-OCT-17
WG2633641-2 LCS								
F1 (C6-C10)			98.8		%		80-120	10-OCT-17
WG2633641-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	10-OCT-17
Surrogate: 3,4-Dichlorotoluene			116.6		%		60-140	10-OCT-17
WG2633641-7 MS		**WG2633641-6**						
F1 (C6-C10)			83.1		%		60-140	10-OCT-17
Batch R3857496								
WG2640081-4 DUP		**WG2640081-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	17-OCT-17
WG2640081-2 LCS								
F1 (C6-C10)			83.9		%		80-120	17-OCT-17
WG2640081-1 MB								
F1 (C6-C10)			<5.0				5	

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R3857496								
WG2640081-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	17-OCT-17
Surrogate: 3,4-Dichlorotoluene			88.3		%		60-140	17-OCT-17
WG2640081-7 MS		**WG2640081-6**						
F1 (C6-C10)			96.1		%		60-140	17-OCT-17
F2-F4-UW-WT	**Soil**							
Batch R3853919								
WG2635349-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			120.5		%		70-130	13-OCT-17
F3 (C16-C34)			122.1		%		70-130	13-OCT-17
F4 (C34-C50)			128.5		%		70-130	13-OCT-17
WG2635349-5 DUP		**WG2635349-4**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	13-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	13-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	13-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	13-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	13-OCT-17
WG2635349-2 LCS								
F2 (C10-C16)			113.0		%		70-130	13-OCT-17
F3a (C16-C22)			117.0		%		70-130	13-OCT-17
F3b (C22-C34)			108.9		%		70-130	13-OCT-17
F3 (C16-C34)			112.9		%		70-130	13-OCT-17
F4 (C34-C50)			111.6		%		70-130	13-OCT-17
WG2635349-1 MB								
F2 (C10-C16)			<10		ug/g		10	13-OCT-17
F3a (C16-C22)			<25		ug/g		25	13-OCT-17
F3b (C22-C34)			<25		ug/g		25	13-OCT-17
F3 (C16-C34)			<50		ug/g		50	13-OCT-17
F4 (C34-C50)			<50		ug/g		50	13-OCT-17
Surrogate: 2-Bromobenzotrifluoride			83.2		%		60-140	13-OCT-17
Batch R3855568								
WG2636459-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			106.9		%		70-130	13-OCT-17
F3 (C16-C34)			110.5		%		70-130	13-OCT-17
F4 (C34-C50)			116.2		%		70-130	13-OCT-17
WG2636459-5 DUP		**WG2636459-4**						

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3855568								
WG2636459-5 DUP		**WG2636459-4**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	13-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	13-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	13-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	13-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	13-OCT-17
WG2636459-2 LCS								
F2 (C10-C16)			107.8		%		70-130	13-OCT-17
F3a (C16-C22)			111.6		%		70-130	13-OCT-17
F3b (C22-C34)			105.6		%		70-130	13-OCT-17
F3 (C16-C34)			108.6		%		70-130	13-OCT-17
F4 (C34-C50)			110.5		%		70-130	13-OCT-17
WG2636459-1 MB								
F2 (C10-C16)			<10		ug/g		10	13-OCT-17
F3a (C16-C22)			<25		ug/g		25	13-OCT-17
F3b (C22-C34)			<25		ug/g		25	13-OCT-17
F3 (C16-C34)			<50		ug/g		50	13-OCT-17
F4 (C34-C50)			<50		ug/g		50	13-OCT-17
Surrogate: 2-Bromobenzotrifluoride			80.8		%		60-140	13-OCT-17
Batch R3857175								
WG2636243-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			96.3		%		70-130	16-OCT-17
F3 (C16-C34)			103.2		%		70-130	16-OCT-17
F4 (C34-C50)			104.5		%		70-130	16-OCT-17
WG2636243-5 DUP		**WG2636243-4**						
F2 (C10-C16)		18	16		ug/g	11	40	16-OCT-17
F3a (C16-C22)		63	65		ug/g	1.8	40	16-OCT-17
F3b (C22-C34)		113	110		ug/g	3.3	40	16-OCT-17
F3 (C16-C34)		177	174		ug/g	1.5	40	16-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	16-OCT-17
WG2636243-2 LCS								
F2 (C10-C16)			106.0		%		70-130	16-OCT-17
F3a (C16-C22)			101.1		%		70-130	16-OCT-17
F3b (C22-C34)			111.0		%		70-130	16-OCT-17
F3 (C16-C34)			106.1		%		70-130	16-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3857175								
WG2636243-2 LCS								
F4 (C34-C50)			98.3		%		70-130	16-OCT-17
WG2636243-1 MB								
F2 (C10-C16)			<10		ug/g		10	16-OCT-17
F3a (C16-C22)			<25		ug/g		25	16-OCT-17
F3b (C22-C34)			<25		ug/g		25	16-OCT-17
F3 (C16-C34)			<50		ug/g		50	16-OCT-17
F4 (C34-C50)			<50		ug/g		50	16-OCT-17
Surrogate: 2-Bromobenzotrifluoride			68.9		%		60-140	16-OCT-17
Batch R3860285								
WG2640807-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			95.6		%		70-130	19-OCT-17
F3 (C16-C34)			92.6		%		70-130	19-OCT-17
F4 (C34-C50)			80.7		%		70-130	19-OCT-17
WG2640807-5 DUP		**WG2640807-4**						
F2 (C10-C16)		61	35	DUP-H,J	ug/g	26	20	19-OCT-17
F3a (C16-C22)		134	90		ug/g	40	40	19-OCT-17
F3b (C22-C34)		282	196		ug/g	36	40	19-OCT-17
F3 (C16-C34)		417	286		ug/g	37	40	19-OCT-17
F4 (C34-C50)		71	50		ug/g	35	40	19-OCT-17
WG2640807-2 LCS								
F2 (C10-C16)			110.1		%		70-130	19-OCT-17
F3a (C16-C22)			106.5		%		70-130	19-OCT-17
F3b (C22-C34)			118.3		%		70-130	19-OCT-17
F3 (C16-C34)			112.4		%		70-130	19-OCT-17
F4 (C34-C50)			98.6		%		70-130	19-OCT-17
WG2640807-1 MB								
F2 (C10-C16)			<10		ug/g		10	19-OCT-17
F3a (C16-C22)			<25		ug/g		25	19-OCT-17
F3b (C22-C34)			<25		ug/g		25	19-OCT-17
F3 (C16-C34)			<50		ug/g		50	19-OCT-17
F4 (C34-C50)			<50		ug/g		50	19-OCT-17
Surrogate: 2-Bromobenzotrifluoride			70.2		%		60-140	19-OCT-17
F4G-ADD-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F4G-ADD-511-WT	**Soil**							
Batch R3854074								
WG2638864-2 LCS								
F4G-SG (GHH-Silica)			99.96		%		60-140	13-OCT-17
WG2638864-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	13-OCT-17
Batch R3857895								
WG2641644-2 LCS								
F4G-SG (GHH-Silica)			96.6		%		60-140	12-OCT-17
WG2641644-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	12-OCT-17
Batch R3857984								
WG2641729-2 LCS								
F4G-SG (GHH-Silica)			92.0		%		60-140	12-OCT-17
WG2641729-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	12-OCT-17
Batch R3863341								
WG2646420-2 LCS								
F4G-SG (GHH-Silica)			88.6		%		60-140	18-OCT-17
WG2646420-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	18-OCT-17
F4G-ADD-WT	**Soil**							
Batch R3854074								
WG2638864-2 LCS								
F4G-SG (GHH-Silica)			99.96		%		60-120	13-OCT-17
WG2638864-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	13-OCT-17
Batch R3857895								
WG2641644-2 LCS								
F4G-SG (GHH-Silica)			96.6		%		60-120	12-OCT-17
WG2641644-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	12-OCT-17
Batch R3857984								
WG2641729-2 LCS								
F4G-SG (GHH-Silica)			92.0		%		60-120	12-OCT-17
WG2641729-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	12-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F4G-ADD-WT	**Soil**							
Batch R3863341								
WG2646420-2 LCS								
F4G-SG (GHH-Silica)			88.6		%		60-120	18-OCT-17
WG2646420-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	18-OCT-17
HG-200.2-CVAA-WT	**Soil**							
Batch R3851891								
WG2636150-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			102.5		%		70-130	11-OCT-17
WG2636150-6 DUP		**WG2636150-5**						
Mercury (Hg)		0.0622	0.0587		ug/g	5.8	40	11-OCT-17
WG2636150-3 LCS								
Mercury (Hg)			103.5		%		80-120	11-OCT-17
WG2636150-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	11-OCT-17
Batch R3852818								
WG2637222-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			102.3		%		70-130	12-OCT-17
WG2637222-6 DUP		**WG2637222-5**						
Mercury (Hg)		0.0203	0.0217		ug/g	6.6	40	12-OCT-17
WG2637222-3 LCS								
Mercury (Hg)			111.0		%		80-120	12-OCT-17
WG2637222-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	12-OCT-17
Batch R3858587								
WG2642035-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			100.9		%		70-130	18-OCT-17
WG2642035-6 DUP		**WG2642035-5**						
Mercury (Hg)		0.0169	0.0122		ug/g	32	40	18-OCT-17
WG2642035-3 LCS								
Mercury (Hg)			107.5		%		80-120	18-OCT-17
WG2642035-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	18-OCT-17
Batch R3869387								
WG2651645-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			96.7		%		70-130	30-OCT-17
WG2651645-6 DUP		**WG2651645-5**						
Mercury (Hg)		0.0139	0.0137		ug/g	1.6	40	30-OCT-17
WG2651645-3 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R3869387								
WG2651645-3 LCS								
Mercury (Hg)			103.0		%		80-120	30-OCT-17
WG2651645-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	30-OCT-17
MET-200.2-CCMS-WT	**Soil**							
Batch R3852783								
WG2636150-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			97.7		%		70-130	11-OCT-17
Arsenic (As)			104.8		%		70-130	11-OCT-17
Barium (Ba)			110.6		%		70-130	11-OCT-17
Beryllium (Be)			97.4		%		70-130	11-OCT-17
Bismuth (Bi)			95.4		%		70-130	11-OCT-17
Boron (B)			3.6		mg/kg		0-8.2	11-OCT-17
Cadmium (Cd)			100.4		%		70-130	11-OCT-17
Calcium (Ca)			108.4		%		70-130	11-OCT-17
Chromium (Cr)			105.8		%		70-130	11-OCT-17
Cobalt (Co)			104.8		%		70-130	11-OCT-17
Copper (Cu)			105.7		%		70-130	11-OCT-17
Iron (Fe)			106.1		%		70-130	11-OCT-17
Lead (Pb)			99.9		%		70-130	11-OCT-17
Magnesium (Mg)			105.7		%		70-130	11-OCT-17
Molybdenum (Mo)			101.2		%		70-130	11-OCT-17
Nickel (Ni)			104.4		%		70-130	11-OCT-17
Selenium (Se)			0.28		mg/kg		0.11-0.51	11-OCT-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	11-OCT-17
Thallium (Tl)			0.121		mg/kg		0.077-0.18	11-OCT-17
Uranium (U)			93.7		%		70-130	11-OCT-17
Vanadium (V)			108.4		%		70-130	11-OCT-17
Zinc (Zn)			97.9		%		70-130	11-OCT-17
WG2636150-6 DUP		**WG2636150-5**						
Antimony (Sb)		1.42	1.44		ug/g	1.9	30	11-OCT-17
Arsenic (As)		13.4	13.3		ug/g	1.4	30	11-OCT-17
Barium (Ba)		91.9	88.2		ug/g	4.2	40	11-OCT-17
Beryllium (Be)		0.49	0.48		ug/g	2.0	30	11-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	11-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3852783								
WG2636150-6 DUP		**WG2636150-5**						
Boron (B)		16.2	14.1		ug/g	14	30	11-OCT-17
Cadmium (Cd)		2.57	2.69		ug/g	4.4	30	11-OCT-17
Calcium (Ca)		91800	89800		ug/g	2.2	30	11-OCT-17
Chromium (Cr)		18.6	18.8		ug/g	1.3	30	11-OCT-17
Cobalt (Co)		9.47	9.13		ug/g	3.7	30	11-OCT-17
Copper (Cu)		45.1	44.3		ug/g	1.8	30	11-OCT-17
Iron (Fe)		34000	34100		ug/g	0.1	30	11-OCT-17
Lead (Pb)		188	183		ug/g	2.7	40	11-OCT-17
Magnesium (Mg)		49000	49000		ug/g	0.1	30	11-OCT-17
Molybdenum (Mo)		1.95	1.97		ug/g	0.9	40	11-OCT-17
Nickel (Ni)		24.9	24.0		ug/g	3.5	30	11-OCT-17
Selenium (Se)		0.27	0.28		ug/g	3.7	30	11-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	11-OCT-17
Thallium (Tl)		0.231	0.243		ug/g	5.2	30	11-OCT-17
Uranium (U)		1.12	1.11		ug/g	0.6	30	11-OCT-17
Vanadium (V)		35.2	35.1		ug/g	0.2	30	11-OCT-17
Zinc (Zn)		2660	2460		ug/g	2.8	30	11-OCT-17
WG2636150-4 LCS								
Antimony (Sb)			100.1		%		80-120	11-OCT-17
Arsenic (As)			99.1		%		80-120	11-OCT-17
Barium (Ba)			101.0		%		80-120	11-OCT-17
Beryllium (Be)			85.8		%		80-120	11-OCT-17
Bismuth (Bi)			92.6		%		80-120	11-OCT-17
Boron (B)			81.2		%		80-120	11-OCT-17
Cadmium (Cd)			96.6		%		80-120	11-OCT-17
Calcium (Ca)			92.0		%		80-120	11-OCT-17
Chromium (Cr)			98.3		%		80-120	11-OCT-17
Cobalt (Co)			99.1		%		80-120	11-OCT-17
Copper (Cu)			96.0		%		80-120	11-OCT-17
Iron (Fe)			97.7		%		80-120	11-OCT-17
Lead (Pb)			91.3		%		80-120	11-OCT-17
Magnesium (Mg)			98.7		%		80-120	11-OCT-17
Molybdenum (Mo)			93.1		%		80-120	11-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3852783								
WG2636150-4 LCS								
Nickel (Ni)			98.1		%		80-120	11-OCT-17
Selenium (Se)			98.3		%		80-120	11-OCT-17
Silver (Ag)			95.6		%		80-120	11-OCT-17
Thallium (Tl)			92.8		%		80-120	11-OCT-17
Uranium (U)			91.8		%		80-120	11-OCT-17
Vanadium (V)			101.2		%		80-120	11-OCT-17
Zinc (Zn)			89.9		%		80-120	11-OCT-17
WG2636150-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	11-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	11-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	11-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	11-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	11-OCT-17
Boron (B)			<5.0		mg/kg		5	11-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	11-OCT-17
Calcium (Ca)			<50		mg/kg		50	11-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	11-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	11-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	11-OCT-17
Iron (Fe)			<50		mg/kg		50	11-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	11-OCT-17
Magnesium (Mg)			<20		mg/kg		20	11-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	11-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	11-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	11-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	11-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	11-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	11-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	11-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	11-OCT-17
Batch R3853032								
WG2637222-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			103.1		%		70-130	12-OCT-17
Arsenic (As)			109.8		%		70-130	12-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3853032								
WG2637222-2 CRM		**WT-CANMET-TILL1**						
Barium (Ba)			116.2		%		70-130	12-OCT-17
Beryllium (Be)			102.9		%		70-130	12-OCT-17
Bismuth (Bi)			99.7		%		70-130	12-OCT-17
Boron (B)			3.2		mg/kg		0-8.2	12-OCT-17
Cadmium (Cd)			101.7		%		70-130	12-OCT-17
Calcium (Ca)			110.8		%		70-130	12-OCT-17
Chromium (Cr)			112.9		%		70-130	12-OCT-17
Cobalt (Co)			108.7		%		70-130	12-OCT-17
Copper (Cu)			109.1		%		70-130	12-OCT-17
Iron (Fe)			111.2		%		70-130	12-OCT-17
Lead (Pb)			103.0		%		70-130	12-OCT-17
Magnesium (Mg)			112.2		%		70-130	12-OCT-17
Molybdenum (Mo)			105.4		%		70-130	12-OCT-17
Nickel (Ni)			108.1		%		70-130	12-OCT-17
Selenium (Se)			0.33		mg/kg		0.11-0.51	12-OCT-17
Silver (Ag)			0.24		mg/kg		0.13-0.33	12-OCT-17
Thallium (Tl)			0.128		mg/kg		0.077-0.18	12-OCT-17
Uranium (U)			98.1		%		70-130	12-OCT-17
Vanadium (V)			113.7		%		70-130	12-OCT-17
Zinc (Zn)			101.8		%		70-130	12-OCT-17
WG2637222-6 DUP		**WG2637222-5**						
Antimony (Sb)		0.21	0.19		ug/g	9.1	30	12-OCT-17
Arsenic (As)		2.18	2.18		ug/g	0.4	30	12-OCT-17
Barium (Ba)		48.1	51.6		ug/g	7.2	40	12-OCT-17
Beryllium (Be)		0.38	0.39		ug/g	4.3	30	12-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	12-OCT-17
Boron (B)		8.8	9.8		ug/g	10	30	12-OCT-17
Cadmium (Cd)		1.06	1.09		ug/g	2.7	30	12-OCT-17
Calcium (Ca)		82300	87700		ug/g	6.3	30	12-OCT-17
Chromium (Cr)		14.0	14.8		ug/g	5.3	30	12-OCT-17
Cobalt (Co)		4.71	4.93		ug/g	4.4	30	12-OCT-17
Copper (Cu)		27.0	28.1		ug/g	3.8	30	12-OCT-17
Iron (Fe)		12100	12400		ug/g	2.3	30	12-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3853032								
WG2637222-6 DUP		**WG2637222-5**						
Lead (Pb)		87.4	91.8		ug/g	4.9	40	12-OCT-17
Magnesium (Mg)		36400	39200		ug/g	7.3	30	12-OCT-17
Molybdenum (Mo)		0.27	0.28		ug/g	2.5	40	12-OCT-17
Nickel (Ni)		14.1	14.8		ug/g	4.5	30	12-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	12-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	12-OCT-17
Thallium (Tl)		0.149	0.154		ug/g	2.8	30	12-OCT-17
Uranium (U)		0.739	0.794		ug/g	7.2	30	12-OCT-17
Vanadium (V)		23.5	24.8		ug/g	5.3	30	12-OCT-17
Zinc (Zn)		1070	1140		ug/g	5.8	30	12-OCT-17
WG2637222-4 LCS								
Antimony (Sb)			104.2		%		80-120	12-OCT-17
Arsenic (As)			98.9		%		80-120	12-OCT-17
Barium (Ba)			103.0		%		80-120	12-OCT-17
Beryllium (Be)			91.6		%		80-120	12-OCT-17
Bismuth (Bi)			97.1		%		80-120	12-OCT-17
Boron (B)			86.6		%		80-120	12-OCT-17
Cadmium (Cd)			91.3		%		80-120	12-OCT-17
Calcium (Ca)			96.8		%		80-120	12-OCT-17
Chromium (Cr)			96.7		%		80-120	12-OCT-17
Cobalt (Co)			95.5		%		80-120	12-OCT-17
Copper (Cu)			93.6		%		80-120	12-OCT-17
Iron (Fe)			94.1		%		80-120	12-OCT-17
Lead (Pb)			98.0		%		80-120	12-OCT-17
Magnesium (Mg)			96.0		%		80-120	12-OCT-17
Molybdenum (Mo)			97.8		%		80-120	12-OCT-17
Nickel (Ni)			94.1		%		80-120	12-OCT-17
Selenium (Se)			95.9		%		80-120	12-OCT-17
Silver (Ag)			95.3		%		80-120	12-OCT-17
Thallium (Tl)			97.2		%		80-120	12-OCT-17
Uranium (U)			92.1		%		80-120	12-OCT-17
Vanadium (V)			99.6		%		80-120	12-OCT-17
Zinc (Zn)			86.4		%		80-120	12-OCT-17
WG2637222-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3853032								
WG2637222-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	12-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	12-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	12-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	12-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	12-OCT-17
Boron (B)			<5.0		mg/kg		5	12-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	12-OCT-17
Calcium (Ca)			<50		mg/kg		50	12-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	12-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	12-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	12-OCT-17
Iron (Fe)			<50		mg/kg		50	12-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	12-OCT-17
Magnesium (Mg)			<20		mg/kg		20	12-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	12-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	12-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	12-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	12-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	12-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	12-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	12-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	12-OCT-17
Batch R3859743								
WG2642035-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			92.9		%		70-130	18-OCT-17
Arsenic (As)			103.1		%		70-130	18-OCT-17
Barium (Ba)			107.9		%		70-130	18-OCT-17
Beryllium (Be)			100.4		%		70-130	18-OCT-17
Bismuth (Bi)			92.9		%		70-130	18-OCT-17
Boron (B)			3.3		mg/kg		0-8.2	18-OCT-17
Cadmium (Cd)			108.9		%		70-130	18-OCT-17
Calcium (Ca)			98.7		%		70-130	18-OCT-17
Chromium (Cr)			99.8		%		70-130	18-OCT-17
Cobalt (Co)			99.2		%		70-130	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3859743								
WG2642035-2 CRM		**WT-CANMET-TILL1**						
Copper (Cu)			102.6		%		70-130	18-OCT-17
Iron (Fe)			104.8		%		70-130	18-OCT-17
Lead (Pb)			95.7		%		70-130	18-OCT-17
Magnesium (Mg)			107.7		%		70-130	18-OCT-17
Molybdenum (Mo)			96.6		%		70-130	18-OCT-17
Nickel (Ni)			103.1		%		70-130	18-OCT-17
Selenium (Se)			0.32		mg/kg		0.11-0.51	18-OCT-17
Silver (Ag)			0.23		mg/kg		0.13-0.33	18-OCT-17
Thallium (Tl)			0.113		mg/kg		0.077-0.18	18-OCT-17
Uranium (U)			91.8		%		70-130	18-OCT-17
Vanadium (V)			104.0		%		70-130	18-OCT-17
Zinc (Zn)			104.7		%		70-130	18-OCT-17
WG2642035-6 DUP		**WG2642035-5**						
Antimony (Sb)		0.16	0.14		ug/g	14	30	18-OCT-17
Arsenic (As)		9.39	9.19		ug/g	2.2	30	18-OCT-17
Barium (Ba)		31.5	31.3		ug/g	0.5	40	18-OCT-17
Beryllium (Be)		1.12	1.14		ug/g	1.5	30	18-OCT-17
Bismuth (Bi)		0.30	0.30		ug/g	0.9	30	18-OCT-17
Boron (B)		15.8	16.8		ug/g	6.1	30	18-OCT-17
Cadmium (Cd)		0.046	0.040		ug/g	14	30	18-OCT-17
Calcium (Ca)		34600	35400		ug/g	2.3	30	18-OCT-17
Chromium (Cr)		32.2	31.9		ug/g	1.0	30	18-OCT-17
Cobalt (Co)		19.9	19.2		ug/g	3.2	30	18-OCT-17
Copper (Cu)		46.5	44.8		ug/g	3.7	30	18-OCT-17
Iron (Fe)		42100	41800		ug/g	0.7	30	18-OCT-17
Lead (Pb)		2.42	2.41		ug/g	0.4	40	18-OCT-17
Magnesium (Mg)		11600	11500		ug/g	1.2	30	18-OCT-17
Molybdenum (Mo)		0.12	0.11		ug/g	15	40	18-OCT-17
Nickel (Ni)		41.0	40.4		ug/g	1.3	30	18-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	18-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	18-OCT-17
Thallium (Tl)		0.102	0.098		ug/g	4.0	30	18-OCT-17
Uranium (U)		0.584	0.609		ug/g	4.1	30	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3859743								
WG2642035-6 DUP		**WG2642035-5**						
Vanadium (V)		40.8	41.0		ug/g	0.5	30	18-OCT-17
Zinc (Zn)		80.1	79.1		ug/g	1.2	30	18-OCT-17
WG2642035-4 LCS								
Antimony (Sb)			96.1		%		80-120	18-OCT-17
Arsenic (As)			95.2		%		80-120	18-OCT-17
Barium (Ba)			94.8		%		80-120	18-OCT-17
Beryllium (Be)			90.4		%		80-120	18-OCT-17
Bismuth (Bi)			89.7		%		80-120	18-OCT-17
Boron (B)			86.3		%		80-120	18-OCT-17
Cadmium (Cd)			95.0		%		80-120	18-OCT-17
Calcium (Ca)			89.8		%		80-120	18-OCT-17
Chromium (Cr)			93.3		%		80-120	18-OCT-17
Cobalt (Co)			88.7		%		80-120	18-OCT-17
Copper (Cu)			91.3		%		80-120	18-OCT-17
Iron (Fe)			93.6		%		80-120	18-OCT-17
Lead (Pb)			92.8		%		80-120	18-OCT-17
Magnesium (Mg)			96.0		%		80-120	18-OCT-17
Molybdenum (Mo)			88.5		%		80-120	18-OCT-17
Nickel (Ni)			93.5		%		80-120	18-OCT-17
Selenium (Se)			94.5		%		80-120	18-OCT-17
Silver (Ag)			88.8		%		80-120	18-OCT-17
Thallium (Tl)			90.5		%		80-120	18-OCT-17
Uranium (U)			87.3		%		80-120	18-OCT-17
Vanadium (V)			96.2		%		80-120	18-OCT-17
Zinc (Zn)			88.9		%		80-120	18-OCT-17
WG2642035-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	18-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	18-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	18-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	18-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	18-OCT-17
Boron (B)			<5.0		mg/kg		5	18-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	18-OCT-17
Calcium (Ca)			<50		mg/kg		50	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3859743								
WG2642035-1 MB								
Chromium (Cr)			<0.50		mg/kg		0.5	18-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	18-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	18-OCT-17
Iron (Fe)			<50		mg/kg		50	18-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	18-OCT-17
Magnesium (Mg)			<20		mg/kg		20	18-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	18-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	18-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	18-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	18-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	18-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	18-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	18-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	18-OCT-17
Batch R3871055								
WG2651645-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			93.2		%		70-130	30-OCT-17
Arsenic (As)			94.1		%		70-130	30-OCT-17
Barium (Ba)			97.1		%		70-130	30-OCT-17
Beryllium (Be)			93.0		%		70-130	30-OCT-17
Bismuth (Bi)			96.0		%		70-130	30-OCT-17
Boron (B)			2.8		mg/kg		0-8.2	30-OCT-17
Cadmium (Cd)			92.3		%		70-130	30-OCT-17
Calcium (Ca)			93.8		%		70-130	30-OCT-17
Chromium (Cr)			93.7		%		70-130	30-OCT-17
Cobalt (Co)			90.0		%		70-130	30-OCT-17
Copper (Cu)			93.1		%		70-130	30-OCT-17
Iron (Fe)			92.1		%		70-130	30-OCT-17
Lead (Pb)			94.8		%		70-130	30-OCT-17
Magnesium (Mg)			96.8		%		70-130	30-OCT-17
Molybdenum (Mo)			94.1		%		70-130	30-OCT-17
Nickel (Ni)			92.5		%		70-130	30-OCT-17
Selenium (Se)			0.24		mg/kg		0.11-0.51	30-OCT-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	30-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3871055								
WG2651645-2 CRM		**WT-CANMET-TILL1**						
Thallium (Tl)			0.115		mg/kg		0.077-0.18	30-OCT-17
Uranium (U)			92.2		%		70-130	30-OCT-17
Vanadium (V)			92.8		%		70-130	30-OCT-17
Zinc (Zn)			86.4		%		70-130	30-OCT-17
WG2651645-6 DUP		**WG2651645-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	30-OCT-17
Arsenic (As)		3.62	3.53		ug/g	2.7	30	30-OCT-17
Barium (Ba)		100	94.7		ug/g	5.5	40	30-OCT-17
Beryllium (Be)		0.49	0.47		ug/g	3.9	30	30-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	30-OCT-17
Boron (B)		6.0	5.3		ug/g	12	30	30-OCT-17
Cadmium (Cd)		0.087	0.082		ug/g	5.2	30	30-OCT-17
Calcium (Ca)		62800	63500		ug/g	1.1	30	30-OCT-17
Chromium (Cr)		23.7	23.4		ug/g	1.3	30	30-OCT-17
Cobalt (Co)		10.5	10.3		ug/g	1.9	30	30-OCT-17
Copper (Cu)		18.9	18.5		ug/g	2.0	30	30-OCT-17
Iron (Fe)		19200	19500		ug/g	1.8	30	30-OCT-17
Lead (Pb)		8.21	7.99		ug/g	2.7	40	30-OCT-17
Magnesium (Mg)		9490	9580		ug/g	1.0	30	30-OCT-17
Molybdenum (Mo)		0.65	0.90		ug/g	32	40	30-OCT-17
Nickel (Ni)		23.2	23.1		ug/g	0.7	30	30-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	30-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	30-OCT-17
Thallium (Tl)		0.138	0.136		ug/g	1.6	30	30-OCT-17
Uranium (U)		0.624	0.611		ug/g	2.2	30	30-OCT-17
Vanadium (V)		30.4	29.7		ug/g	2.4	30	30-OCT-17
Zinc (Zn)		37.1	37.2		ug/g	0.2	30	30-OCT-17
WG2651645-4 LCS								
Antimony (Sb)			95.4		%		80-120	30-OCT-17
Arsenic (As)			92.3		%		80-120	30-OCT-17
Barium (Ba)			94.8		%		80-120	30-OCT-17
Beryllium (Be)			92.4		%		80-120	30-OCT-17
Bismuth (Bi)			90.9		%		80-120	30-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3871055								
WG2651645-4 LCS								
Boron (B)			86.4		%		80-120	30-OCT-17
Cadmium (Cd)			88.6		%		80-120	30-OCT-17
Calcium (Ca)			94.4		%		80-120	30-OCT-17
Chromium (Cr)			93.2		%		80-120	30-OCT-17
Cobalt (Co)			90.5		%		80-120	30-OCT-17
Copper (Cu)			90.8		%		80-120	30-OCT-17
Iron (Fe)			90.9		%		80-120	30-OCT-17
Lead (Pb)			90.7		%		80-120	30-OCT-17
Magnesium (Mg)			93.9		%		80-120	30-OCT-17
Molybdenum (Mo)			97.2		%		80-120	30-OCT-17
Nickel (Ni)			91.1		%		80-120	30-OCT-17
Selenium (Se)			85.7		%		80-120	30-OCT-17
Silver (Ag)			94.1		%		80-120	30-OCT-17
Thallium (Tl)			88.9		%		80-120	30-OCT-17
Uranium (U)			93.0		%		80-120	30-OCT-17
Vanadium (V)			94.8		%		80-120	30-OCT-17
Zinc (Zn)			81.2		%		80-120	30-OCT-17
WG2651645-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	30-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	30-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	30-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	30-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	30-OCT-17
Boron (B)			<5.0		mg/kg		5	30-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	30-OCT-17
Calcium (Ca)			<50		mg/kg		50	30-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	30-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	30-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	30-OCT-17
Iron (Fe)			<50		mg/kg		50	30-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	30-OCT-17
Magnesium (Mg)			<20		mg/kg		20	30-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	30-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	30-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3871055								
WG2651645-1 MB								
Selenium (Se)			<0.20		mg/kg		0.2	30-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	30-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	30-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	30-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	30-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	30-OCT-17
MOISTURE-BU	**Soil**							
Batch R3877027								
WG2649390-3 DUP		**L2012596-1**						
% Moisture		31.6	30.9		%	2.3	50	07-NOV-17
WG2649390-2 LCS								
% Moisture			95.9		%		50-150	07-NOV-17
WG2649390-1 MB								
% Moisture			<0.10		%		0.1	07-NOV-17
MOISTURE-WT	**Soil**							
Batch R3851169								
WG2635219-3 DUP		**L2001860-1**						
% Moisture		13.5	13.9		%	2.7	20	10-OCT-17
WG2635219-2 LCS								
% Moisture			101.5		%		90-110	10-OCT-17
WG2635219-1 MB								
% Moisture			<0.10		%		0.1	10-OCT-17
Batch R3851618								
WG2635220-3 DUP		**L2003037-13**						
% Moisture		6.51	6.39		%	1.9	20	10-OCT-17
WG2635220-2 LCS								
% Moisture			100.7		%		90-110	10-OCT-17
WG2635220-1 MB								
% Moisture			<0.10		%		0.1	10-OCT-17
Batch R3851647								
WG2635486-3 DUP		**L2003936-1**						
% Moisture		4.28	4.46		%	4.1	20	10-OCT-17
WG2635486-2 LCS								
% Moisture			99.3		%		90-110	10-OCT-17
WG2635486-1 MB								
% Moisture			<0.10		%		0.1	10-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R3857370								
WG2640306-3 DUP		**L2006742-50**						
% Moisture		5.68	5.44		%	4.3	20	16-OCT-17
WG2640306-2 LCS								
% Moisture			103.5		%		90-110	16-OCT-17
WG2640306-1 MB								
% Moisture			<0.10		%		0.1	16-OCT-17
Batch R3866393								
WG2648010-4 DUP		**L2012486-7**						
% Moisture		9.26	9.63		%	3.9	20	26-OCT-17
WG2648010-2 LCS								
% Moisture			100.0		%		90-110	26-OCT-17
WG2648010-1 MB								
% Moisture			<0.10		%		0.1	26-OCT-17
PAH-511-WT	**Soil**							
Batch R3855251								
WG2636606-4 DUP		**WG2636606-3**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	16-OCT-17
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	16-OCT-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	16-OCT-17
WG2636606-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3855251								
WG2636606-2 LCS								
1-Methylnaphthalene			86.3		%		50-140	16-OCT-17
2-Methylnaphthalene			86.0		%		50-140	16-OCT-17
Acenaphthene			88.6		%		50-140	16-OCT-17
Acenaphthylene			85.7		%		50-140	16-OCT-17
Anthracene			86.8		%		50-140	16-OCT-17
Benzo(a)anthracene			81.6		%		50-140	16-OCT-17
Benzo(a)pyrene			82.7		%		50-140	16-OCT-17
Benzo(b)fluoranthene			88.0		%		50-140	16-OCT-17
Benzo(g,h,i)perylene			72.7		%		50-140	16-OCT-17
Benzo(k)fluoranthene			96.9		%		50-140	16-OCT-17
Chrysene			92.3		%		50-140	16-OCT-17
Dibenzo(ah)anthracene			77.4		%		50-140	16-OCT-17
Fluoranthene			81.0		%		50-140	16-OCT-17
Fluorene			87.8		%		50-140	16-OCT-17
Indeno(1,2,3-cd)pyrene			67.8		%		50-140	16-OCT-17
Naphthalene			87.9		%		50-140	16-OCT-17
Phenanthrene			83.4		%		50-140	16-OCT-17
Pyrene			82.9		%		50-140	16-OCT-17
WG2636606-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	16-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	16-OCT-17
Acenaphthene			<0.050		ug/g		0.05	16-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	16-OCT-17
Anthracene			<0.050		ug/g		0.05	16-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	16-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	16-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	16-OCT-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	16-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	16-OCT-17
Chrysene			<0.050		ug/g		0.05	16-OCT-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	16-OCT-17
Fluoranthene			<0.050		ug/g		0.05	16-OCT-17
Fluorene			<0.050		ug/g		0.05	16-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	16-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3855251								
WG2636606-1 MB								
Naphthalene			<0.050		ug/g		0.05	16-OCT-17
Phenanthrene			<0.050		ug/g		0.05	16-OCT-17
Pyrene			<0.050		ug/g		0.05	16-OCT-17
Surrogate: 2-Fluorobiphenyl			93.6		%		50-140	16-OCT-17
Surrogate: p-Terphenyl d14			93.1		%		50-140	16-OCT-17
WG2636606-5 MS		**WG2636606-3**						
1-Methylnaphthalene			77.7		%		50-140	16-OCT-17
2-Methylnaphthalene			77.6		%		50-140	16-OCT-17
Acenaphthene			79.7		%		50-140	16-OCT-17
Acenaphthylene			76.0		%		50-140	16-OCT-17
Anthracene			80.2		%		50-140	16-OCT-17
Benzo(a)anthracene			76.6		%		50-140	16-OCT-17
Benzo(a)pyrene			76.6		%		50-140	16-OCT-17
Benzo(b)fluoranthene			81.4		%		50-140	16-OCT-17
Benzo(g,h,i)perylene			67.3		%		50-140	16-OCT-17
Benzo(k)fluoranthene			88.9		%		50-140	16-OCT-17
Chrysene			87.2		%		50-140	16-OCT-17
Dibenzo(ah)anthracene			70.7		%		50-140	16-OCT-17
Fluoranthene			75.7		%		50-140	16-OCT-17
Fluorene			78.7		%		50-140	16-OCT-17
Indeno(1,2,3-cd)pyrene			62.4		%		50-140	16-OCT-17
Naphthalene			79.2		%		50-140	16-OCT-17
Phenanthrene			76.9		%		50-140	16-OCT-17
Pyrene			77.5		%		50-140	16-OCT-17
Batch R3870401								
WG2650122-4 DUP		**WG2650122-3**						
1-Methylnaphthalene		0.256	0.208		ug/g	21	40	31-OCT-17
2-Methylnaphthalene		0.310	0.243		ug/g	24	40	31-OCT-17
Acenaphthene		0.349	0.162	DUP-H	ug/g	73	40	31-OCT-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-OCT-17
Anthracene		0.887	0.293	DUP-H	ug/g	101	40	31-OCT-17
Benzo(a)anthracene		2.19	1.29	DUP-H	ug/g	52	40	31-OCT-17
Benzo(a)pyrene		1.99	1.39		ug/g	35	40	31-OCT-17
Benzo(b)fluoranthene		2.38	1.67		ug/g	35	40	31-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3870401								
WG2650122-4 DUP		**WG2650122-3**						
Benzo(g,h,i)perylene		1.32	0.929		ug/g	35	40	31-OCT-17
Benzo(k)fluoranthene		1.16	0.744	DUP-H	ug/g	44	40	31-OCT-17
Chrysene		2.10	1.24	DUP-H	ug/g	52	40	31-OCT-17
Dibenzo(ah)anthracene		0.399	0.287		ug/g	33	40	31-OCT-17
Fluoranthene		4.18	1.89	DUP-H	ug/g	75	40	31-OCT-17
Fluorene		0.395	0.151	DUP-H	ug/g	89	40	31-OCT-17
Indeno(1,2,3-cd)pyrene		1.40	0.955		ug/g	37	40	31-OCT-17
Naphthalene		0.332	0.229		ug/g	36	40	31-OCT-17
Phenanthrene		3.75	1.50	DUP-H	ug/g	86	40	31-OCT-17
Pyrene		3.31	1.58	DUP-H	ug/g	71	40	31-OCT-17
WG2650122-2 LCS								
1-Methylnaphthalene			84.8		%		50-140	31-OCT-17
2-Methylnaphthalene			83.9		%		50-140	31-OCT-17
Acenaphthene			84.5		%		50-140	31-OCT-17
Acenaphthylene			83.6		%		50-140	31-OCT-17
Anthracene			81.9		%		50-140	31-OCT-17
Benzo(a)anthracene			83.1		%		50-140	31-OCT-17
Benzo(a)pyrene			82.3		%		50-140	31-OCT-17
Benzo(b)fluoranthene			84.6		%		50-140	31-OCT-17
Benzo(g,h,i)perylene			75.0		%		50-140	31-OCT-17
Benzo(k)fluoranthene			84.9		%		50-140	31-OCT-17
Chrysene			87.6		%		50-140	31-OCT-17
Dibenzo(ah)anthracene			75.6		%		50-140	31-OCT-17
Fluoranthene			80.4		%		50-140	31-OCT-17
Fluorene			83.2		%		50-140	31-OCT-17
Indeno(1,2,3-cd)pyrene			71.4		%		50-140	31-OCT-17
Naphthalene			86.7		%		50-140	31-OCT-17
Phenanthrene			82.9		%		50-140	31-OCT-17
Pyrene			81.0		%		50-140	31-OCT-17
WG2650122-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	31-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	31-OCT-17
Acenaphthene			<0.050		ug/g		0.05	31-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	31-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3870401								
WG2650122-1 MB								
Anthracene			<0.050		ug/g		0.05	31-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	31-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	31-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	31-OCT-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	31-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	31-OCT-17
Chrysene			<0.050		ug/g		0.05	31-OCT-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	31-OCT-17
Fluoranthene			<0.050		ug/g		0.05	31-OCT-17
Fluorene			<0.050		ug/g		0.05	31-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	31-OCT-17
Naphthalene			<0.050		ug/g		0.05	31-OCT-17
Phenanthrene			<0.050		ug/g		0.05	31-OCT-17
Pyrene			<0.050		ug/g		0.05	31-OCT-17
Surrogate: 2-Fluorobiphenyl			92.6		%		50-140	31-OCT-17
Surrogate: p-Terphenyl d14			91.9		%		50-140	31-OCT-17
WG2650122-5 MS		**WG2650122-3**						
1-Methylnaphthalene			122.9		%		50-140	31-OCT-17
2-Methylnaphthalene			135.3		%		50-140	31-OCT-17
Acenaphthene			42.5	E	%		50-140	31-OCT-17
Acenaphthylene			85.1		%		50-140	31-OCT-17
Anthracene			N/A	MS-B	%		-	31-OCT-17
Benzo(a)anthracene			N/A	MS-B	%		-	31-OCT-17
Benzo(a)pyrene			N/A	MS-B	%		-	31-OCT-17
Benzo(b)fluoranthene			N/A	MS-B	%		-	31-OCT-17
Benzo(g,h,i)perylene			N/A	MS-B	%		-	31-OCT-17
Benzo(k)fluoranthene			N/A	MS-B	%		-	31-OCT-17
Chrysene			N/A	MS-B	%		-	31-OCT-17
Dibenzo(ah)anthracene			61.7		%		50-140	31-OCT-17
Fluoranthene			N/A	MS-B	%		-	31-OCT-17
Fluorene			40.0	E	%		50-140	31-OCT-17
Indeno(1,2,3-cd)pyrene			N/A	MS-B	%		-	31-OCT-17
Naphthalene			93.8		%		50-140	31-OCT-17
Phenanthrene			N/A	MS-B	%		-	31-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3870401								
WG2650122-5 MS		**WG2650122-3**						
Pyrene			N/A	MS-B	%		-	31-OCT-17
PCB-511-WT	**Soil**							
Batch R3853808								
WG2636606-4 DUP		**WG2636606-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-OCT-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-OCT-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-OCT-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-OCT-17
WG2636606-2 LCS								
Aroclor 1242			87.3		%		60-140	13-OCT-17
Aroclor 1248			92.9		%		60-140	13-OCT-17
Aroclor 1254			87.6		%		60-140	13-OCT-17
Aroclor 1260			85.3		%		60-140	13-OCT-17
WG2636606-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	13-OCT-17
Aroclor 1248			<0.010		ug/g		0.01	13-OCT-17
Aroclor 1254			<0.010		ug/g		0.01	13-OCT-17
Aroclor 1260			<0.010		ug/g		0.01	13-OCT-17
Surrogate: d14-Terphenyl			94.5		%		60-140	13-OCT-17
WG2636606-5 MS		**WG2636606-3**						
Aroclor 1242			86.4		%		60-140	13-OCT-17
Aroclor 1254			86.2		%		60-140	13-OCT-17
Aroclor 1260			86.5		%		60-140	13-OCT-17
Batch R3871561								
WG2650352-4 DUP		**WG2650352-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	01-NOV-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	01-NOV-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	01-NOV-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	01-NOV-17
WG2650352-2 LCS								
Aroclor 1242			90.8		%		60-140	01-NOV-17
Aroclor 1248			95.2		%		60-140	01-NOV-17
Aroclor 1254			109.6		%		60-140	01-NOV-17
Aroclor 1260			123.3		%		60-140	01-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R3871561								
WG2650352-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	01-NOV-17
Aroclor 1248			<0.010		ug/g		0.01	01-NOV-17
Aroclor 1254			<0.010		ug/g		0.01	01-NOV-17
Aroclor 1260			<0.010		ug/g		0.01	01-NOV-17
Surrogate: d14-Terphenyl			108.8		%		60-140	01-NOV-17
WG2650352-5 MS		**WG2650352-3**						
Aroclor 1242			85.6		%		60-140	01-NOV-17
Aroclor 1254			100.7		%		60-140	01-NOV-17
Aroclor 1260			124.5		%		60-140	01-NOV-17
PH-WT	**Soil**							
Batch R3852970								
WG2635537-1 DUP		**L2003970-5**						
pH		7.56	7.50	J	pH units	0.06	0.3	12-OCT-17
WG2637574-1 LCS								
pH			6.98		pH units		6.9-7.1	12-OCT-17
Batch R3852975								
WG2635192-1 DUP		**L2000556-1**						
pH		7.01	7.02	J	pH units	0.01	0.3	12-OCT-17
WG2637571-1 LCS								
pH			7.00		pH units		6.9-7.1	12-OCT-17
Batch R3858171								
WG2640339-1 DUP		**L2003037-16**						
pH		8.15	8.08	J	pH units	0.07	0.3	17-OCT-17
WG2641518-1 LCS								
pH			6.98		pH units		6.9-7.1	17-OCT-17
Batch R3868753								
WG2649301-1 DUP		**L2012530-1**						
pH		7.72	7.66	J	pH units	0.06	0.3	28-OCT-17
WG2651202-1 LCS								
pH			7.01		pH units		6.9-7.1	28-OCT-17
SAR-R511-WT	**Soil**							
Batch R3852088								
WG2636178-4 DUP		**WG2636178-3**						
Calcium (Ca)		5.1	5.4		mg/L	5.3	30	11-OCT-17
Sodium (Na)		3.5	3.7		mg/L	5.0	30	11-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R3852088								
WG2636178-4 DUP		**WG2636178-3**						
Magnesium (Mg)		<1.0	1.0	RPD-NA	mg/L	N/A	30	11-OCT-17
WG2636178-2 IRM		**WT SAR1**						
Calcium (Ca)			71.0		%		70-130	11-OCT-17
Sodium (Na)			92.3		%		70-130	11-OCT-17
Magnesium (Mg)			76.5		%		70-130	11-OCT-17
WG2636178-1 MB								
Calcium (Ca)			<1.0		mg/L		1	11-OCT-17
Sodium (Na)			<1.0		mg/L		1	11-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	11-OCT-17
Batch R3852976								
WG2637243-4 DUP		**WG2637243-3**						
Calcium (Ca)		16.2	18.9		mg/L	16	30	12-OCT-17
Sodium (Na)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	12-OCT-17
Magnesium (Mg)		1.4	1.6		mg/L	16	30	12-OCT-17
WG2637243-2 IRM		**WT SAR1**						
Calcium (Ca)			77.8		%		70-130	12-OCT-17
Sodium (Na)			95.9		%		70-130	12-OCT-17
Magnesium (Mg)			81.7		%		70-130	12-OCT-17
WG2637243-1 MB								
Calcium (Ca)			<1.0		mg/L		1	12-OCT-17
Sodium (Na)			<1.0		mg/L		1	12-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	12-OCT-17
Batch R3858841								
WG2642063-8 DUP		**WG2642063-7**						
Calcium (Ca)		6.8	7.1		mg/L	5.0	30	18-OCT-17
Sodium (Na)		5.7	5.9		mg/L	2.6	30	18-OCT-17
Magnesium (Mg)		1.2	1.2		mg/L	5.9	30	18-OCT-17
WG2642063-6 IRM		**WT SAR1**						
Calcium (Ca)			96.5		%		70-130	18-OCT-17
Sodium (Na)			108.2		%		70-130	18-OCT-17
Magnesium (Mg)			96.0		%		70-130	18-OCT-17
WG2642063-5 MB								
Calcium (Ca)			<1.0		mg/L		1	18-OCT-17
Sodium (Na)			<1.0		mg/L		1	18-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R3871109								
WG2651666-4 DUP		**WG2651666-3**						
Calcium (Ca)		7.0	7.2		mg/L	2.3	30	30-OCT-17
Sodium (Na)		1.2	1.2		mg/L	1.6	30	30-OCT-17
Magnesium (Mg)		1.3	1.4		mg/L	7.7	30	30-OCT-17
WG2651666-2 IRM		**WT SAR1**						
Calcium (Ca)			106.9		%		70-130	30-OCT-17
Sodium (Na)			98.6		%		70-130	30-OCT-17
Magnesium (Mg)			108.3		%		70-130	30-OCT-17
WG2651666-1 MB								
Calcium (Ca)			<1.0		mg/L		1	30-OCT-17
Sodium (Na)			<1.0		mg/L		1	30-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	30-OCT-17
TOC-R511-WT	**Soil**							
Batch R3852982								
WG2637293-3 CRM		**WT-TOC-CRM**						
Total Organic Carbon			104.4		%		70-130	13-OCT-17
WG2637293-4 DUP		**L2003037-8**						
Total Organic Carbon		5.48	5.16		%	6.0	35	13-OCT-17
WG2637293-2 LCS								
Total Organic Carbon			101.8		%		80-120	13-OCT-17
Total Organic Carbon			101.8		%		80-120	13-OCT-17
Total Organic Carbon			101.8		%		80-120	13-OCT-17
WG2637293-1 MB								
Total Organic Carbon			<0.10		%		0.1	13-OCT-17
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-4 DUP		**WG2633641-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-4 DUP		**WG2633641-3**						
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	10-OCT-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	10-OCT-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	10-OCT-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	10-OCT-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	10-OCT-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	10-OCT-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	10-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	10-OCT-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	10-OCT-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	10-OCT-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	10-OCT-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	10-OCT-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	10-OCT-17
WG2633641-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-2 LCS								
1,1,1,2-Tetrachloroethane			93.8		%		60-130	10-OCT-17
1,1,2,2-Tetrachloroethane			108.0		%		60-130	10-OCT-17
1,1,1-Trichloroethane			93.0		%		60-130	10-OCT-17
1,1,2-Trichloroethane			99.96		%		60-130	10-OCT-17
1,1-Dichloroethane			94.5		%		60-130	10-OCT-17
1,1-Dichloroethylene			83.2		%		60-130	10-OCT-17
1,2-Dibromoethane			102.3		%		70-130	10-OCT-17
1,2-Dichlorobenzene			96.9		%		70-130	10-OCT-17
1,2-Dichloroethane			104.2		%		60-130	10-OCT-17
1,2-Dichloropropane			105.1		%		70-130	10-OCT-17
1,3-Dichlorobenzene			90.7		%		70-130	10-OCT-17
1,4-Dichlorobenzene			94.8		%		70-130	10-OCT-17
Acetone			125.2		%		60-140	10-OCT-17
Benzene			101.8		%		70-130	10-OCT-17
Bromodichloromethane			98.3		%		50-140	10-OCT-17
Bromoform			98.0		%		70-130	10-OCT-17
Bromomethane			89.9		%		50-140	10-OCT-17
Carbon tetrachloride			91.3		%		70-130	10-OCT-17
Chlorobenzene			95.3		%		70-130	10-OCT-17
Chloroform			99.4		%		70-130	10-OCT-17
cis-1,2-Dichloroethylene			96.3		%		70-130	10-OCT-17
cis-1,3-Dichloropropene			95.1		%		70-130	10-OCT-17
Dibromochloromethane			104.6		%		60-130	10-OCT-17
Dichlorodifluoromethane			52.1		%		50-140	10-OCT-17
Ethylbenzene			85.1		%		70-130	10-OCT-17
n-Hexane			96.9		%		70-130	10-OCT-17
Methylene Chloride			104.7		%		70-130	10-OCT-17
MTBE			93.6		%		70-130	10-OCT-17
m+p-Xylenes			87.4		%		70-130	10-OCT-17
Methyl Ethyl Ketone			116.0		%		60-140	10-OCT-17
Methyl Isobutyl Ketone			103.7		%		60-140	10-OCT-17
o-Xylene			89.3		%		70-130	10-OCT-17
Styrene			92.0		%		70-130	10-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-2 LCS								
Tetrachloroethylene			83.5		%		60-130	10-OCT-17
Toluene			88.6		%		70-130	10-OCT-17
trans-1,2-Dichloroethylene			93.9		%		60-130	10-OCT-17
trans-1,3-Dichloropropene			85.2		%		70-130	10-OCT-17
Trichloroethylene			90.9		%		60-130	10-OCT-17
Trichlorofluoromethane			89.6		%		50-140	10-OCT-17
Vinyl chloride			79.1		%		60-140	10-OCT-17
WG2633641-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	10-OCT-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	10-OCT-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	10-OCT-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	10-OCT-17
1,1-Dichloroethane			<0.050		ug/g		0.05	10-OCT-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	10-OCT-17
1,2-Dibromoethane			<0.050		ug/g		0.05	10-OCT-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	10-OCT-17
1,2-Dichloroethane			<0.050		ug/g		0.05	10-OCT-17
1,2-Dichloropropane			<0.050		ug/g		0.05	10-OCT-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	10-OCT-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	10-OCT-17
Acetone			<0.50		ug/g		0.5	10-OCT-17
Benzene			<0.0068		ug/g		0.0068	10-OCT-17
Bromodichloromethane			<0.050		ug/g		0.05	10-OCT-17
Bromoform			<0.050		ug/g		0.05	10-OCT-17
Bromomethane			<0.050		ug/g		0.05	10-OCT-17
Carbon tetrachloride			<0.050		ug/g		0.05	10-OCT-17
Chlorobenzene			<0.050		ug/g		0.05	10-OCT-17
Chloroform			<0.050		ug/g		0.05	10-OCT-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	10-OCT-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	10-OCT-17
Dibromochloromethane			<0.050		ug/g		0.05	10-OCT-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	10-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	10-OCT-17
n-Hexane			<0.050		ug/g		0.05	10-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-1 MB								
Methylene Chloride			<0.050		ug/g		0.05	10-OCT-17
MTBE			<0.050		ug/g		0.05	10-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	10-OCT-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	10-OCT-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	10-OCT-17
o-Xylene			<0.020		ug/g		0.02	10-OCT-17
Styrene			<0.050		ug/g		0.05	10-OCT-17
Tetrachloroethylene			<0.050		ug/g		0.05	10-OCT-17
Toluene			<0.080		ug/g		0.08	10-OCT-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	10-OCT-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	10-OCT-17
Trichloroethylene			<0.010		ug/g		0.01	10-OCT-17
Trichlorofluoromethane			<0.050		ug/g		0.05	10-OCT-17
Vinyl chloride			<0.020		ug/g		0.02	10-OCT-17
Surrogate: 1,4-Difluorobenzene			97.7		%		50-140	10-OCT-17
Surrogate: 4-Bromofluorobenzene			95.5		%		50-140	10-OCT-17
WG2633641-5 MS		**WG2633641-3**						
1,1,1,2-Tetrachloroethane			99.9		%		50-140	10-OCT-17
1,1,2,2-Tetrachloroethane			115.5		%		50-140	10-OCT-17
1,1,1-Trichloroethane			97.4		%		50-140	10-OCT-17
1,1,2-Trichloroethane			108.3		%		50-140	10-OCT-17
1,1-Dichloroethane			99.8		%		50-140	10-OCT-17
1,1-Dichloroethylene			87.4		%		50-140	10-OCT-17
1,2-Dibromoethane			111.3		%		50-140	10-OCT-17
1,2-Dichlorobenzene			97.2		%		50-140	10-OCT-17
1,2-Dichloroethane			109.9		%		50-140	10-OCT-17
1,2-Dichloropropane			111.4		%		50-140	10-OCT-17
1,3-Dichlorobenzene			90.0		%		50-140	10-OCT-17
1,4-Dichlorobenzene			92.9		%		50-140	10-OCT-17
Acetone			135.9		%		50-140	10-OCT-17
Benzene			106.9		%		50-140	10-OCT-17
Bromodichloromethane			103.4		%		50-140	10-OCT-17
Bromoform			105.2		%		50-140	10-OCT-17
Bromomethane			95.6		%		50-140	10-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3851281								
WG2633641-5 MS		**WG2633641-3**						
Carbon tetrachloride			95.4		%		50-140	10-OCT-17
Chlorobenzene			100.7		%		50-140	10-OCT-17
Chloroform			104.4		%		50-140	10-OCT-17
cis-1,2-Dichloroethylene			100.6		%		50-140	10-OCT-17
cis-1,3-Dichloropropene			99.1		%		50-140	10-OCT-17
Dibromochloromethane			111.7		%		50-140	10-OCT-17
Dichlorodifluoromethane			58.9		%		50-140	10-OCT-17
Ethylbenzene			90.8		%		50-140	10-OCT-17
n-Hexane			104.2		%		50-140	10-OCT-17
Methylene Chloride			110.4		%		50-140	10-OCT-17
MTBE			98.7		%		50-140	10-OCT-17
m+p-Xylenes			92.1		%		50-140	10-OCT-17
Methyl Ethyl Ketone			126.3		%		50-140	10-OCT-17
Methyl Isobutyl Ketone			111.8		%		50-140	10-OCT-17
o-Xylene			95.2		%		50-140	10-OCT-17
Styrene			97.9		%		50-140	10-OCT-17
Tetrachloroethylene			87.2		%		50-140	10-OCT-17
Toluene			94.8		%		50-140	10-OCT-17
trans-1,2-Dichloroethylene			97.0		%		50-140	10-OCT-17
trans-1,3-Dichloropropene			92.5		%		50-140	10-OCT-17
Trichloroethylene			94.0		%		50-140	10-OCT-17
Trichlorofluoromethane			95.3		%		50-140	10-OCT-17
Vinyl chloride			84.2		%		50-140	10-OCT-17
Batch R3857496								
WG2640081-4 DUP		**WG2640081-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3857496								
WG2640081-4 DUP		**WG2640081-3**						
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	17-OCT-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	17-OCT-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	17-OCT-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	17-OCT-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	17-OCT-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	17-OCT-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	17-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	17-OCT-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	17-OCT-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	17-OCT-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	17-OCT-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	17-OCT-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	17-OCT-17
WG2640081-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3857496								
WG2640081-2 LCS								
1,1,1,2-Tetrachloroethane			100.2		%		60-130	17-OCT-17
1,1,2,2-Tetrachloroethane			100.2		%		60-130	17-OCT-17
1,1,1-Trichloroethane			97.8		%		60-130	17-OCT-17
1,1,2-Trichloroethane			103.6		%		60-130	17-OCT-17
1,1-Dichloroethane			97.8		%		60-130	17-OCT-17
1,1-Dichloroethylene			84.7		%		60-130	17-OCT-17
1,2-Dibromoethane			103.4		%		70-130	17-OCT-17
1,2-Dichlorobenzene			102.6		%		70-130	17-OCT-17
1,2-Dichloroethane			103.9		%		60-130	17-OCT-17
1,2-Dichloropropane			102.6		%		70-130	17-OCT-17
1,3-Dichlorobenzene			100.3		%		70-130	17-OCT-17
1,4-Dichlorobenzene			103.3		%		70-130	17-OCT-17
Acetone			100.8		%		60-140	17-OCT-17
Benzene			99.6		%		70-130	17-OCT-17
Bromodichloromethane			99.1		%		50-140	17-OCT-17
Bromoform			99.5		%		70-130	17-OCT-17
Bromomethane			93.7		%		50-140	17-OCT-17
Carbon tetrachloride			96.0		%		70-130	17-OCT-17
Chlorobenzene			100.5		%		70-130	17-OCT-17
Chloroform			101.7		%		70-130	17-OCT-17
cis-1,2-Dichloroethylene			99.0		%		70-130	17-OCT-17
cis-1,3-Dichloropropene			100.1		%		70-130	17-OCT-17
Dibromochloromethane			106.6		%		60-130	17-OCT-17
Dichlorodifluoromethane			48.5	MES	%		50-140	17-OCT-17
Ethylbenzene			103.0		%		70-130	17-OCT-17
n-Hexane			97.3		%		70-130	17-OCT-17
Methylene Chloride			103.5		%		70-130	17-OCT-17
MTBE			92.2		%		70-130	17-OCT-17
m+p-Xylenes			102.9		%		70-130	17-OCT-17
Methyl Ethyl Ketone			105.1		%		60-140	17-OCT-17
Methyl Isobutyl Ketone			112.5		%		60-140	17-OCT-17
o-Xylene			104.8		%		70-130	17-OCT-17
Styrene			105.7		%		70-130	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3857496								
WG2640081-2 LCS								
Tetrachloroethylene			93.9		%		60-130	17-OCT-17
Toluene			94.3		%		70-130	17-OCT-17
trans-1,2-Dichloroethylene			95.2		%		60-130	17-OCT-17
trans-1,3-Dichloropropene			107.0		%		70-130	17-OCT-17
Trichloroethylene			98.4		%		60-130	17-OCT-17
Trichlorofluoromethane			92.8		%		50-140	17-OCT-17
Vinyl chloride			82.9		%		60-140	17-OCT-17
WG2640081-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	17-OCT-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	17-OCT-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	17-OCT-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	17-OCT-17
1,1-Dichloroethane			<0.050		ug/g		0.05	17-OCT-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	17-OCT-17
1,2-Dibromoethane			<0.050		ug/g		0.05	17-OCT-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	17-OCT-17
1,2-Dichloroethane			<0.050		ug/g		0.05	17-OCT-17
1,2-Dichloropropane			<0.050		ug/g		0.05	17-OCT-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	17-OCT-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	17-OCT-17
Acetone			<0.50		ug/g		0.5	17-OCT-17
Benzene			<0.0068		ug/g		0.0068	17-OCT-17
Bromodichloromethane			<0.050		ug/g		0.05	17-OCT-17
Bromoform			<0.050		ug/g		0.05	17-OCT-17
Bromomethane			<0.050		ug/g		0.05	17-OCT-17
Carbon tetrachloride			<0.050		ug/g		0.05	17-OCT-17
Chlorobenzene			<0.050		ug/g		0.05	17-OCT-17
Chloroform			<0.050		ug/g		0.05	17-OCT-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	17-OCT-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	17-OCT-17
Dibromochloromethane			<0.050		ug/g		0.05	17-OCT-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	17-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	17-OCT-17
n-Hexane			<0.050		ug/g		0.05	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3857496								
WG2640081-1 MB								
Methylene Chloride			<0.050		ug/g		0.05	17-OCT-17
MTBE			<0.050		ug/g		0.05	17-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	17-OCT-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	17-OCT-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	17-OCT-17
o-Xylene			<0.020		ug/g		0.02	17-OCT-17
Styrene			<0.050		ug/g		0.05	17-OCT-17
Tetrachloroethylene			<0.050		ug/g		0.05	17-OCT-17
Toluene			<0.080		ug/g		0.08	17-OCT-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	17-OCT-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	17-OCT-17
Trichloroethylene			<0.010		ug/g		0.01	17-OCT-17
Trichlorofluoromethane			<0.050		ug/g		0.05	17-OCT-17
Vinyl chloride			<0.020		ug/g		0.02	17-OCT-17
Surrogate: 1,4-Difluorobenzene			103.1		%		50-140	17-OCT-17
Surrogate: 4-Bromofluorobenzene			101.5		%		50-140	17-OCT-17
WG2640081-5 MS		**WG2640081-3**						
1,1,1,2-Tetrachloroethane			99.8		%		50-140	17-OCT-17
1,1,2,2-Tetrachloroethane			93.7		%		50-140	17-OCT-17
1,1,1-Trichloroethane			98.7		%		50-140	17-OCT-17
1,1,2-Trichloroethane			100.6		%		50-140	17-OCT-17
1,1-Dichloroethane			97.4		%		50-140	17-OCT-17
1,1-Dichloroethylene			85.7		%		50-140	17-OCT-17
1,2-Dibromoethane			99.7		%		50-140	17-OCT-17
1,2-Dichlorobenzene			101.4		%		50-140	17-OCT-17
1,2-Dichloroethane			100.1		%		50-140	17-OCT-17
1,2-Dichloropropane			100.2		%		50-140	17-OCT-17
1,3-Dichlorobenzene			100.7		%		50-140	17-OCT-17
1,4-Dichlorobenzene			102.6		%		50-140	17-OCT-17
Acetone			98.0		%		50-140	17-OCT-17
Benzene			98.4		%		50-140	17-OCT-17
Bromodichloromethane			96.5		%		50-140	17-OCT-17
Bromoform			94.7		%		50-140	17-OCT-17
Bromomethane			93.7		%		50-140	17-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3857496								
WG2640081-5 MS		**WG2640081-3**						
Carbon tetrachloride			97.2		%		50-140	17-OCT-17
Chlorobenzene			99.95		%		50-140	17-OCT-17
Chloroform			100.6		%		50-140	17-OCT-17
cis-1,2-Dichloroethylene			97.8		%		50-140	17-OCT-17
cis-1,3-Dichloropropene			96.5		%		50-140	17-OCT-17
Dibromochloromethane			103.9		%		50-140	17-OCT-17
Dichlorodifluoromethane			52.9		%		50-140	17-OCT-17
Ethylbenzene			103.3		%		50-140	17-OCT-17
n-Hexane			100.8		%		50-140	17-OCT-17
Methylene Chloride			101.6		%		50-140	17-OCT-17
MTBE			91.2		%		50-140	17-OCT-17
m+p-Xylenes			103.5		%		50-140	17-OCT-17
Methyl Ethyl Ketone			98.3		%		50-140	17-OCT-17
Methyl Isobutyl Ketone			101.3		%		50-140	17-OCT-17
o-Xylene			104.3		%		50-140	17-OCT-17
Styrene			103.3		%		50-140	17-OCT-17
Tetrachloroethylene			95.4		%		50-140	17-OCT-17
Toluene			94.5		%		50-140	17-OCT-17
trans-1,2-Dichloroethylene			94.6		%		50-140	17-OCT-17
trans-1,3-Dichloropropene			104.5		%		50-140	17-OCT-17
Trichloroethylene			98.2		%		50-140	17-OCT-17
Trichlorofluoromethane			95.6		%		50-140	17-OCT-17
Vinyl chloride			83.9		%		50-140	17-OCT-17

Quality Control Report

Workorder: L2003037 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
A	Method Blank exceeds ALS DQO. Refer to narrative comments for further information.
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
E	Matrix Spike recovery outside ALS DQO due to heterogeneous analyte background in sample.
J	Duplicate results and limits are expressed in terms of absolute difference.
M,J	A peak has been manually integrated, and the analyte was detected below the calibrated range but above the EDL.
M,J,R	A peak has been manually integrated, the analyte was detected below the calibrated range but above the EDL, and the ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
[U]	The analyte was not detected above the EDL.

Quality Control Report

Workorder: L2003037 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
% Moisture							
	11	04-OCT-17 14:20	26-OCT-17 10:22	14	22	days	EHT
	18	04-OCT-17 17:10	26-OCT-17 10:23	14	22	days	EHT
Cyanides							
Cyanide (WAD)-O.Reg 153/04 (July 2011)							
	18	04-OCT-17 17:10	25-OCT-17 19:00	14	21	days	EHT
Hydrocarbons							
F2-F4 (O.Reg.153/04)							
	19	04-OCT-17 17:50	20-OCT-17 00:00	14	15	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2003037 were received on 05-OCT-17 15:30.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GRAIN SIZE DETERMINATIONS

Client:	CH2M HILL CANADA LIMITED~WATERLOO	Sample Location:	
Project Number:	11546	Sample ID:	TP17-301-1-3
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	04-10-17
Lab ID Number:	L2003037-8	Date Submitted:	05-10-17
		Date Completed:	20-10-17

Total Sample Weight	66	grams	Specific Gravity:	2.650
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000
% Past #10	0.773	* 100	Grav Factor:	1.606
Sub Factor	1.020			

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	0.000	0.000	19.000	0.000	100.000
9.5 mm. DIA.:	0.000	0.000	9.500	0.000	100.000
NO. 4 SIEVE :	10.000	15.152	4.500	15.152	84.848
NO. 10 SIEVE :	5.000	7.576	2.000	22.727	77.273
NO. 20 SIEVE :	5.000	7.727	0.850	30.455	69.545
NO. 40 SIEVE :	5.000	7.727	0.425	38.182	61.818
NO. 60 SIEVE :	4.000	6.182	0.250	44.364	55.636
NO. 100 SIEVE:	4.000	6.182	0.150	50.545	49.455
NO. 200 SIEVE:	7.000	10.818	0.075	61.364	38.636

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	5.0	20.4	0.053	6.996	5.406
2.00	5.0	20.4	0.037	6.996	5.406
4.00	4.0	20.4	0.027	3.784	2.924
8.00	4.0	20.4	0.019	3.784	2.924
15.00	4.0	20.3	0.014	3.721	2.876
30.00	4.0	20.4	0.010	3.784	2.924
60.00	4.0	20.3	0.007	3.721	2.876
120.00	4.0	20.2	0.005	3.659	2.827
240.00	4.0	19.7	0.003	3.345	2.585
480.00	3.5	19.4	0.002	1.551	1.199
1440.00	3.0	21.0	0.001	0.948	0.732

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	15.15	> 4.5
% COARSE SAND :	7.58	2.0 - 4.5
% MEDIUM SAND :	15.45	0.425 - 2.0
% FINE SAND :	23.18	0.075 - 0.425
% SILT :	37.61	0.075 - 0.002
% CLAY :	1.03	< 0.002
% CLAY :	2.83	< 0.005

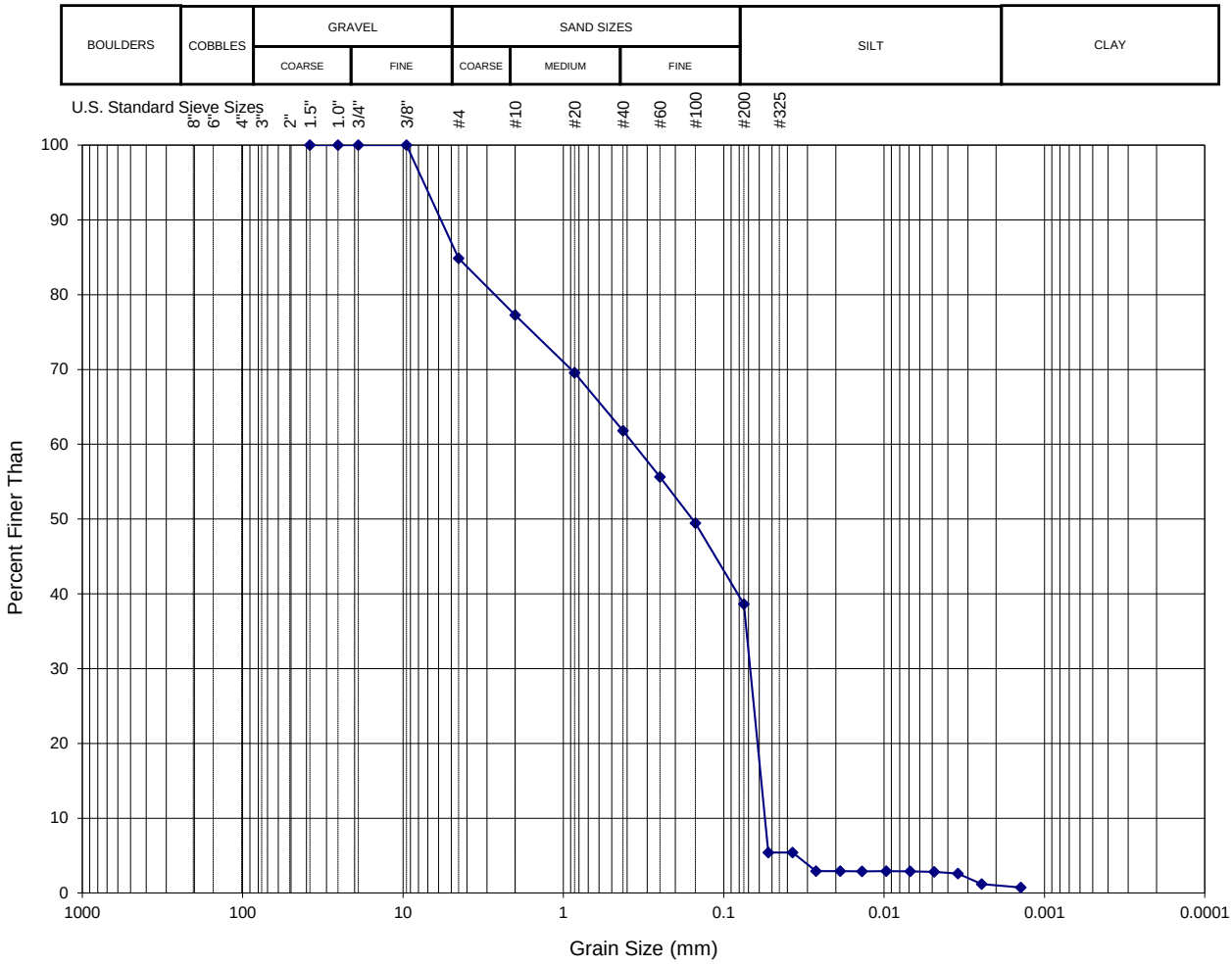
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

Project Name:	CH2M HILL CANADA LIMITED~WATERLOO
Project Number:	11546
Sample Location:	
Sample Number:	TP17-301-1-3
Sample Depth:	
Lab ID Number:	L2003037-8
Technician:	CB6
Sampler:	
Dates:	
Collected On:	04-10-17
Analyzed:	20-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SAND AND SILT WITH GRAVEL	AND	36 - 50 %	GRAVEL	15	%
COARSE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	46	%
ESTIMATED HAZEN NUMBER: 3.06E-03 cm/s	WITH	11 - 20 %	SILT + CLAY	39	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

GRAIN SIZE DETERMINATIONS

Client:	CH2M HILL CANADA LIMITED~WATERLOO	Sample Location:	
Project Number:	11546	Sample ID:	TP17-301-4-5
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	04-10-17
Lab ID Number:	L2003037-9	Date Submitted:	05-10-17
		Date Completed:	20-10-17

Total Sample Weight	151	grams	Specific Gravity:	2.650
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000
% Past #10	0.404	* 100	Grav Factor:	1.606
Sub Factor	1.220			

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	20.000	13.245	19.000	13.245	86.755
9.5 mm. DIA.:	36.000	23.841	9.500	37.086	62.914
NO. 4 SIEVE :	20.000	13.245	4.500	50.331	49.669
NO. 10 SIEVE :	14.000	9.272	2.000	59.603	40.397
NO. 20 SIEVE :	4.000	3.232	0.850	62.834	37.166
NO. 40 SIEVE :	6.000	4.848	0.425	67.682	32.318
NO. 60 SIEVE :	5.000	4.040	0.250	71.722	28.278
NO. 100 SIEVE:	4.000	3.232	0.150	74.954	25.046
NO. 200 SIEVE:	8.000	6.464	0.075	81.417	18.583

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	10.0	20.4	0.050	23.057	9.314
2.00	9.0	20.4	0.036	19.844	8.017
4.00	9.0	20.4	0.025	19.844	8.017
8.00	8.0	20.4	0.018	16.632	6.719
15.00	8.0	20.3	0.013	16.570	6.694
30.00	7.0	20.4	0.009	13.420	5.421
60.00	7.0	20.3	0.007	13.358	5.396
120.00	7.0	20.2	0.005	13.295	5.371
240.00	6.0	19.7	0.003	9.770	3.947
480.00	6.0	19.4	0.002	9.582	3.871
1440.00	5.0	21.0	0.001	7.372	2.978

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	50.33	> 4.5
% COARSE SAND :	9.27	2.0 - 4.5
% MEDIUM SAND :	8.08	0.425 - 2.0
% FINE SAND :	13.74	0.075 - 0.425
% SILT :	15.01	0.075 - 0.002
% CLAY :	3.57	< 0.002
% CLAY :	5.37	< 0.005

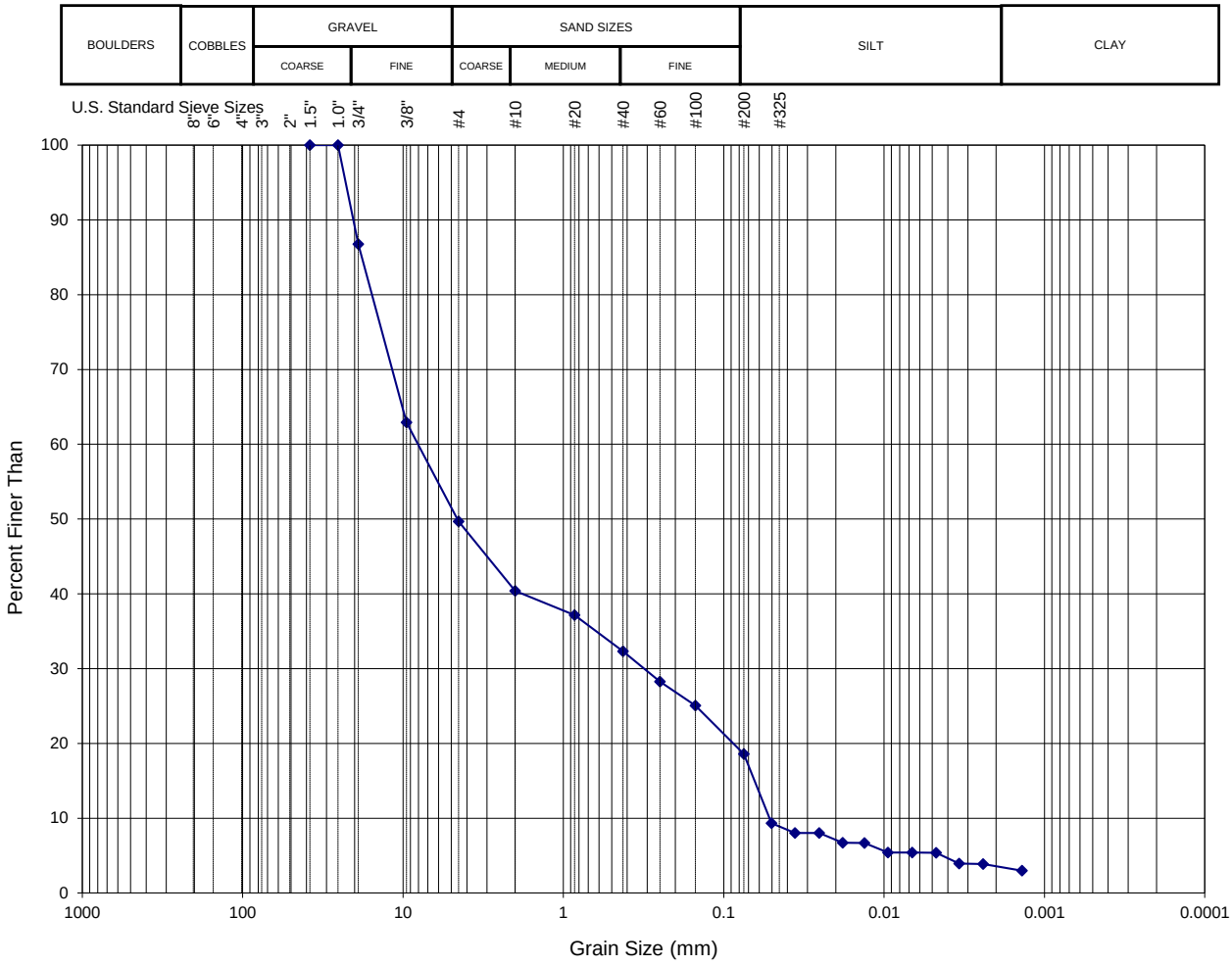
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

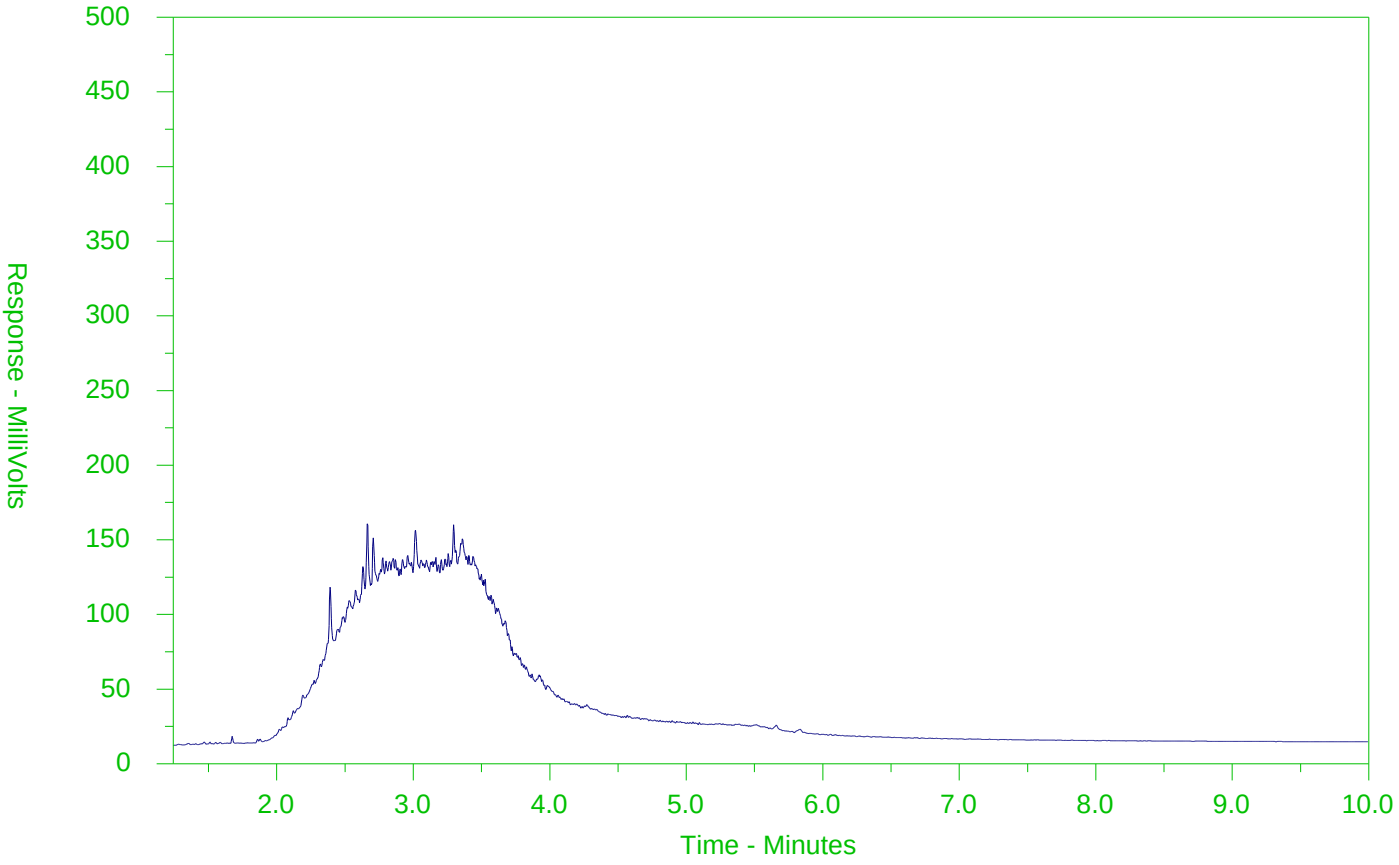
Project Name:	CH2M HILL CANADA LIMITED~WATERLOO
Project Number:	11546
Sample Location:	
Sample Number:	TP17-301-4-5
Sample Depth:	
Lab ID Number:	L2003037-9
Technician:	CB6
Sampler:	
Dates:	
Collected On:	04-10-17
Analyzed:	20-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SANDY GRAVEL WITH SILT, TRACE CLAY	AND	36 - 50 %	GRAVEL	50	%
COARSE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	31	%
ESTIMATED HAZEN NUMBER: 2.68E-03 cm/s	WITH	11 - 20 %	SILT + CLAY	19	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-2
Client Sample ID: TP17-305-5-6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

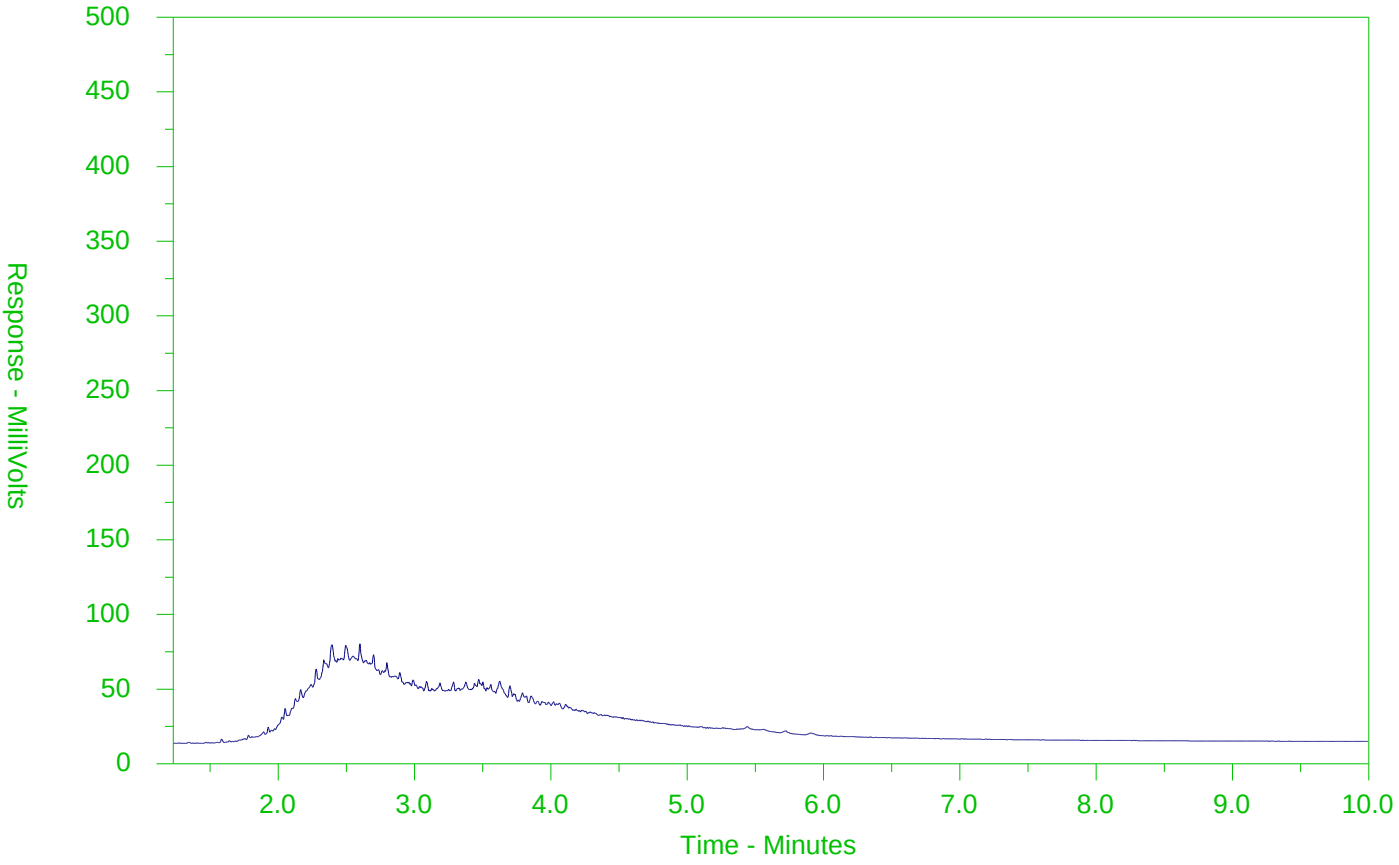
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-3
Client Sample ID: TP17-304-3-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

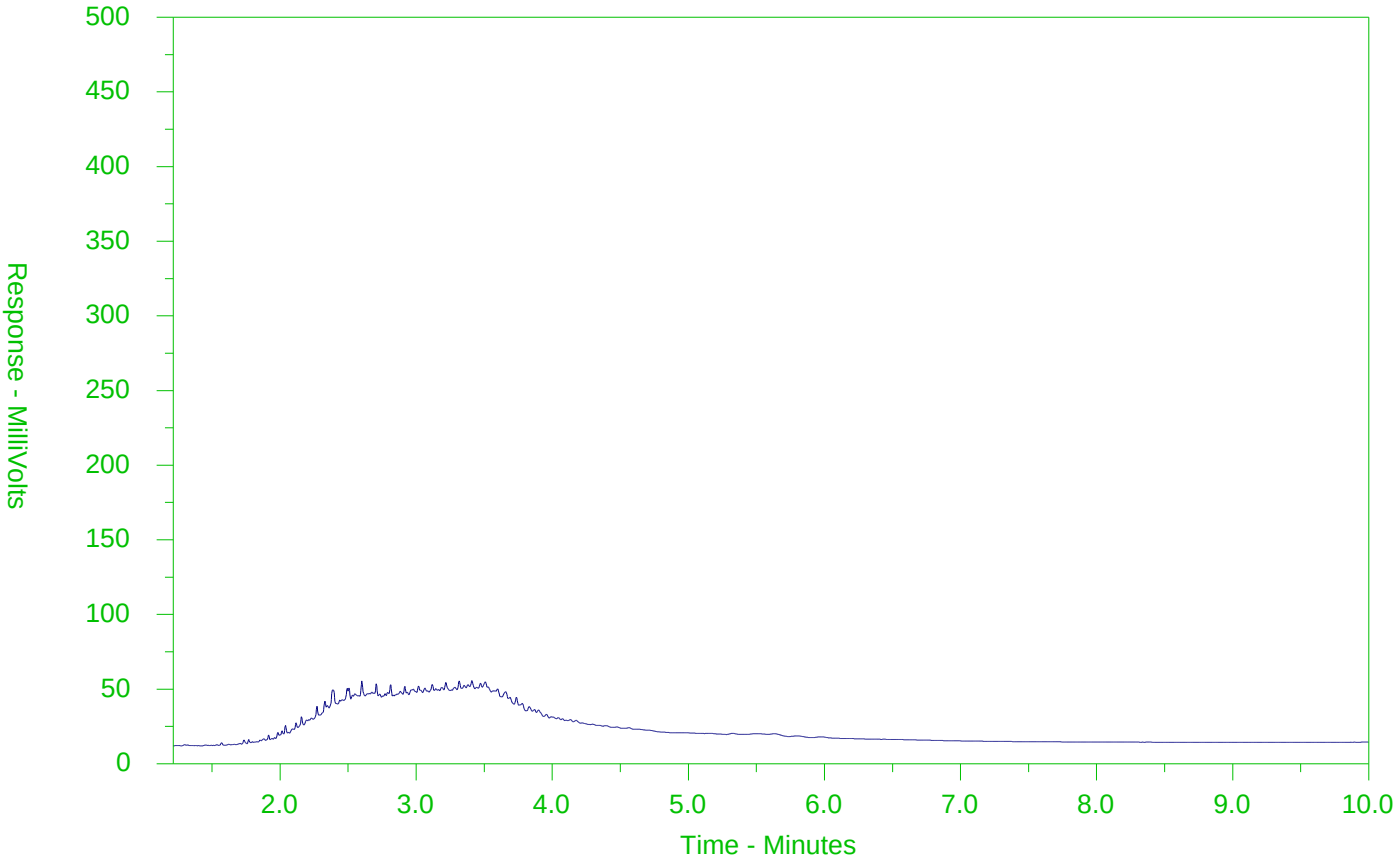
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-4
Client Sample ID: TP17-304-6-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

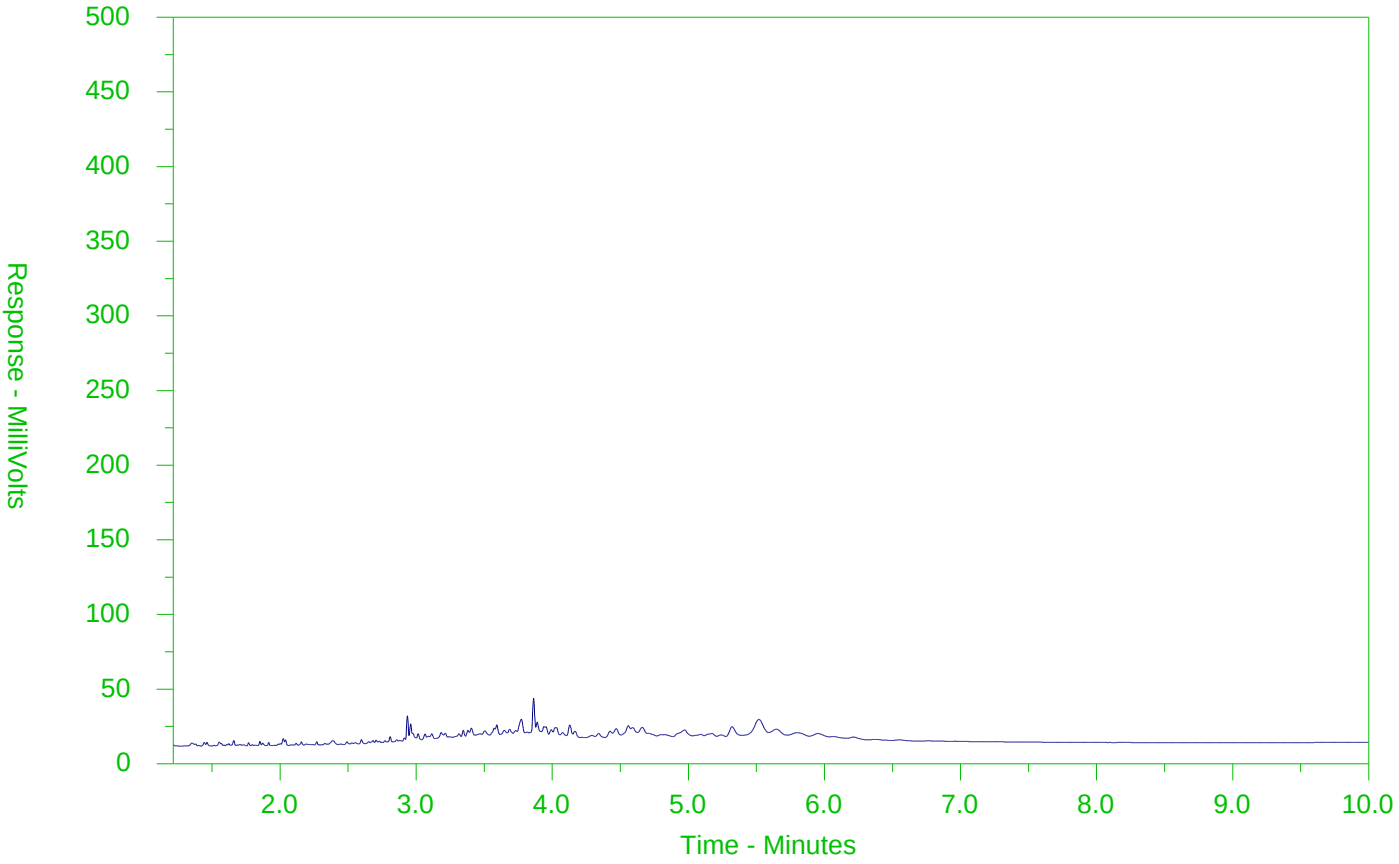
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-5
Client Sample ID: TP17-302-1-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

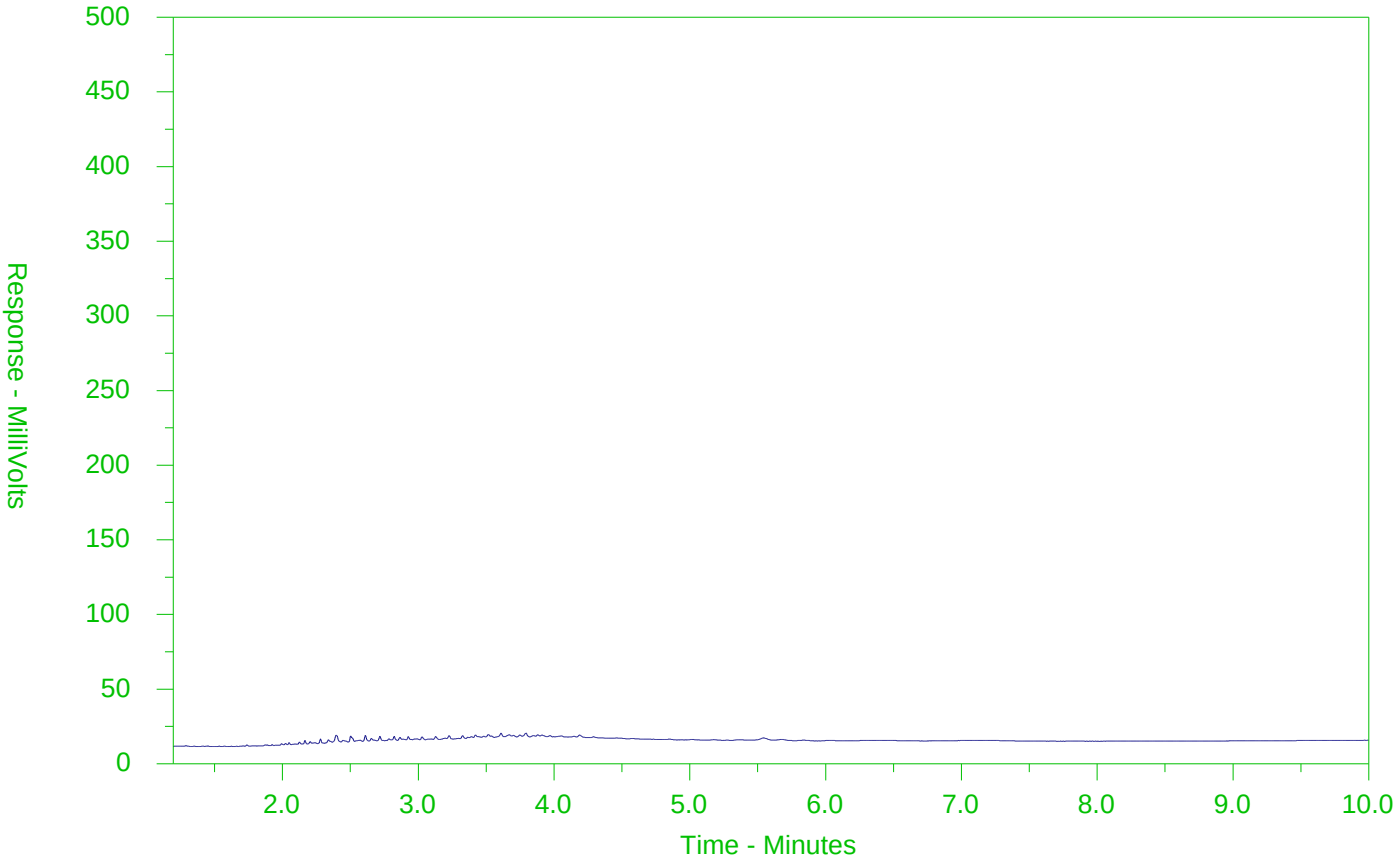
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-7
Client Sample ID: TP17-302-5-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

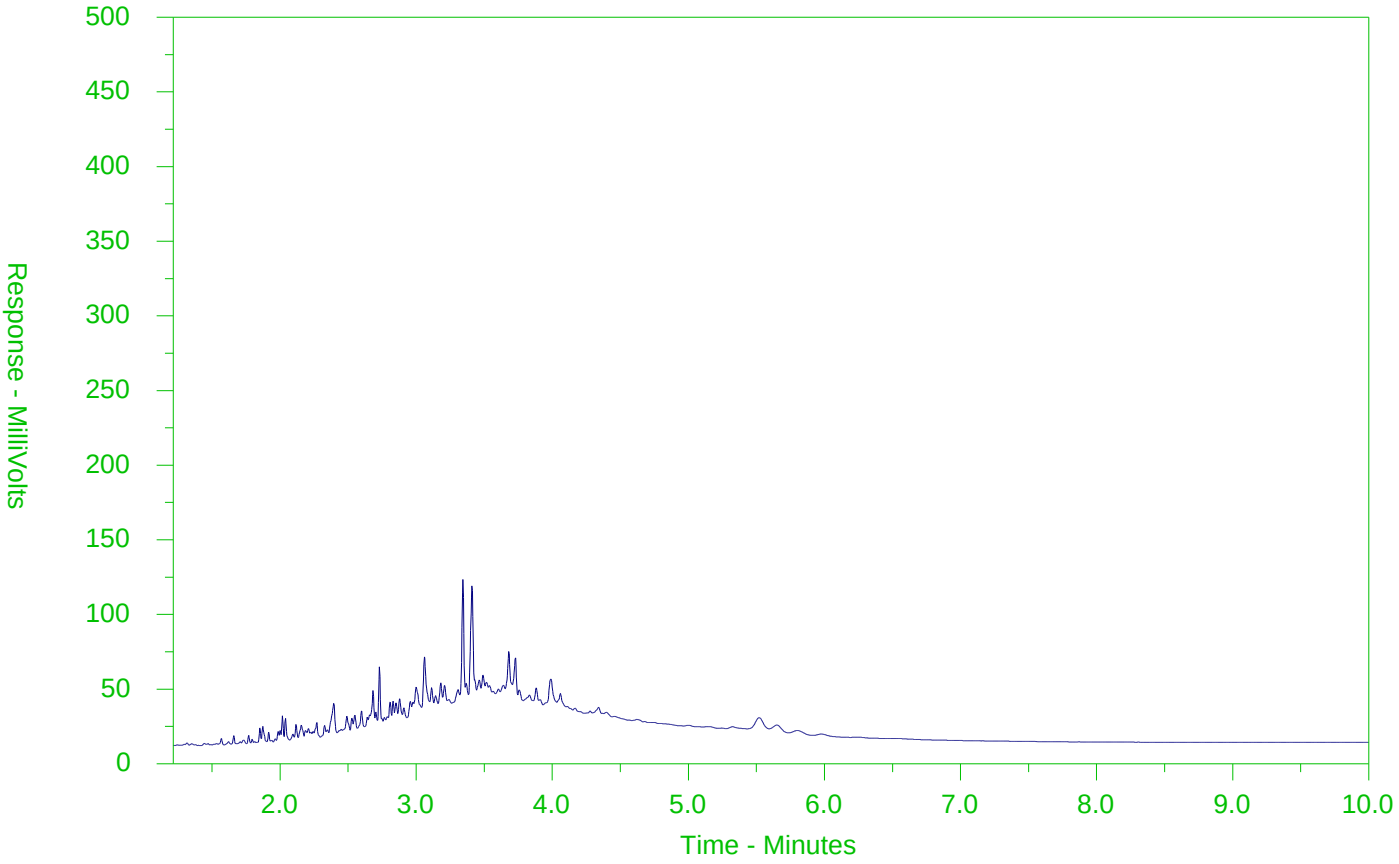
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-8
Client Sample ID: TP17-301-1-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

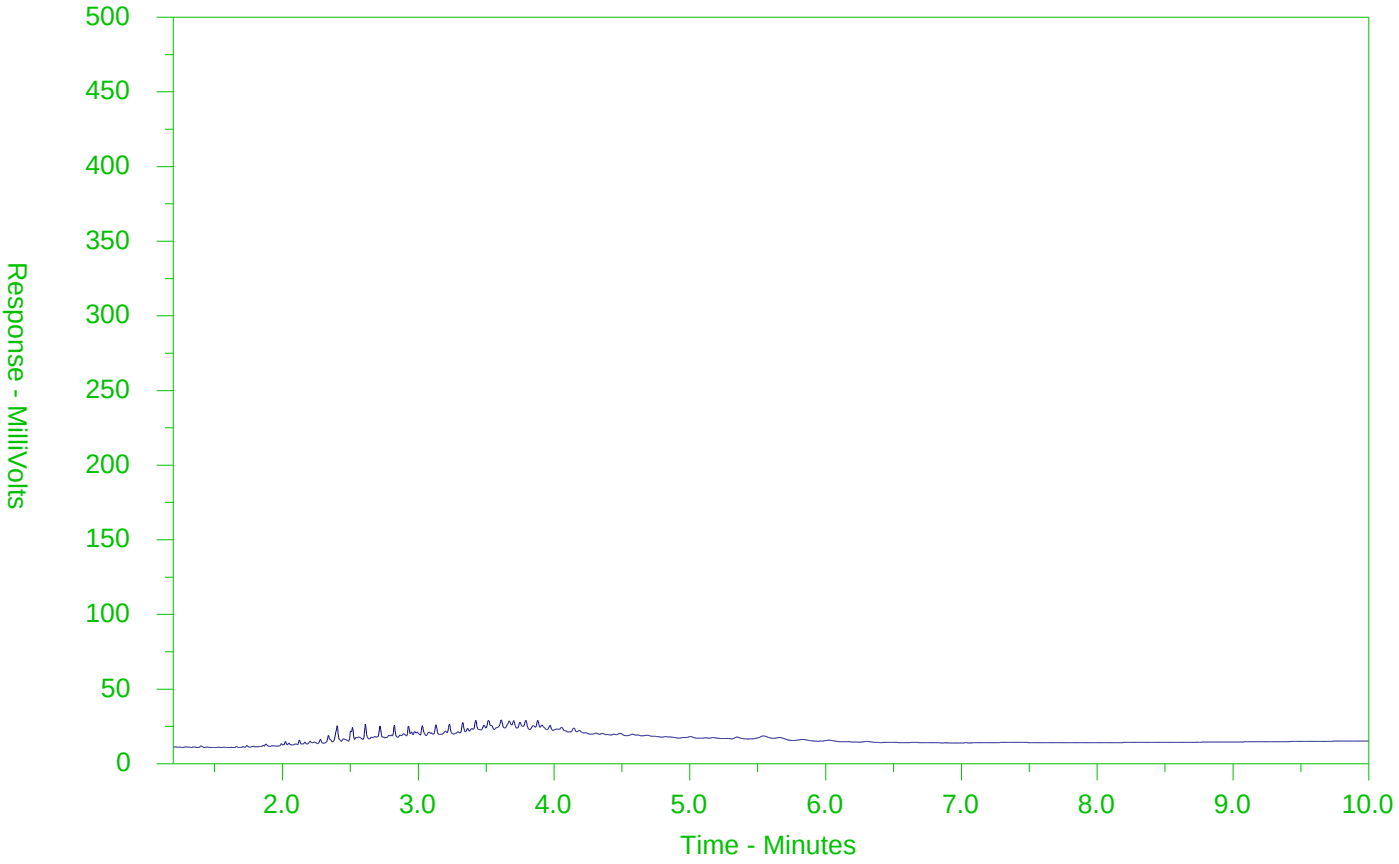
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-9
Client Sample ID: TP17-301-4-5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

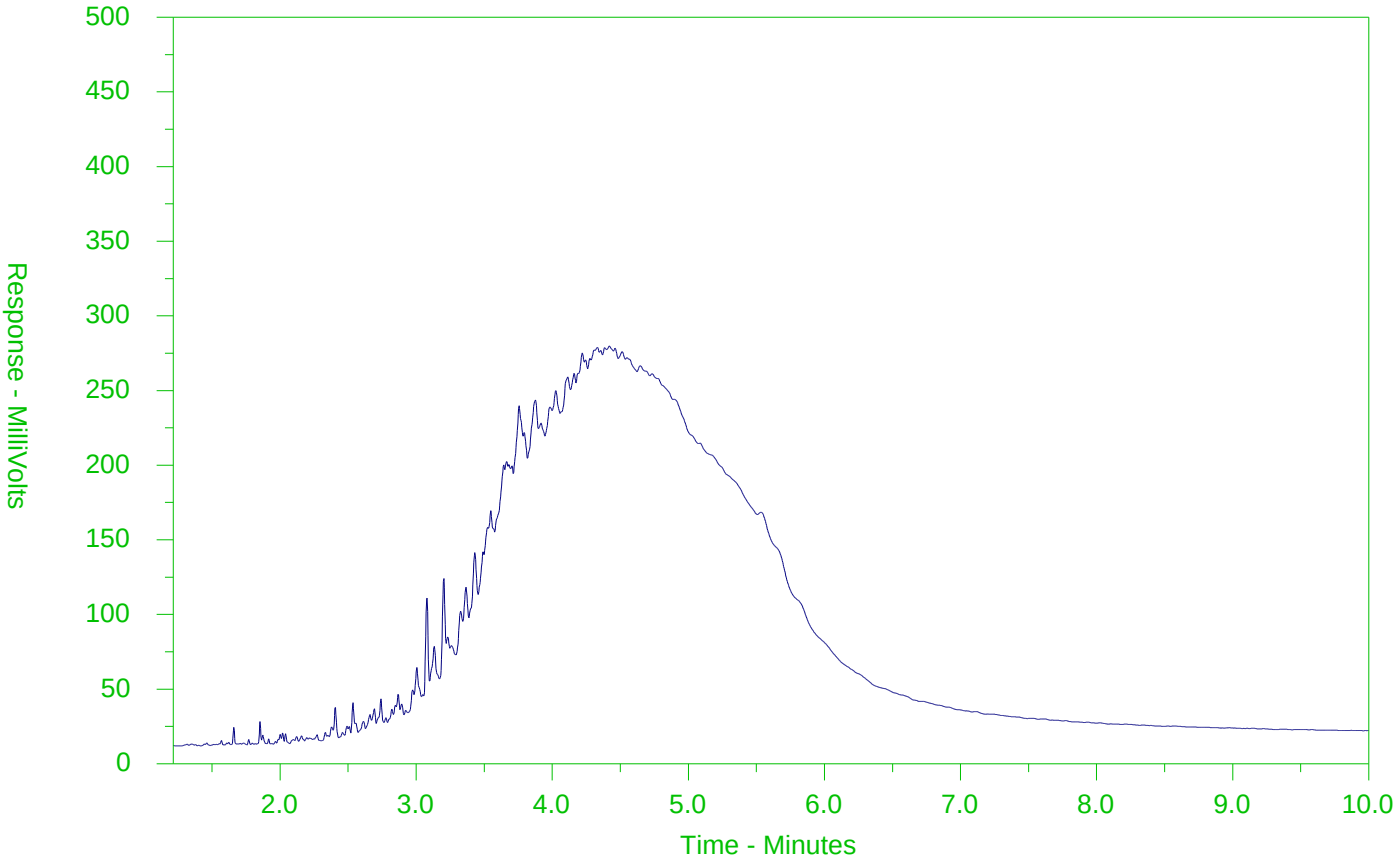
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-12
Client Sample ID: TP17-300-1-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

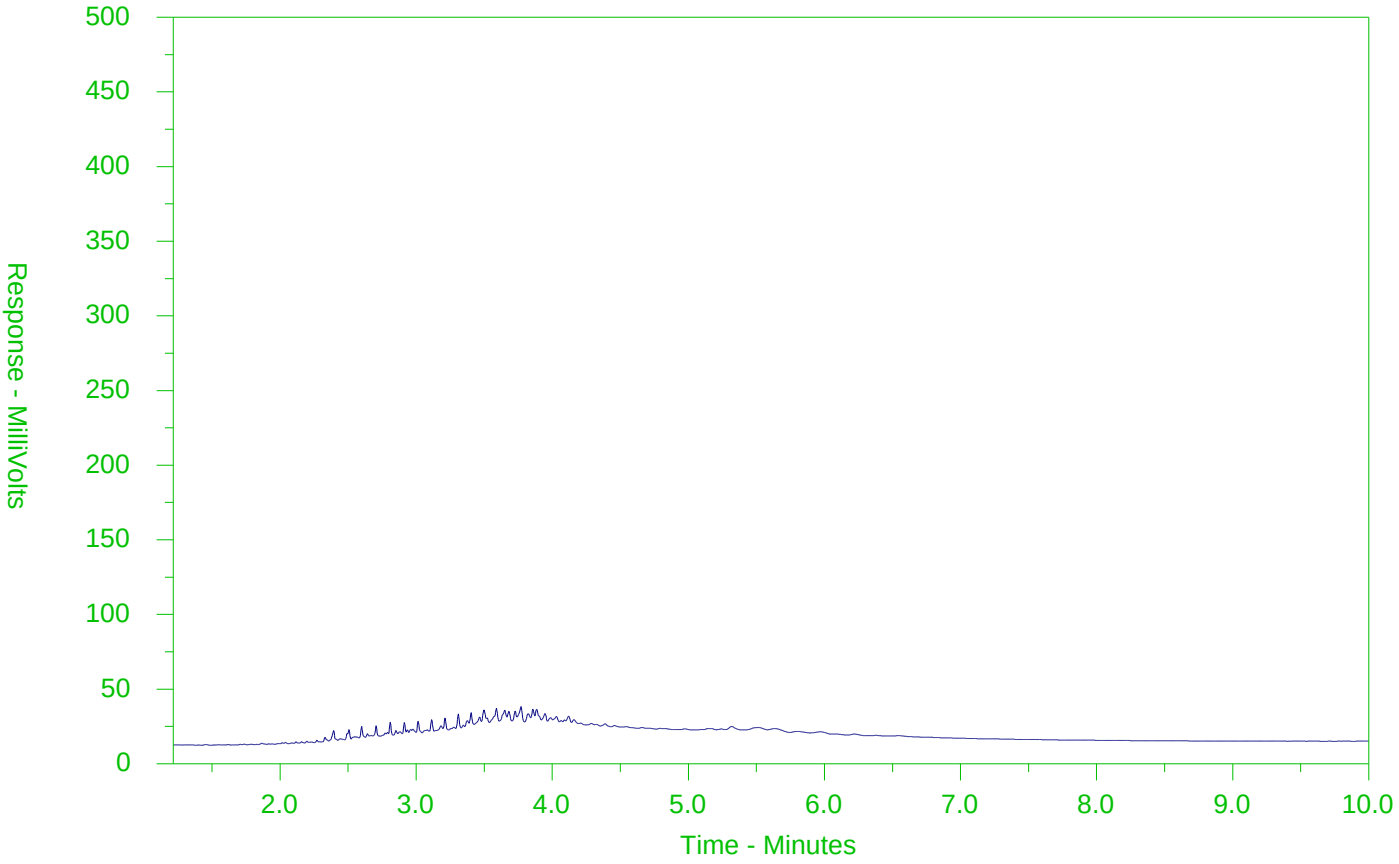
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-13
Client Sample ID: TP17-300-3-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

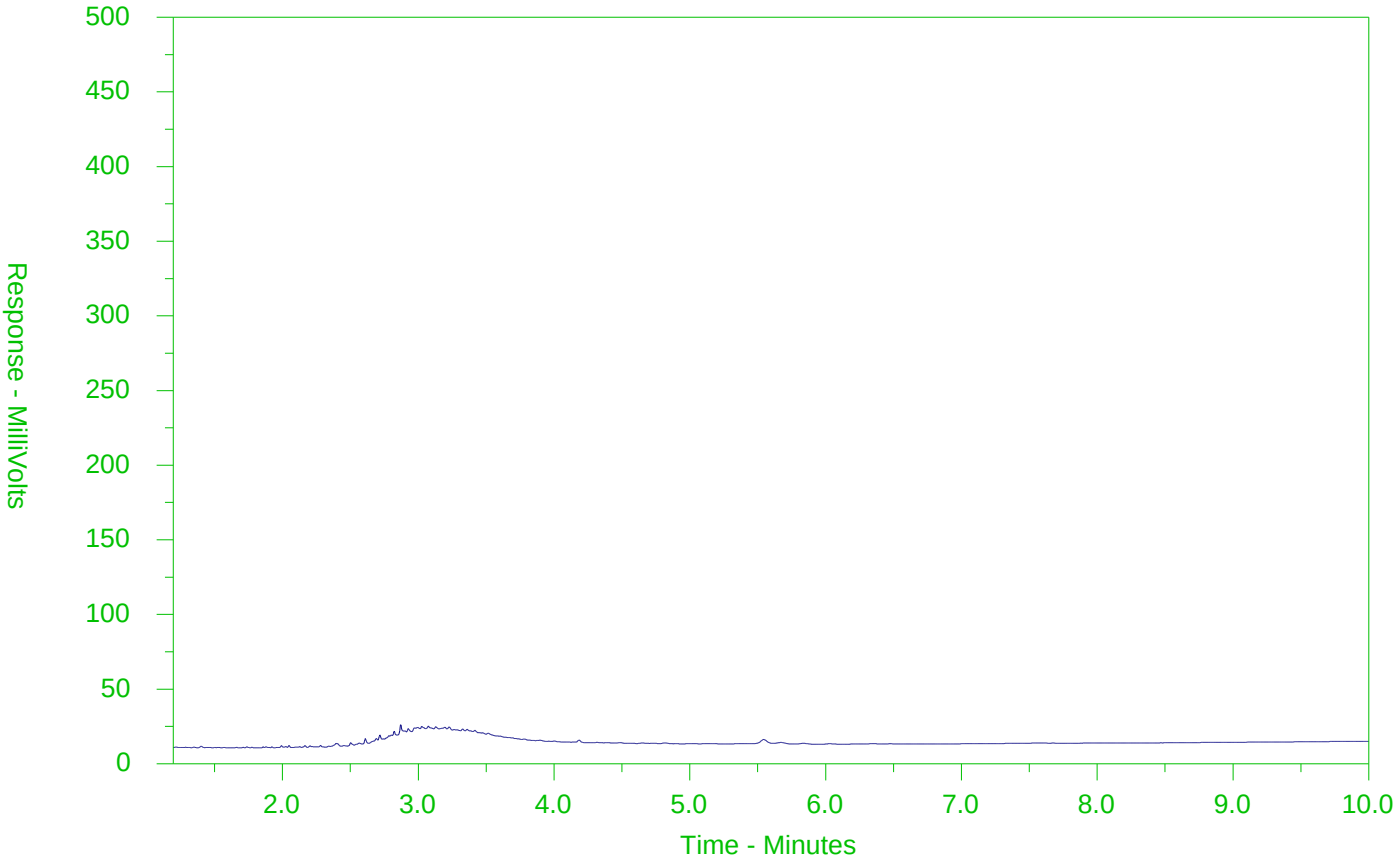
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-14
Client Sample ID: TP17-303-1-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

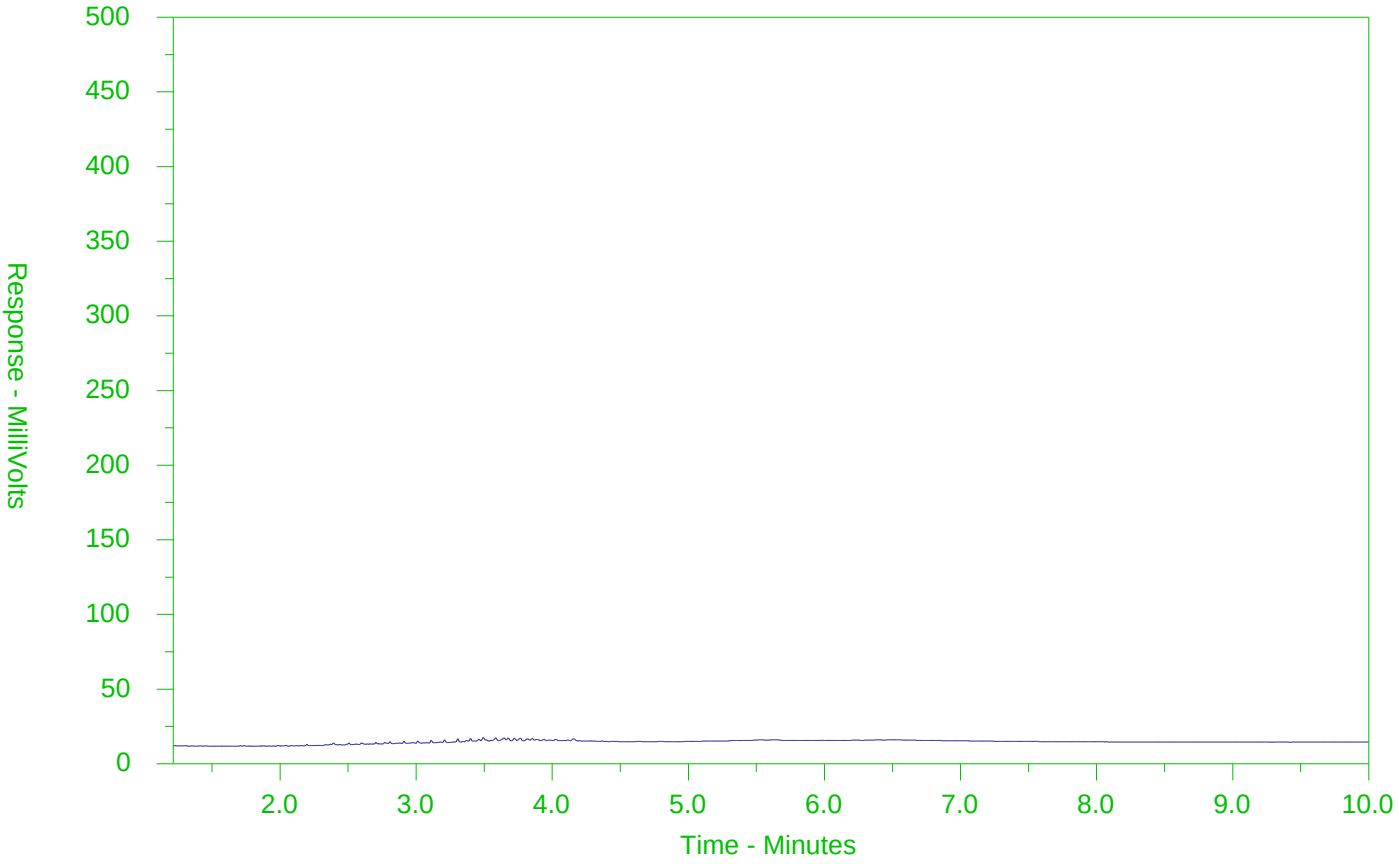
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-15
Client Sample ID: TP17-303-4-5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

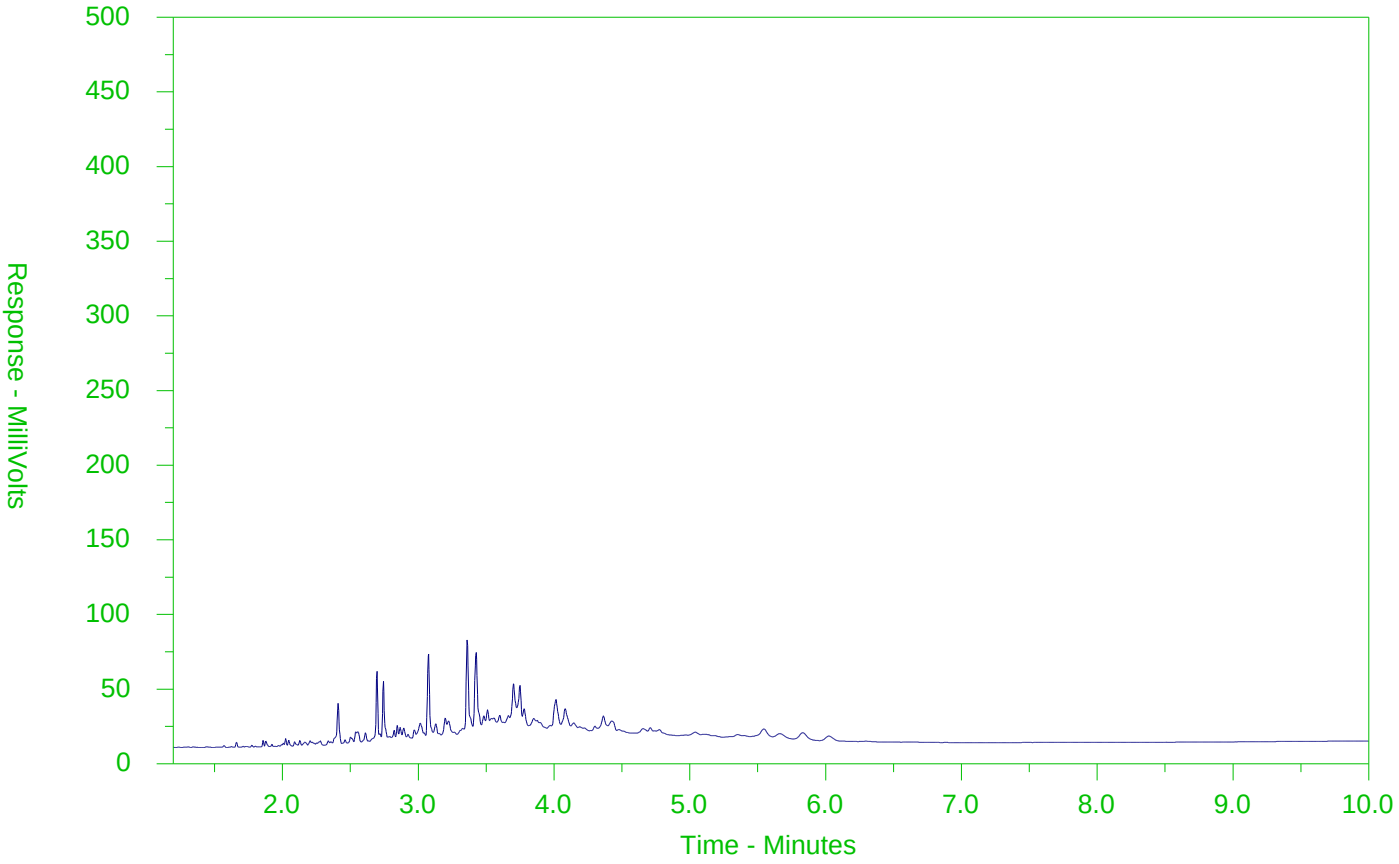
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-17
Client Sample ID: TP17-306-3-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

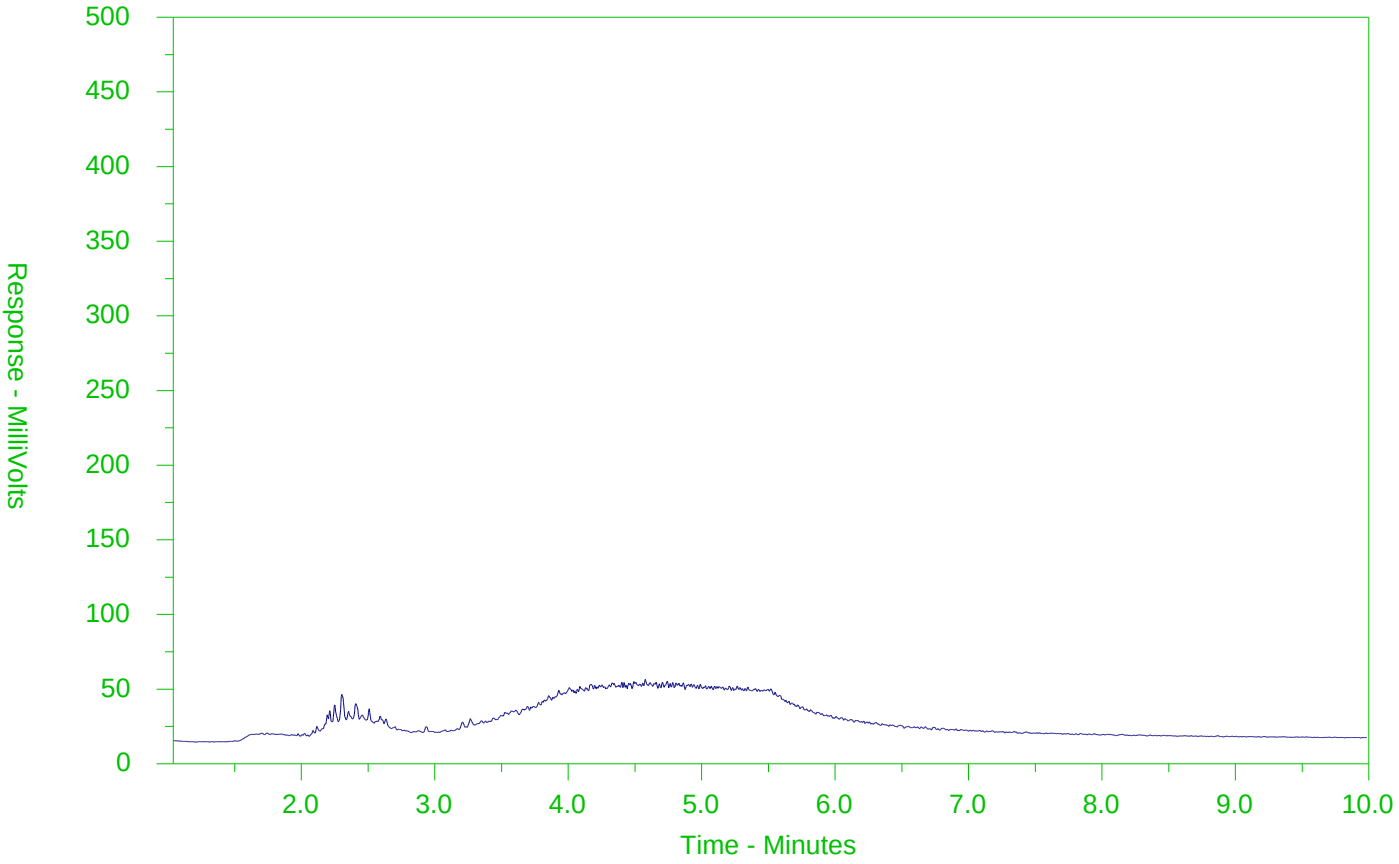
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-19
Client Sample ID: TP17-307-7-8



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

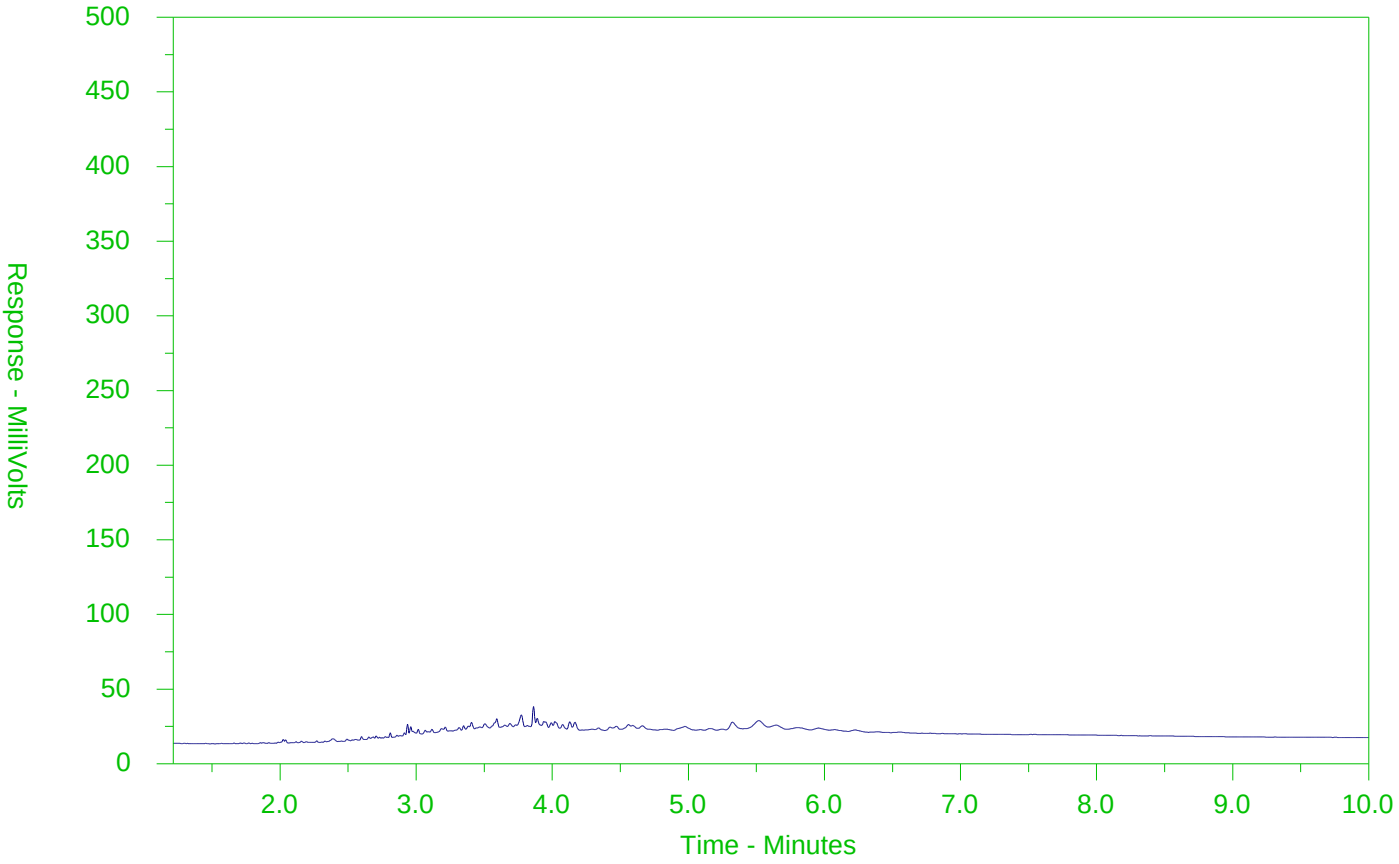
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-20
Client Sample ID: DUP 1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

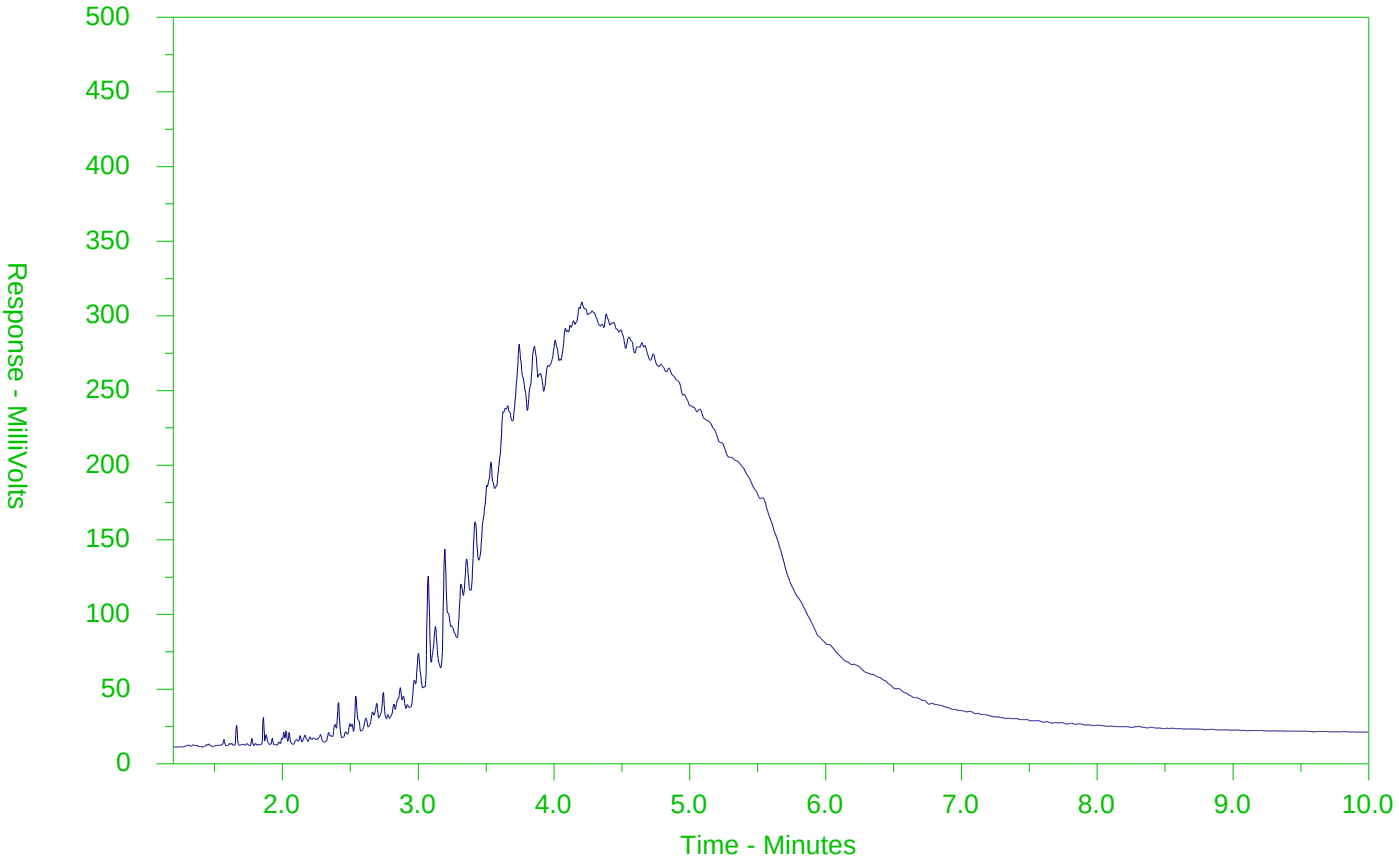
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2003037-23
Client Sample ID: DUP 4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2003037-COFC

COC Number: 17 - 616667

Page 1 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shirey	Quality Control (QC) Report with Report YES NO	Priority (Business Days): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%]; Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax Same as previous	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2 list Tamin, Dirk	
Postal Code:		Email 3 Michael, Kyrie	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acc't. Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	6941757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	BSP	Location:	
ALS Lab Work Order # (lab use only):	L2003037 DA	ALS Contact: Matthy	Sampler: M. Shirey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O.Reg Metals + Inorganics	O.Reg PHC + BTEX	O.Reg VOCs	O.Reg PAH	O.Reg Suites	O.Reg PCB	TOC	Grain Size - Sieve + Hy	Dioxins / Furans							SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	TP17-305-1-2	4-OCT-17	1000	Soil	X	X	X															4
2	TP17-305-5-6		1030		X	X	X															4
3	TP17-304-3-4		1105		X	X	X															4
4	TP17-304-6-7		1110		X	X	X															4
5	TP17-302-1-3		1150		X	X	X	X														5
6	TP17-302-3-4		1215		X			X												X		2
7	TP17-302-5-7		1245		X	X	X	X														5
8	TP17-301-1-3		1320		X	X			X		X	X										7
9	TP17-301-4-5		1340		X	X			X		X	X										7
10	TP17-300-0-1		1415							X			X							X		2
11	TP17-300-1-2A		1420							X			X							X		2
12	TP17-300-1-2		1425		X	X	X		X													5

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 Residential Parkland Institutional
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				-1.7	-4.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)			
Released by:	Date:	Time:	Received by:	Date	Time	Received by: DA	Date: 05/10/17	Time: 15:40	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2003037-COFC

COC Number 17 - 616668

Page 2 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CHZM	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Sluy	Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax: Tracy, Dirk	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2: Meehan, Kynie	
Postal Code:		Email 3	

Invoice To	Same as Report To YES NO	Invoice Distribution
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX
Company:	CHZM	Email 1 or Fax
Contact:	Acct Payable	Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	644757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	05B	Location:	
ALS Lab Work Order # (lab use only):	L2003037 DA	ALS Contact: Matt	Sampler: M. Sluy

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O.Reg Metals + Inorganics	O.Reg PHC + BTEX	O.Reg VOCs	O.Reg PAHs	O.Reg SVOCs	O.Reg PCBs	TOC	Grain Size	Diverse / Forens	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
13	TP17-300-3-4	4-OCT-17	1435	Soil	X	X	X		X							5
14	TP17-303-1-2		1520		X	X	X	X								5
15	TP17-303-4-5		1540		X	X	X	X								5
16	TP17-304-8-8.5		1635		X									X		1
17	TP17-306-3-4		1705		X	X	X	X								5
18	TP17-306-5-6		1710			X		X						X		4
19	TP17-307-7-8		1750			X	X							X		3
20	DUP 1		—		X	X	X	X								5
21	DUP 2		—						X							1
22	DUP 3		—							X						1
23	DUP 4		—		X	X	X		X							5
24	DUP 5		—		X			X								2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 Res. Fnt. Park.
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes	No	
Ice Packs	Ice Cubes	Custody seal intact	Yes	No	
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				-1.3	-4.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)			
Released by:	Date: 2017/10/5	Time: 15:00	Received by:	Date:	Time:	Received by: DA	Date: 05/10/17	Time: 15:30	

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2003037-COFC

COC Number: 17 - 616669

Page 3 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Sluy	Quality Control (QC) Report with Report YES NO	Priority (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	
Street:		Email 1 or Fax: Tanya.Doke	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:		Email 2: Michael.Kyme	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:		Email 3	

Invoice To	Same as Report To YES NO	Invoice Distribution
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX
Company:		Email 1 or Fax
Contact:	Acct Payable	Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2003037	ALS Contact: Matty	Sampler: M. Sluy

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O. Reg 153/04 + F1	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
25	Trip Blank - TP	5-OCT-17	—	other	X			1

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 Res. Inst. Park
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No	
Ice Packs	Ice Cubes	Custody seal intact	Yes		No	
Cooling Initiated						

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				-1.3	-4.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2017/10/5	1500					05/10/17	15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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ALS 16-Front

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 16-OCT-17
Report Date: 12-APR-21 14:30 (MT)
Version: FINAL REV. 3

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2007635

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-616670, 17-616671, 17-616673
Legal Site Desc:

Comments: 12-APR-21:
L2007635-1, 3, 5, 6, 9, 11, 17, 18, 21, 22, 23, 25, 28, 29, 32 - results for Bismuth, Iron, Calcium and Magnesium included.

22-NOV-17: F2-F4-UW added. Results included.

16-NOV-17: Grain size results attached at the end of the report.
23-NOV-17: F2-F4-UW results included.

Mathy Mahadeva
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-1	BH17-200-3-3.5									
Sampled By:	M. SHIRY on 10-OCT-17 @ 16:06									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.178		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	25.7		0.10	%	18-OCT-17				
	pH	7.39		0.10	pH units	17-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.17		0.10	SAR	19-OCT-17	12	12	5	5
	Calcium (Ca)	8.7		1.0	mg/L	19-OCT-17				
	Magnesium (Mg)	2.4		1.0	mg/L	19-OCT-17				
	Sodium (Na)	2.1		1.0	mg/L	19-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
	Arsenic (As)	12.4		1.0	ug/g	19-OCT-17	18	18	18	18
	Barium (Ba)	92.2		1.0	ug/g	19-OCT-17	670	670	390	390
	Beryllium (Be)	0.51		0.50	ug/g	19-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	9.9		5.0	ug/g	19-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.87		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	1.47		0.50	ug/g	19-OCT-17	1.9	1.9	*1.2	*1.2
	Calcium (Ca)	38300		50	ug/g	12-APR-21				
	Chromium (Cr)	17.3		1.0	ug/g	19-OCT-17	160	160	160	160
	Cobalt (Co)	8.0		1.0	ug/g	19-OCT-17	80	100	22	22
	Copper (Cu)	15.6		1.0	ug/g	19-OCT-17	230	300	140	180
	Iron (Fe)	34600		50	ug/g	12-APR-21				
	Lead (Pb)	134		1.0	ug/g	19-OCT-17	*120	*120	*120	*120
	Magnesium (Mg)	19800		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0892		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	1.2		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	11.5		1.0	ug/g	19-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
	Vanadium (V)	38.1		1.0	ug/g	19-OCT-17	86	86	86	86
	Zinc (Zn)	722		5.0	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons										
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics										
	Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
	Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
	Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-1 BH17-200-3-3.5									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:06									
Matrix: SOIL									
Semi-Volatile Organics									
Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
Chrysene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	24-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	93.9		50-140	%	24-OCT-17				
Surrogate: Nitrobenzene d5	87.2		50-140	%	24-OCT-17				
Surrogate: Phenol d5	82.4		30-130	%	24-OCT-17				
Surrogate: p-Terphenyl d14	96.1		50-140	%	24-OCT-17				
Surrogate: 2,4,6-Tribromophenol	53.3		50-140	%	24-OCT-17				
L2007635-2 BH17-200-3.5-4									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:06									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	13.1		0.10	%	18-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
							#1	#2	#3	#4
L2007635-2	BH17-200-3.5-4									
Sampled By:	M. SHIRY on 10-OCT-17 @ 16:06									
Matrix:	SOIL									
Volatile Organic Compounds										
	Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	95.1		50-140	%	18-OCT-17				
	Surrogate: 1,4-Difluorobenzene	101.7		50-140	%	18-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-2 BH17-200-3.5-4									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:06									
Matrix: SOIL									
Hydrocarbons									
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	62.8		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	90.7		60-140	%	18-OCT-17				
L2007635-3 BH17-200-4-6									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:16									
Matrix: SOIL									
Physical Tests									
Conductivity	0.199		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.03		0.10	%	17-OCT-17				
pH	8.52		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.38		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	4.6		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	2.4		1.0	mg/L	19-OCT-17				
Sodium (Na)	4.1		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.0		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	12.3		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.6		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.15		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	185000		50	ug/g	12-APR-21				
Chromium (Cr)	7.9		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	2.1		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	7.0		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	8900		50	ug/g	12-APR-21				
Lead (Pb)	50.3		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	75200		20	ug/g	12-APR-21				
Mercury (Hg)	0.0163		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	6.1		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-3 BH17-200-4-6									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:16									
Matrix: SOIL									
Metals									
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	12.6		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	335		5.0	ug/g	19-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
Chrysene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	24-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-3	BH17-200-4-6									
Sampled By:	M. SHIRY on 10-OCT-17 @ 16:16									
Matrix:	SOIL						#1	#2	#3	#4
Semi-Volatile Organics										
	2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	62.9		50-140	%	24-OCT-17				
	Surrogate: Nitrobenzene d5	97.2		50-140	%	24-OCT-17				
	Surrogate: Phenol d5	85.7		30-130	%	24-OCT-17				
	Surrogate: p-Terphenyl d14	94.1		50-140	%	24-OCT-17				
	Surrogate: 2,4,6-Tribromophenol	72.9		50-140	%	24-OCT-17				
L2007635-4	BH17-200-6-6.5									
Sampled By:	M. SHIRY on 10-OCT-17 @ 16:29									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	7.43		0.10	%	17-OCT-17				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
	Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-4 BH17-200-6-6.5									
Sampled By: M. SHIRY on 10-OCT-17 @ 16:29									
Matrix: SOIL									
Volatile Organic Compounds									
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	97.3		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	102.8		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	34		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	70.5		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	89.6		60-140	%	18-OCT-17				
L2007635-5 BH17-201-0-2									
Sampled By: M. SHIRY on 10-OCT-17 @ 17:10									
Matrix: SOIL									
Physical Tests									
Conductivity	0.260		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	7.99		0.10	%	17-OCT-17				
pH	7.71		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.12		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	13.9		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	3.2		1.0	mg/L	19-OCT-17				
Sodium (Na)	1.8		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	3.3		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	11.3		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	85.1		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	9.3		1.0	ug/g	12-APR-21				
Boron (B)	6.7		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.30		0.10	ug/g	19-OCT-17	2	2	1.5	1.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-5 BH17-201-0-2									
Sampled By: M. SHIRY on 10-OCT-17 @ 17:10									
Matrix: SOIL									
Metals									
Cadmium (Cd)	1.44		0.50	ug/g	19-OCT-17	1.9	1.9	*1.2	*1.2
Calcium (Ca)	52900		50	ug/g	12-APR-21				
Chromium (Cr)	15.3		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	4.2		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	77.4		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	23800		50	ug/g	12-APR-21				
Lead (Pb)	282		1.0	ug/g	19-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	27000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0451		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.2		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	15.3		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	27.3		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	1140	DLHC	40	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F2 (C10-C16)	13		10	ug/g	20-OCT-17	230	250	98	150
F2-Naphth	13		10	ug/g	24-OCT-17				
F3a (C16-C22)	325		25	ug/g	20-OCT-17				
F3 (C16-C34)	521		50	ug/g	20-OCT-17	1700	2500	*300	1300
F3b (C22-C34)	196		25	ug/g	20-OCT-17				
F3-PAH	518		50	ug/g	24-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	535		72	ug/g	24-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	74.5		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	89.3		60-140	%	18-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	0.101		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.339		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	0.279		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.398		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	0.184		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.190		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.376		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	0.051		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	0.836		0.050	ug/g	24-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.186		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-5 BH17-201-0-2									
Sampled By: M. SHIRY on 10-OCT-17 @ 17:10									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	0.133		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	0.060		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.073		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
Naphthalene	0.074		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Phenanthrene	0.497		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Pyrene	0.645		0.050	ug/g	24-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	90.6		50-140	%	24-OCT-17				
Surrogate: p-Terphenyl d14	100.2		50-140	%	24-OCT-17				
L2007635-6 BH17-201-2-3									
Sampled By: M. SHIRY on 10-OCT-17 @ 17:25									
Matrix: SOIL									
Physical Tests									
Conductivity	0.152		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	3.80		0.10	%	17-OCT-17				
pH	7.84		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.20		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	3.4		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	1.1		1.0	mg/L	19-OCT-17				
Sodium (Na)	1.7		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.8		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	24.0		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	35000		50	ug/g	12-APR-21				
Chromium (Cr)	4.2		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	4.1		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	28.1		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	18100		50	ug/g	12-APR-21				
Lead (Pb)	29.1		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	22700		20	ug/g	12-APR-21				
Mercury (Hg)	0.0144		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	10.2		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-6	BH17-201-2-3									
Sampled By:	M. SHIRY on 10-OCT-17 @ 17:25									
Matrix:	SOIL						#1	#2	#3	#4
Metals										
	Vanadium (V)	17.3		1.0	ug/g	19-OCT-17	86	86	86	86
	Zinc (Zn)	446		5.0	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	23-OCT-17	230	250	98	150
	F2-Naphth	<10		10	ug/g	24-OCT-17				
	F3a (C16-C22)	134		25	ug/g	23-OCT-17				
	F3 (C16-C34)	229		50	ug/g	23-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	95		25	ug/g	23-OCT-17				
	F3-PAH	229		50	ug/g	24-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	23-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	229		72	ug/g	24-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	23-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	78.1		60-140	%	23-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	93.6		60-140	%	18-OCT-17				
Polycyclic Aromatic Hydrocarbons										
	Acenaphthene	<0.050		0.050	ug/g	23-OCT-17	21	29	7.9	29
	Acenaphthylene	<0.050		0.050	ug/g	23-OCT-17	0.15	0.17	0.15	0.17
	Anthracene	<0.050		0.050	ug/g	23-OCT-17	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.3	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
	Chrysene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	7	7.8
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.1	0.1	0.1	0.1
	Fluoranthene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	0.69	0.69
	Fluorene	<0.050		0.050	ug/g	23-OCT-17	62	69	62	69
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.76	0.95	0.38	0.48
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
	1-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
	2-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
	Naphthalene	<0.050		0.050	ug/g	23-OCT-17	9.6	28	0.6	0.75
	Phenanthrene	<0.050		0.050	ug/g	23-OCT-17	12	16	6.2	7.8
	Pyrene	<0.050		0.050	ug/g	23-OCT-17	96	96	78	78
	Surrogate: 2-Fluorobiphenyl	85.2		50-140	%	23-OCT-17				
	Surrogate: p-Terphenyl d14	86.7		50-140	%	23-OCT-17				
L2007635-7	BH17-201-0-1									
Sampled By:	M. SHIRY on 10-OCT-17 @ 17:10									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	4.01		0.10	%	17-OCT-17				
Polychlorinated Biphenyls										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-7 BH17-201-0-1									
Sampled By: M. SHIRY on 10-OCT-17 @ 17:10									
Matrix: SOIL									
Polychlorinated Biphenyls									
Aroclor 1242	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1248	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1254	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1260	<0.0150	DLM	0.015	ug/g	23-OCT-17				
Total PCBs	<0.0230	DLM	0.023	ug/g	23-OCT-17	1.1	1.1	0.35	0.35
Surrogate: d14-Terphenyl	97.5		60-140	%	23-OCT-17				
L2007635-9 BH17-202-0-2									
Sampled By: M. SHIRY on 10-OCT-17 @ 14:22									
Matrix: SOIL									
Physical Tests									
Conductivity	0.401		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	7.60		0.10	%	17-OCT-17				
pH	8.16		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.13		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	39.7		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	1.8		1.0	mg/L	19-OCT-17				
Sodium (Na)	3.1		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	1.5		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	3.2		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	26.3		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.7		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.25		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	16100		50	ug/g	12-APR-21				
Chromium (Cr)	12.2		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	3.2		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	10.2		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	23900		50	ug/g	12-APR-21				
Lead (Pb)	77.9		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	5860		20	ug/g	12-APR-21				
Mercury (Hg)	0.0178		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	8.4		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	20.7		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	53.2		5.0	ug/g	19-OCT-17	340	340	340	340

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-9 BH17-202-0-2 Sampled By: M. SHIRY on 10-OCT-17 @ 14:22 Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	23-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	23-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	23-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.106		0.050	ug/g	23-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	0.103		0.050	ug/g	23-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.191		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	0.088		0.050	ug/g	23-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.077		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.164		0.050	ug/g	23-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	0.198		0.050	ug/g	23-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	23-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.076		0.050	ug/g	23-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	0.131		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	0.058		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.073		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
Naphthalene	0.064		0.050	ug/g	23-OCT-17	9.6	28	0.6	0.75
Phenanthrene	0.136		0.050	ug/g	23-OCT-17	12	16	6.2	7.8
Pyrene	0.159		0.050	ug/g	23-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	89.5		50-140	%	23-OCT-17				
Surrogate: p-Terphenyl d14	89.1		50-140	%	23-OCT-17				
L2007635-10 BH17-202-2-4 Sampled By: M. SHIRY on 10-OCT-17 @ 14:30 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	6.64		0.10	%	17-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-10	BH17-202-2-4									
Sampled By:	M. SHIRY on 10-OCT-17 @ 14:30									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	92.0		50-140	%	18-OCT-17				
	Surrogate: 1,4-Difluorobenzene	100.8		50-140	%	18-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
	F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
	F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	<25		25	ug/g	20-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	70.5		60-140	%	20-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	81.9		60-140	%	18-OCT-17				
L2007635-11	BH17-202-4-6									
Sampled By:	M. SHIRY on 10-OCT-17 @ 14:40									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-11 BH17-202-4-6									
Sampled By: M. SHIRY on 10-OCT-17 @ 14:40									
Matrix: SOIL									
Physical Tests									
Conductivity	0.208		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.60		0.10	%	17-OCT-17				
pH	8.57		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.43		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	5.8		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	1.7		1.0	mg/L	19-OCT-17				
Sodium (Na)	4.6		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	9.3		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	17.9		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	6.7		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.22		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	1.29		0.50	ug/g	19-OCT-17	1.9	1.9	*1.2	*1.2
Calcium (Ca)	156000		50	ug/g	12-APR-21				
Chromium (Cr)	7.9		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	3.8		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	23.5		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	16000		50	ug/g	12-APR-21				
Lead (Pb)	95.6		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	63600		20	ug/g	12-APR-21				
Mercury (Hg)	0.0309		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	10.3		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	17.9		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	548		5.0	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	23-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	23-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	23-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	6.6	7.8

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-11	BH17-202-4-6									
Sampled By:	M. SHIRY on 10-OCT-17 @ 14:40									
Matrix:	SOIL						#1	#2	#3	#4
Polycyclic Aromatic Hydrocarbons										
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
	Chrysene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	7	7.8
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.1	0.1	0.1	0.1
	Fluoranthene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	0.69	0.69
	Fluorene	<0.050		0.050	ug/g	23-OCT-17	62	69	62	69
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.76	0.95	0.38	0.48
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
	1-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
	2-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
	Naphthalene	<0.050		0.050	ug/g	23-OCT-17	9.6	28	0.6	0.75
	Phenanthrene	<0.050		0.050	ug/g	23-OCT-17	12	16	6.2	7.8
	Pyrene	<0.050		0.050	ug/g	23-OCT-17	96	96	78	78
	Surrogate: 2-Fluorobiphenyl	89.9		50-140	%	23-OCT-17				
	Surrogate: p-Terphenyl d14	88.9		50-140	%	23-OCT-17				
L2007635-12	BH17-202-6-7									
Sampled By:	M. SHIRY on 10-OCT-17 @ 15:12									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	5.41		0.10	%	17-OCT-17				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
	Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-12 BH17-202-6-7									
Sampled By: M. SHIRY on 10-OCT-17 @ 15:12									
Matrix: SOIL									
Volatile Organic Compounds									
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	97.9		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	103.6		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	14		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	91		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	67		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	105		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	84.2		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	98.7		60-140	%	18-OCT-17				
L2007635-13 BH17-203-0-2									
Sampled By: M. SHIRY on 11-OCT-17 @ 10:06									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	11.1		0.10	%	17-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-13 BH17-203-0-2									
Sampled By: M. SHIRY on 11-OCT-17 @ 10:06									
Matrix: SOIL									
Volatile Organic Compounds									
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.156		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	95.0		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	102.1		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-13	BH17-203-0-2									
Sampled By:	M. SHIRY on 11-OCT-17 @ 10:06									
Matrix:	SOIL						#1	#2	#3	#4
Hydrocarbons										
	Surrogate: 2-Bromobenzotrifluoride	62.6		60-140	%	20-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	91.1		60-140	%	18-OCT-17				
L2007635-14	BH17-203-6-8									
Sampled By:	M. SHIRY on 11-OCT-17 @ 10:42									
Matrix:	SOIL						#1	#2	#3	#4
Organic / Inorganic Carbon										
	Fraction Organic Carbon	0.0024		0.0010	No Unit	17-OCT-17				
	Fraction Organic Carbon	0.0025		0.0010	No Unit	17-OCT-17				
	Fraction Organic Carbon	0.0026		0.0010	No Unit	17-OCT-17				
	Average Fraction Organic Carbon	0.0025		0.0010	No Unit	17-OCT-17				
	Total Organic Carbon	0.24		0.10	%	17-OCT-17				
	Total Organic Carbon	0.25		0.10	%	17-OCT-17				
	Total Organic Carbon	0.26		0.10	%	17-OCT-17				
L2007635-15	MW17-108S-0-1									
Sampled By:	M. SHIRY on 11-OCT-17 @ 11:08									
Matrix:	SOIL						#1	#2	#3	#4
Organic / Inorganic Carbon										
	Fraction Organic Carbon	0.0291		0.0010	No Unit	17-OCT-17				
	Fraction Organic Carbon	0.0316		0.0010	No Unit	17-OCT-17				
	Fraction Organic Carbon	0.0324		0.0010	No Unit	17-OCT-17				
	Average Fraction Organic Carbon	0.0310		0.0010	No Unit	17-OCT-17				
	Total Organic Carbon	2.91		0.10	%	17-OCT-17				
	Total Organic Carbon	3.16		0.10	%	17-OCT-17				
	Total Organic Carbon	3.24		0.10	%	17-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-17 MW17-108S-2-4									
Sampled By: M. SHIRY on 11-OCT-17 @ 11:15									
Matrix: SOIL									
Physical Tests									
Conductivity	0.478		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.12		0.10	%	17-OCT-17				
pH	7.76		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.31		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	15.4		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	19.0		1.0	mg/L	19-OCT-17				
Sodium (Na)	7.8		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	5.9		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	12.3		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	28.7		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	15.3		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.34		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	41.4		0.50	ug/g	19-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	142000		50	ug/g	12-APR-21				
Chromium (Cr)	55.1		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	2.6		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	69.6		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	51100		50	ug/g	12-APR-21				
Lead (Pb)	197		1.0	ug/g	19-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	74700		20	ug/g	12-APR-21				
Mercury (Hg)	0.0893		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	2.2		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	10.3		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	41.1		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	24400	DLHC	800	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-17	MW17-108S-2-4									
Sampled By:	M. SHIRY on 11-OCT-17 @ 11:15									
Matrix:	SOIL						#1	#2	#3	#4
Semi-Volatile Organics										
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
	Benzo(ghi)perylene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
	Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
	4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
	Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
	Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
	2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
	Chrysene	0.081		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
	Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
	3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
	2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
	Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
	Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
	2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
	2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
	2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
	2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
	2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
	Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
	Fluoranthene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
	Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
	1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
	2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
	Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
	Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
	Phenanthrene	0.064		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
	Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
	Pyrene	<0.050		0.050	ug/g	24-OCT-17	96	96	78	78
	1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
	2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5
	2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	102.3		50-140	%	24-OCT-17				
	Surrogate: Nitrobenzene d5	90.2		50-140	%	24-OCT-17				
	Surrogate: Phenol d5	87.9		30-130	%	24-OCT-17				
	Surrogate: p-Terphenyl d14	91.3		50-140	%	24-OCT-17				
	Surrogate: 2,4,6-Tribromophenol	67.7		50-140	%	24-OCT-17				
L2007635-18	MW17-108S-8-9									
Sampled By:	M. SHIRY on 11-OCT-17 @ 12:04									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.352		0.0040	mS/cm	19-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	7.57		0.10	%	17-OCT-17				
	pH	7.39		0.10	pH units	17-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-18 MW17-108S-8-9									
Sampled By: M. SHIRY on 11-OCT-17 @ 12:04									
Matrix: SOIL									
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.18		0.10	SAR	19-OCT-17	12	12	5	5
Calcium (Ca)	9.5		1.0	mg/L	19-OCT-17				
Magnesium (Mg)	12.9		1.0	mg/L	19-OCT-17				
Sodium (Na)	3.6		1.0	mg/L	19-OCT-17				
Metals									
Antimony (Sb)	6.5		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	8.7		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	50.5		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	21.3		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.35		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	83.4		0.50	ug/g	19-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	83500		50	ug/g	12-APR-21				
Chromium (Cr)	26.2		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	4.5		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	364		1.0	ug/g	19-OCT-17	*230	*300	*140	*180
Iron (Fe)	67100		50	ug/g	12-APR-21				
Lead (Pb)	121		1.0	ug/g	19-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	40000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0108		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	10.5		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	56.4		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	67200	DLHC	800	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
L2007635-19 MW17-108S-9-9.5									
Sampled By: M. SHIRY on 11-OCT-17 @ 12:20									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	7.77		0.10	%	17-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-19	MW17-108S-9-9.5									
Sampled By:	M. SHIRY on 11-OCT-17 @ 12:20									
Matrix:	SOIL									
Volatile Organic Compounds										
	Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	1,4-Dioxane	<0.20		0.20	mg/kg	18-OCT-17	1.8	1.8	1.8	1.8
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.20	DLVH	0.20	ug/g	18-OCT-17	**0.05	**0.094	**0.05	**0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	105.4		50-140	%	18-OCT-17				
	Surrogate: 1,4-Difluorobenzene	104.1		50-140	%	18-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
	F2 (C10-C16)	345		10	ug/g	20-OCT-17	*230	*250	*98	*150
	F3a (C16-C22)	4080		25	ug/g	20-OCT-17				
	F3 (C16-C34)	14700		50	ug/g	20-OCT-17	*1700	*2500	*300	*1300

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-19	MW17-108S-9-9.5									
Sampled By:	M. SHIRY on 11-OCT-17 @ 12:20									
Matrix:	SOIL						#1	#2	#3	#4
Hydrocarbons										
	F3b (C22-C34)	10600		25	ug/g	20-OCT-17				
	F4 (C34-C50)	981		50	ug/g	20-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	16000		72	ug/g	23-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	87.0		60-140	%	20-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	48.9	SOL:MI	60-140	%	18-OCT-17				
L2007635-20	MW17-108S-10-10.5									
Sampled By:	M. SHIRY on 11-OCT-17 @ 12:32									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	7.38		0.10	%	17-OCT-17				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
	Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	1,4-Dioxane	<0.20		0.20	mg/kg	18-OCT-17	1.8	1.8	1.8	1.8
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-20 MW17-108S-10-10.5									
Sampled By: M. SHIRY on 11-OCT-17 @ 12:32									
Matrix: SOIL									
Volatile Organic Compounds									
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	104.7		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	103.1		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	24-OCT-17	55	65	55	65
F2 (C10-C16)	55		10	ug/g	20-OCT-17	230	250	98	150
F2-Naphth	55		10	ug/g	24-OCT-17				
F3a (C16-C22)	675		25	ug/g	20-OCT-17				
F3 (C16-C34)	2280		50	ug/g	20-OCT-17	*1700	2500	*300	*1300
F3b (C22-C34)	1610		25	ug/g	20-OCT-17				
F3-PAH	2280		50	ug/g	24-OCT-17				
F4 (C34-C50)	142		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	2480		72	ug/g	24-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	78.8		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	77.3		60-140	%	18-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	23-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	23-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	23-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	23-OCT-17	0.96	0.96	0.78	0.78
Chrysene	0.192		0.050	ug/g	23-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	23-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	23-OCT-17	9.6	9.6	0.69	0.69
Fluorene	0.052		0.050	ug/g	23-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	23-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	23-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	23-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	23-OCT-17	12	16	6.2	7.8
Pyrene	0.085		0.050	ug/g	23-OCT-17	96	96	78	78

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-20 MW17-108S-10-10.5 Sampled By: M. SHIRY on 11-OCT-17 @ 12:32 Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
Surrogate: 2-Fluorobiphenyl	95.4		50-140	%	23-OCT-17				
Surrogate: p-Terphenyl d14	108.6		50-140	%	23-OCT-17				
L2007635-21 DUP 6 Sampled By: M. SHIRY on 11-OCT-17 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.445		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
% Moisture	5.25		0.10	%	17-OCT-17				
pH	7.75		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.34		0.10	SAR	20-OCT-17	12	12	5	5
Calcium (Ca)	14.5		1.0	mg/L	20-OCT-17				
Magnesium (Mg)	18.1		1.0	mg/L	20-OCT-17				
Sodium (Na)	8.2		1.0	mg/L	20-OCT-17				
Metals									
Antimony (Sb)	6.6		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	10.6		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	33.2		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	15.3		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.35		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	38.3		0.50	ug/g	19-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	139000		50	ug/g	12-APR-21				
Chromium (Cr)	54.8		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	2.5		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	74.8		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	52400		50	ug/g	12-APR-21				
Lead (Pb)	233		1.0	ug/g	19-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	74200		20	ug/g	12-APR-21				
Mercury (Hg)	0.112		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.8		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	9.7		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	43.2		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	25300	DLHC	800	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-21 DUP 6									
Sampled By: M. SHIRY on 11-OCT-17									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.075		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	0.067		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.073		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	0.074		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.066		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
Chrysene	0.158		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
Fluoranthene	0.145		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.091		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	0.144		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
Pyrene	0.135		0.050	ug/g	24-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	83.8		50-140	%	24-OCT-17				
Surrogate: Nitrobenzene d5	90.5		50-140	%	24-OCT-17				
Surrogate: Phenol d5	87.5		30-130	%	24-OCT-17				
Surrogate: p-Terphenyl d14	86.6		50-140	%	24-OCT-17				
Surrogate: 2,4,6-Tribromophenol	70.5		50-140	%	24-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-22 MW17-107S-0.5-2									
Sampled By: M. SHIRY on 12-OCT-17 @ 09:40									
Matrix: SOIL									
Physical Tests									
Conductivity	0.172		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
% Moisture	11.8		0.10	%	17-OCT-17				
pH	7.80		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.11	SAR:DL	0.11	SAR	20-OCT-17	12	12	5	5
Calcium (Ca)	5.9		1.0	mg/L	20-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	20-OCT-17				
Sodium (Na)	<1.0		1.0	mg/L	20-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.8		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	20.3		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.18		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	33200		50	ug/g	12-APR-21				
Chromium (Cr)	6.9		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	3.2		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	8.9		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	15200		50	ug/g	12-APR-21				
Lead (Pb)	33.1		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	4490		20	ug/g	12-APR-21				
Mercury (Hg)	0.0061		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	7.0		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	13.9		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	53.4		5.0	ug/g	19-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<1.0	DLVH	1.0	ug/g	18-OCT-17	16	28	16	28
Benzene	0.0452		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-22 MW17-107S-0.5-2									
Sampled By: M. SHIRY on 12-OCT-17 @ 09:40									
Matrix: SOIL									
Volatile Organic Compounds									
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.43	DLVH	0.43	ug/g	18-OCT-17	1.6	2	**0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	0.053		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.861		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	0.211		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.121		0.020	ug/g	18-OCT-17				
m+p-Xylenes	0.133		0.030	ug/g	18-OCT-17				
Xylenes (Total)	0.254		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	101.4		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	101.7		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	11.4		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	10.8		5.0	ug/g	24-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	24-OCT-17				
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	30		25	ug/g	20-OCT-17				
F3-PAH	<50		50	ug/g	24-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-22 MW17-107S-0.5-2									
Sampled By: M. SHIRY on 12-OCT-17 @ 09:40									
Matrix: SOIL									
Hydrocarbons									
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	24-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	70.6		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	82.5		60-140	%	18-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	0.141		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.053		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.063		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
Chrysene	0.066		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
Fluoranthene	0.092		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	0.073		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.068		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	0.099		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
Pyrene	0.083		0.050	ug/g	24-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-22	MW17-107S-0.5-2									
Sampled By:	M. SHIRY on 12-OCT-17 @ 09:40									
Matrix:	SOIL									
Semi-Volatile Organics										
	Surrogate: 2-Fluorobiphenyl	89.6		50-140	%	24-OCT-17				
	Surrogate: Nitrobenzene d5	88.2		50-140	%	24-OCT-17				
	Surrogate: Phenol d5	86.4		30-130	%	24-OCT-17				
	Surrogate: p-Terphenyl d14	102.6		50-140	%	24-OCT-17				
	Surrogate: 2,4,6-Tribromophenol	61.9		50-140	%	24-OCT-17				
L2007635-23	MW17-107S-4.5-5.5									
Sampled By:	M. SHIRY on 12-OCT-17 @ 10:01									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.162		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	7.78		0.10	%	18-OCT-17				
	pH	8.86		0.10	pH units	17-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.29		0.10	SAR	20-OCT-17	12	12	5	5
	Calcium (Ca)	4.9		1.0	mg/L	20-OCT-17				
	Magnesium (Mg)	1.2		1.0	mg/L	20-OCT-17				
	Sodium (Na)	2.8		1.0	mg/L	20-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
	Arsenic (As)	2.4		1.0	ug/g	19-OCT-17	18	18	18	18
	Barium (Ba)	22.4		1.0	ug/g	19-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	6.3		5.0	ug/g	19-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.11		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	0.58		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	143000		50	ug/g	12-APR-21				
	Chromium (Cr)	11.3		1.0	ug/g	19-OCT-17	160	160	160	160
	Cobalt (Co)	4.7		1.0	ug/g	19-OCT-17	80	100	22	22
	Copper (Cu)	13.9		1.0	ug/g	19-OCT-17	230	300	140	180
	Iron (Fe)	14500		50	ug/g	12-APR-21				
	Lead (Pb)	75.1		1.0	ug/g	19-OCT-17	120	120	120	120
	Magnesium (Mg)	46300		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0235		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	11.6		1.0	ug/g	19-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
	Vanadium (V)	19.6		1.0	ug/g	19-OCT-17	86	86	86	86
	Zinc (Zn)	534		5.0	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-23 MW17-107S-4.5-5.5									
Sampled By: M. SHIRY on 12-OCT-17 @ 10:01									
Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	96.5		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	100.8		50-140	%	18-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-23 MW17-107S-4.5-5.5									
Sampled By: M. SHIRY on 12-OCT-17 @ 10:01									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	24-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	24-OCT-17				
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	<25		25	ug/g	20-OCT-17				
F3-PAH	<50		50	ug/g	24-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	24-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	61.3		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	84.4		60-140	%	18-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	24-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	24-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	24-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	24-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	24-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	24-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	24-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	24-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	24-OCT-17	3.1	3.9	1.6	2
Chrysene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	24-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	24-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	24-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	24-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	24-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	24-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	24-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	24-OCT-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	24-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	24-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	24-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	24-OCT-17	30	42	0.99	3.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-23 MW17-107S-4.5-5.5									
Sampled By: M. SHIRY on 12-OCT-17 @ 10:01									
Matrix: SOIL									
Semi-Volatile Organics									
Naphthalene	<0.050		0.050	ug/g	24-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	24-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	24-OCT-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	24-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	24-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	78.3		50-140	%	24-OCT-17				
Surrogate: Nitrobenzene d5	91.2		50-140	%	24-OCT-17				
Surrogate: Phenol d5	92.1		30-130	%	24-OCT-17				
Surrogate: p-Terphenyl d14	92.1		50-140	%	24-OCT-17				
Surrogate: 2,4,6-Tribromophenol	64.3		50-140	%	24-OCT-17				
L2007635-24 MW17-111S-0-1									
Sampled By: M. SHIRY on 12-OCT-17 @ 14:55									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	10.2		0.10	%	18-OCT-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1248	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1254	<0.010		0.010	ug/g	23-OCT-17				
Aroclor 1260	<0.010		0.010	ug/g	23-OCT-17				
Total PCBs	<0.020		0.020	ug/g	23-OCT-17	1.1	1.1	0.35	0.35
Surrogate: d14-Terphenyl	106.7		60-140	%	23-OCT-17				
L2007635-25 MW17-111S-0-2									
Sampled By: M. SHIRY on 12-OCT-17 @ 14:55									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.112		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
% Moisture	3.92		0.10	%	18-OCT-17				
pH	7.13		0.10	pH units	17-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.21	SAR:M	0.10	SAR	20-OCT-17	12	12	5	5
Calcium (Ca)	2.9		1.0	mg/L	20-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	20-OCT-17				
Sodium (Na)	1.3		1.0	mg/L	20-OCT-17				
Metals									
Antimony (Sb)	1.1		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	10.2		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	51.3		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-25 MW17-111S-0-2									
Sampled By: M. SHIRY on 12-OCT-17 @ 14:55									
Matrix: SOIL									
Metals									
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	6.7		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.30		0.10	ug/g	19-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	5410		50	ug/g	12-APR-21				
Chromium (Cr)	27.9		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	7.4		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	26.5		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	53000		50	ug/g	12-APR-21				
Lead (Pb)	34.9		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	3080		20	ug/g	12-APR-21				
Mercury (Hg)	0.0102		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.5		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	18.4		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	41.3		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	85.5		5.0	ug/g	19-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	0.21		0.20	ug/g	18-OCT-17	8	10	8	10
L2007635-26 MW17-111S-2-4									
Sampled By: M. SHIRY on 12-OCT-17 @ 15:09									
Matrix: SOIL									
Physical Tests									
% Moisture	8.38		0.10	%	18-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-26	MW17-111S-2-4									
Sampled By:	M. SHIRY on 12-OCT-17 @ 15:09									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	95.1		50-140	%	18-OCT-17				
	Surrogate: 1,4-Difluorobenzene	100.8		50-140	%	18-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
	F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
	F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	26		25	ug/g	20-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	74.7		60-140	%	20-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	82.1		60-140	%	18-OCT-17				
L2007635-27	MW17-111S-6-7									
Sampled By:	M. SHIRY on 12-OCT-17 @ 15:35									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	7.00		0.10	%	18-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-27 MW17-111S-6-7									
Sampled By: M. SHIRY on 12-OCT-17 @ 15:35									
Matrix: SOIL									
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	98.3		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	103.8		50-140	%	18-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-28	MW17-100S-1-1.5									
Sampled By:	M. SHIRY on 12-OCT-17 @ 11:33									
Matrix:	SOIL									
Physical Tests										
	Conductivity	0.343		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	11.3		0.10	%	18-OCT-17				
	pH	9.45		0.10	pH units	18-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.28		0.10	SAR	20-OCT-17	12	12	5	5
	Calcium (Ca)	32.6		1.0	mg/L	20-OCT-17				
	Magnesium (Mg)	1.5		1.0	mg/L	20-OCT-17				
	Sodium (Na)	6.0		1.0	mg/L	20-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
	Arsenic (As)	3.3		1.0	ug/g	19-OCT-17	18	18	18	18
	Barium (Ba)	33.6		1.0	ug/g	19-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	6.4		5.0	ug/g	19-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.20		0.10	ug/g	20-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	23300		50	ug/g	12-APR-21				
	Chromium (Cr)	18.1		1.0	ug/g	19-OCT-17	160	160	160	160
	Cobalt (Co)	3.6		1.0	ug/g	19-OCT-17	80	100	22	22
	Copper (Cu)	15.6		1.0	ug/g	19-OCT-17	230	300	140	180
	Iron (Fe)	34000		50	ug/g	12-APR-21				
	Lead (Pb)	20.4		1.0	ug/g	19-OCT-17	120	120	120	120
	Magnesium (Mg)	6030		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0066		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	7.7		1.0	ug/g	19-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
	Vanadium (V)	39.9		1.0	ug/g	19-OCT-17	86	86	86	86
	Zinc (Zn)	42.7		5.0	ug/g	19-OCT-17	340	340	340	340
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
Volatile Organic Compounds										
	Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
	Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
	Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
	o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	102.7		50-140	%	18-OCT-17				
	Surrogate: 1,4-Difluorobenzene	100.6		50-140	%	18-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2007635-28	MW17-100S-1-1.5									
Sampled By:	M. SHIRY on 12-OCT-17 @ 11:33									
Matrix:	SOIL						#1	#2	#3	#4
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	24-OCT-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	24-OCT-17	230	250	98	150
	F3a (C16-C22)	<25		25	ug/g	24-OCT-17				
	F3 (C16-C34)	<50		50	ug/g	24-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	<25		25	ug/g	24-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	24-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	24-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	24-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	92.1		60-140	%	24-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	106.2		60-140	%	18-OCT-17				
L2007635-29	MW17-100S-4.5-6									
Sampled By:	M. SHIRY on 12-OCT-17 @ 12:14									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.157		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	3.42		0.10	%	18-OCT-17				
	pH	8.21		0.10	pH units	18-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	19-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.49		0.10	SAR	20-OCT-17	12	12	5	5
	Calcium (Ca)	3.2		1.0	mg/L	20-OCT-17				
	Magnesium (Mg)	1.4		1.0	mg/L	20-OCT-17				
	Sodium (Na)	4.2		1.0	mg/L	20-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
	Arsenic (As)	2.1		1.0	ug/g	19-OCT-17	18	18	18	18
	Barium (Ba)	35.7		1.0	ug/g	19-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	5.3		5.0	ug/g	19-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	20-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	0.88		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	119000		50	ug/g	12-APR-21				
	Chromium (Cr)	53.6		1.0	ug/g	19-OCT-17	160	160	160	160
	Cobalt (Co)	9.0		1.0	ug/g	19-OCT-17	80	100	22	22
	Copper (Cu)	47.3		1.0	ug/g	19-OCT-17	230	300	140	180
	Iron (Fe)	46100		50	ug/g	12-APR-21				
	Lead (Pb)	116		1.0	ug/g	19-OCT-17	120	120	120	120
	Magnesium (Mg)	59400		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0191		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	<1.0		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	21.9		1.0	ug/g	19-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-29 MW17-100S-4.5-6									
Sampled By: M. SHIRY on 12-OCT-17 @ 12:14									
Matrix: SOIL									
Metals									
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	100		1.0	ug/g	19-OCT-17	*86	*86	*86	*86
Zinc (Zn)	724		5.0	ug/g	19-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	0.32		0.20	ug/g	18-OCT-17	8	10	8	10
L2007635-30 MW17-100S-6-7									
Sampled By: M. SHIRY on 12-OCT-17 @ 12:25									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	4.27		0.10	%	18-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-30 MW17-100S-6-7									
Sampled By: M. SHIRY on 12-OCT-17 @ 12:25									
Matrix: SOIL									
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	104.2		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	107.0		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	20-OCT-17				
F3 (C16-C34)	<50		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	32		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	85.5		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	95.6		60-140	%	18-OCT-17				
L2007635-31 DUP 7									
Sampled By: M. SHIRY on 12-OCT-17									
Matrix: SOIL									
Physical Tests									
% Moisture	11.6		0.10	%	18-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28
Benzene	0.0109		0.0068	ug/g	19-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-31 DUP 7									
Sampled By: M. SHIRY on 12-OCT-17									
Matrix: SOIL									
Volatile Organic Compounds									
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	19-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.064		0.020	ug/g	18-OCT-17				
m+p-Xylenes	0.075		0.030	ug/g	18-OCT-17				
Xylenes (Total)	0.139		0.050	ug/g	19-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	101.2		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	104.7		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	23-OCT-17	55	65	55	65
F2 (C10-C16)	11		10	ug/g	20-OCT-17	230	250	98	150
F3a (C16-C22)	25		25	ug/g	20-OCT-17				
F3 (C16-C34)	63		50	ug/g	20-OCT-17	1700	2500	300	1300
F3b (C22-C34)	38		25	ug/g	20-OCT-17				
F4 (C34-C50)	<50		50	ug/g	20-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	74		72	ug/g	23-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	20-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	63.2		60-140	%	20-OCT-17				
Surrogate: 3,4-Dichlorotoluene	90.1		60-140	%	18-OCT-17				
L2007635-32 DUP 8									
Sampled By: M. SHIRY on 12-OCT-17									
Matrix: SOIL						#1	#2	#3	#4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-32 DUP 8									
Sampled By: M. SHIRY on 12-OCT-17									
Matrix: SOIL									
Physical Tests									
Conductivity	0.108		0.0040	mS/cm	20-OCT-17	1.4	1.4	0.7	0.7
% Moisture	4.26		0.10	%	18-OCT-17				
pH	7.05		0.10	pH units	18-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	20-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.22	SAR:M	0.10	SAR	20-OCT-17	12	12	5	5
Calcium (Ca)	2.5		1.0	mg/L	20-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	20-OCT-17				
Sodium (Na)	1.3		1.0	mg/L	20-OCT-17				
Metals									
Antimony (Sb)	1.3		1.0	ug/g	19-OCT-17	40	50	7.5	7.5
Arsenic (As)	10.9		1.0	ug/g	19-OCT-17	18	18	18	18
Barium (Ba)	50.8		1.0	ug/g	19-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	19-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	5.9		5.0	ug/g	19-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.30		0.10	ug/g	20-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	19-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	5120		50	ug/g	12-APR-21				
Chromium (Cr)	30.2		1.0	ug/g	19-OCT-17	160	160	160	160
Cobalt (Co)	7.6		1.0	ug/g	19-OCT-17	80	100	22	22
Copper (Cu)	27.7		1.0	ug/g	19-OCT-17	230	300	140	180
Iron (Fe)	55100		50	ug/g	12-APR-21				
Lead (Pb)	31.5		1.0	ug/g	19-OCT-17	120	120	120	120
Magnesium (Mg)	2960		20	ug/g	12-APR-21				
Mercury (Hg)	0.0092		0.0050	ug/g	19-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.4		1.0	ug/g	19-OCT-17	40	40	6.9	6.9
Nickel (Ni)	19.4		1.0	ug/g	19-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	19-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	19-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	19-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	19-OCT-17	33	33	23	23
Vanadium (V)	43.6		1.0	ug/g	19-OCT-17	86	86	86	86
Zinc (Zn)	79.1		5.0	ug/g	19-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	18-OCT-17	8	10	8	10
L2007635-33 TRIP BLANK D1									
Sampled By: M. SHIRY on 16-OCT-17									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	<0.10		0.10	%	18-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	18-OCT-17	16	28	16	28

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2007635-33 TRIP BLANK D1									
Sampled By: M. SHIRY on 16-OCT-17									
Matrix: SOIL									
Volatile Organic Compounds									
Benzene	<0.0068		0.0068	ug/g	18-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	18-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	18-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	18-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	18-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	18-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	18-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	18-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	18-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	18-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	18-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	18-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	18-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	18-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	18-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	18-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	18-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	18-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	18-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	18-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	18-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	18-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	18-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	18-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	18-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	18-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	18-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	18-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	111.7		50-140	%	18-OCT-17				
Surrogate: 1,4-Difluorobenzene	116.3		50-140	%	18-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	18-OCT-17	55	65	55	65
Surrogate: 3,4-Dichlorotoluene	90.3		60-140	%	18-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
1,4-DIOXANE-WT	Soil	1,4-Dioxane by GCMS Headspace	EPA 8260

An aliquot of soil/sediment is extract with methanol, and this extract is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution. Results are reported on a dry weight basis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

TOC-R511-WT	Soil	TOC & FOC-O.Reg 153/04 (July 2011)	CARTER 21.3.2

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-616670 17-616671 17-616673

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Reference Information

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Soil**							
Batch R3858453								
WG2641040-4 DUP		**WG2641040-3**						
1,4-Dioxane		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	18-OCT-17
WG2641040-2 LCS								
1,4-Dioxane			106.4		%		60-140	18-OCT-17
WG2641040-1 MB								
1,4-Dioxane			<0.20		mg/kg		0.2	18-OCT-17
WG2641040-5 MS		**WG2641040-3**						
1,4-Dioxane			101.0		%		60-140	18-OCT-17
625-511-WT	**Soil**							
Batch R3864428								
WG2643231-4 DUP		**WG2643231-3**						
1-Methylnaphthalene		<6.0	<6.0	RPD-NA	ug/g	N/A	40	24-OCT-17
1,2,4-Trichlorobenzene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-OCT-17
2-Chlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
2-Methylnaphthalene		<6.0	<6.0	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4-Dichlorophenol		<0.19	<0.19	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4-Dimethylphenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4-Dinitrophenol		<2.0	<2.0	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4-Dinitrotoluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4,5-Trichlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
2,4,6-Trichlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
2,6-Dinitrotoluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
3,3'-Dichlorobenzidine		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
4-Chloroaniline		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
Acenaphthene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Acenaphthylene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-OCT-17
Anthracene		<0.30	<0.30	RPD-NA	ug/g	N/A	40	24-OCT-17
Benzo(a)anthracene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
Benzo(a)pyrene		0.37	0.33		ug/g	11	40	24-OCT-17
Benzo(b)fluoranthene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
Benzo(ghi)perylene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Benzo(k)fluoranthene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
Biphenyl		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-OCT-17
Bis(2-chloroethyl)ether		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
Bis(2-chloroisopropyl)ether		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3864428								
WG2643231-4 DUP		**WG2643231-3**						
Bis(2-ethylhexyl)phthalate		<10	<10	RPD-NA	ug/g	N/A	40	24-OCT-17
Chrysene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Dibenzo(a,h)anthracene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	24-OCT-17
Diethylphthalate		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
Dimethylphthalate		<0.20	<0.20	RPD-NA	ug/g	N/A	40	24-OCT-17
Fluoranthene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Fluorene		<10	<10	RPD-NA	ug/g	N/A	40	24-OCT-17
Indeno(1,2,3-cd)pyrene		0.26	<0.25	RPD-NA	ug/g	N/A	40	24-OCT-17
Naphthalene		<2.5	<2.5	RPD-NA	ug/g	N/A	40	24-OCT-17
Pentachlorophenol		<0.80	<0.80	RPD-NA	ug/g	N/A	40	24-OCT-17
Phenanthrene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Phenol		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
Pyrene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	24-OCT-17
WG2643231-2 LCS								
1-Methylnaphthalene			100.5		%		50-140	24-OCT-17
1,2,4-Trichlorobenzene			87.2		%		50-140	24-OCT-17
2-Chlorophenol			96.6		%		50-140	24-OCT-17
2-Methylnaphthalene			85.6		%		50-140	24-OCT-17
2,4-Dichlorophenol			99.2		%		50-140	24-OCT-17
2,4-Dimethylphenol			94.8		%		30-130	24-OCT-17
2,4-Dinitrophenol			68.8		%		30-130	24-OCT-17
2,4-Dinitrotoluene			105.5		%		50-140	24-OCT-17
2,4,5-Trichlorophenol			82.2		%		50-140	24-OCT-17
2,4,6-Trichlorophenol			80.5		%		50-140	24-OCT-17
2,6-Dinitrotoluene			76.5		%		50-140	24-OCT-17
3,3'-Dichlorobenzidine			71.2		%		30-130	24-OCT-17
4-Chloroaniline			96.6		%		30-130	24-OCT-17
Acenaphthene			73.1		%		50-140	24-OCT-17
Acenaphthylene			79.2		%		50-140	24-OCT-17
Anthracene			90.7		%		50-140	24-OCT-17
Benzo(a)anthracene			92.6		%		50-140	24-OCT-17
Benzo(a)pyrene			90.0		%		50-140	24-OCT-17
Benzo(b)fluoranthene			98.0		%		50-140	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3864428								
WG2643231-2 LCS								
Benzo(ghi)perylene			71.3		%		50-140	24-OCT-17
Benzo(k)fluoranthene			102.4		%		50-140	24-OCT-17
Biphenyl			81.5		%		50-140	24-OCT-17
Bis(2-chloroethyl)ether			91.5		%		50-140	24-OCT-17
Bis(2-chloroisopropyl)ether			88.3		%		50-140	24-OCT-17
Bis(2-ethylhexyl)phthalate			81.8		%		50-140	24-OCT-17
Chrysene			94.6		%		50-140	24-OCT-17
Dibenzo(a,h)anthracene			68.1		%		50-140	24-OCT-17
Diethylphthalate			98.2		%		50-140	24-OCT-17
Dimethylphthalate			72.9		%		50-140	24-OCT-17
Fluoranthene			79.5		%		50-140	24-OCT-17
Fluorene			102.4		%		50-140	24-OCT-17
Indeno(1,2,3-cd)pyrene			74.9		%		50-140	24-OCT-17
Naphthalene			87.1		%		50-140	24-OCT-17
Pentachlorophenol			93.9		%		50-140	24-OCT-17
Phenanthrene			89.1		%		50-140	24-OCT-17
Phenol			97.3		%		30-130	24-OCT-17
Pyrene			82.6		%		50-140	24-OCT-17
WG2643231-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	24-OCT-17
1,2,4-Trichlorobenzene			<0.050		ug/g		0.05	24-OCT-17
2-Chlorophenol			<0.10		ug/g		0.1	24-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	24-OCT-17
2,4-Dichlorophenol			<0.10		ug/g		0.1	24-OCT-17
2,4-Dimethylphenol			<0.10		ug/g		0.1	24-OCT-17
2,4-Dinitrophenol			<1.0		ug/g		1	24-OCT-17
2,4-Dinitrotoluene			<0.10		ug/g		0.1	24-OCT-17
2,4,5-Trichlorophenol			<0.10		ug/g		0.1	24-OCT-17
2,4,6-Trichlorophenol			<0.10		ug/g		0.1	24-OCT-17
2,6-Dinitrotoluene			<0.10		ug/g		0.1	24-OCT-17
3,3'-Dichlorobenzidine			<0.10		ug/g		0.1	24-OCT-17
4-Chloroaniline			<0.10		ug/g		0.1	24-OCT-17
Acenaphthene			<0.050		ug/g		0.05	24-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3864428								
WG2643231-1 MB								
Anthracene			<0.050		ug/g		0.05	24-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	24-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	24-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	24-OCT-17
Benzo(ghi)perylene			<0.050		ug/g		0.05	24-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	24-OCT-17
Biphenyl			<0.050		ug/g		0.05	24-OCT-17
Bis(2-chloroethyl)ether			<0.10		ug/g		0.1	24-OCT-17
Bis(2-chloroisopropyl)ether			<0.10		ug/g		0.1	24-OCT-17
Bis(2-ethylhexyl)phthalate			<0.10		ug/g		0.1	24-OCT-17
Chrysene			<0.050		ug/g		0.05	24-OCT-17
Dibenzo(a,h)anthracene			<0.050		ug/g		0.05	24-OCT-17
Diethylphthalate			<0.10		ug/g		0.1	24-OCT-17
Dimethylphthalate			<0.10		ug/g		0.1	24-OCT-17
Fluoranthene			<0.050		ug/g		0.05	24-OCT-17
Fluorene			<0.050		ug/g		0.05	24-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	24-OCT-17
Naphthalene			<0.050		ug/g		0.05	24-OCT-17
Pentachlorophenol			<0.10		ug/g		0.1	24-OCT-17
Phenanthrene			<0.050		ug/g		0.05	24-OCT-17
Phenol			<0.10		ug/g		0.1	24-OCT-17
Pyrene			<0.050		ug/g		0.05	24-OCT-17
Surrogate: 2-Fluorobiphenyl			70.2		%		50-140	24-OCT-17
Surrogate: 2,4,6-Tribromophenol			68.3		%		50-140	24-OCT-17
Surrogate: Nitrobenzene d5			82.0		%		50-140	24-OCT-17
Surrogate: p-Terphenyl d14			102.5		%		50-140	24-OCT-17
Surrogate: Phenol d5			83.3		%		30-130	24-OCT-17
WG2643231-5 MS		**WG2643231-3**						
1-Methylnaphthalene			110.7		%		50-140	24-OCT-17
1,2,4-Trichlorobenzene			91.8		%		50-140	24-OCT-17
2-Chlorophenol			97.8		%		50-140	24-OCT-17
2-Methylnaphthalene			87.0		%		50-140	24-OCT-17
2,4-Dichlorophenol			91.8		%		50-140	24-OCT-17
2,4-Dimethylphenol			107.6		%		30-150	24-OCT-17

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3864428								
WG2643231-5 MS		**WG2643231-3**						
2,4-Dinitrophenol			58.6		%		30-150	24-OCT-17
2,4-Dinitrotoluene			76.7		%		50-140	24-OCT-17
2,4,5-Trichlorophenol			99.8		%		50-140	24-OCT-17
2,4,6-Trichlorophenol			96.4		%		50-140	24-OCT-17
2,6-Dinitrotoluene			81.0		%		50-140	24-OCT-17
3,3'-Dichlorobenzidine			82.7		%		30-130	24-OCT-17
4-Chloroaniline			90.3		%		30-130	24-OCT-17
Acenaphthene			77.4		%		50-140	24-OCT-17
Acenaphthylene			85.2		%		50-140	24-OCT-17
Anthracene			99.4		%		50-140	24-OCT-17
Benzo(a)anthracene			101.5		%		50-140	24-OCT-17
Benzo(a)pyrene			97.7		%		50-140	24-OCT-17
Benzo(b)fluoranthene			104.0		%		50-140	24-OCT-17
Benzo(ghi)perylene			107.5		%		50-140	24-OCT-17
Benzo(k)fluoranthene			108.7		%		50-140	24-OCT-17
Biphenyl			101.6		%		50-140	24-OCT-17
Bis(2-chloroethyl)ether			93.9		%		50-140	24-OCT-17
Bis(2-chloroisopropyl)ether			98.1		%		50-140	24-OCT-17
Bis(2-ethylhexyl)phthalate			87.0		%		50-140	24-OCT-17
Chrysene			100.3		%		50-140	24-OCT-17
Dibenzo(a,h)anthracene			100.1		%		50-140	24-OCT-17
Diethylphthalate			73.2		%		50-140	24-OCT-17
Dimethylphthalate			75.5		%		50-140	24-OCT-17
Fluoranthene			90.7		%		50-140	24-OCT-17
Fluorene			79.1		%		50-140	24-OCT-17
Indeno(1,2,3-cd)pyrene			113.0		%		50-140	24-OCT-17
Naphthalene			95.9		%		50-140	24-OCT-17
Pentachlorophenol			84.4		%		50-140	24-OCT-17
Phenanthrene			104.9		%		50-140	24-OCT-17
Phenol			107.0		%		30-130	24-OCT-17
Pyrene			91.3		%		50-140	24-OCT-17
B-HWS-R511-WT	**Soil**							

Quality Control Report

Workorder: L2007635 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R3859800								
WG2643175-4 DUP		**L2007390-2**						
Boron (B), Hot Water Ext.		0.11	0.12		ug/g	6.4	30	19-OCT-17
WG2643175-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			87.8		%		70-130	19-OCT-17
WG2643175-3 LCS								
Boron (B), Hot Water Ext.			105.6		%		70-130	19-OCT-17
WG2643175-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	19-OCT-17
Batch R3860400								
WG2644307-4 DUP		**L2008585-2**						
Boron (B), Hot Water Ext.		0.13	0.14		ug/g	4.8	30	20-OCT-17
WG2644307-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			73.4		%		70-130	20-OCT-17
WG2644307-3 LCS								
Boron (B), Hot Water Ext.			107.3		%		70-130	20-OCT-17
WG2644307-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	20-OCT-17
BTX-511-HS-WT	**Soil**							
Batch R3858311								
WG2641096-4 DUP		**WG2641096-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	18-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	18-OCT-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	18-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	18-OCT-17
WG2641096-2 LCS								
Benzene			101.7		%		70-130	18-OCT-17
Ethylbenzene			97.5		%		70-130	18-OCT-17
m+p-Xylenes			100.7		%		70-130	18-OCT-17
o-Xylene			101.7		%		70-130	18-OCT-17
Toluene			98.7		%		70-130	18-OCT-17
WG2641096-1 MB								
Benzene			<0.0068		ug/g		0.0068	18-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	18-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	18-OCT-17
o-Xylene			<0.020		ug/g		0.02	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R3858311								
WG2641096-1 MB								
Toluene			<0.080		ug/g		0.08	18-OCT-17
Surrogate: 1,4-Difluorobenzene			98.6		%		50-140	18-OCT-17
Surrogate: 4-Bromofluorobenzene			95.7		%		50-140	18-OCT-17
WG2641096-5 MS		**WG2641096-3**						
Benzene			107.6		%		60-140	18-OCT-17
Ethylbenzene			108.1		%		60-140	18-OCT-17
m+p-Xylenes			105.6		%		60-140	18-OCT-17
o-Xylene			111.5		%		60-140	18-OCT-17
Toluene			105.8		%		60-140	18-OCT-17
CN-WAD-R511-WT	**Soil**							
Batch R3860732								
WG2642496-3 DUP		**L2007635-32**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	20-OCT-17
WG2642496-2 LCS								
Cyanide, Weak Acid Diss			91.3		%		80-120	20-OCT-17
WG2642496-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	20-OCT-17
WG2642496-4 MS		**L2007635-32**						
Cyanide, Weak Acid Diss			99.9		%		70-130	20-OCT-17
Batch R3863185								
WG2641087-3 DUP		**L2007170-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	19-OCT-17
WG2641087-2 LCS								
Cyanide, Weak Acid Diss			88.0		%		80-120	19-OCT-17
WG2641087-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	19-OCT-17
WG2641087-4 MS		**L2007170-1**						
Cyanide, Weak Acid Diss			100.0		%		70-130	19-OCT-17
CR-CR6-IC-WT	**Soil**							
Batch R3858341								
WG2641224-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			97.2		%		70-130	18-OCT-17
WG2641224-4 DUP		**L2007733-1**						
Chromium, Hexavalent		0.31	0.25		ug/g	19	35	18-OCT-17
WG2641224-2 LCS								
Chromium, Hexavalent			92.8		%		80-120	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	**Soil**							
Batch R3858341								
WG2641224-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	18-OCT-17
EC-WT	**Soil**							
Batch R3859522								
WG2643169-4 DUP		**WG2643169-3**						
Conductivity		0.267	0.261		mS/cm	2.3	20	19-OCT-17
WG2643497-1 LCS								
Conductivity			99.9		%		90-110	19-OCT-17
WG2643169-1 MB								
Conductivity			<0.0040		mS/cm		0.004	19-OCT-17
Batch R3860460								
WG2644313-4 DUP		**WG2644313-3**						
Conductivity		0.0972	0.0981		mS/cm	0.9	20	20-OCT-17
WG2644591-1 LCS								
Conductivity			100.4		%		90-110	20-OCT-17
WG2644313-1 MB								
Conductivity			<0.0040		mS/cm		0.004	20-OCT-17
F1-HS-511-WT	**Soil**							
Batch R3858311								
WG2641096-4 DUP		**WG2641096-3**						
F1 (C6-C10)		5.1	<5.0	RPD-NA	ug/g	N/A	30	18-OCT-17
WG2641096-2 LCS								
F1 (C6-C10)			94.6		%		80-120	18-OCT-17
WG2641096-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	18-OCT-17
Surrogate: 3,4-Dichlorotoluene			107.9		%		60-140	18-OCT-17
WG2641096-7 MS		**WG2641096-6**						
F1 (C6-C10)			99.0		%		60-140	18-OCT-17
Batch R3858369								
WG2641128-4 DUP		**WG2641128-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	18-OCT-17
WG2641128-2 LCS								
F1 (C6-C10)			100.5		%		80-120	18-OCT-17
WG2641128-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	18-OCT-17
Surrogate: 3,4-Dichlorotoluene			95.0		%		60-140	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R3858369								
WG2641128-7 MS		**WG2641128-6**						
F1 (C6-C10)			94.4		%		60-140	18-OCT-17
Batch R3858453								
WG2641040-4 DUP		**WG2641040-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	18-OCT-17
WG2641040-2 LCS								
F1 (C6-C10)			96.9		%		80-120	18-OCT-17
WG2641040-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	18-OCT-17
Surrogate: 3,4-Dichlorotoluene			103.6		%		60-140	18-OCT-17
WG2641040-7 MS		**WG2641040-6**						
F1 (C6-C10)			80.8		%		60-140	18-OCT-17
F2-F4-UW-WT	**Soil**							
Batch R3862841								
WG2641627-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			104.5		%		70-130	20-OCT-17
F3 (C16-C34)			106.2		%		70-130	20-OCT-17
F4 (C34-C50)			107.4		%		70-130	20-OCT-17
WG2641627-3 DUP		**WG2641627-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	23-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	23-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	23-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	23-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	23-OCT-17
COMMENTS: Surrogate recovery marginally exceeded ALS DQO. Reported non-detect results for associated samples were deemed to be unaffected.								
WG2641627-2 LCS								
F2 (C10-C16)			110.7		%		70-130	20-OCT-17
F3a (C16-C22)			107.2		%		70-130	20-OCT-17
F3b (C22-C34)			109.3		%		70-130	20-OCT-17
F3 (C16-C34)			108.2		%		70-130	20-OCT-17
F4 (C34-C50)			110.8		%		70-130	20-OCT-17
WG2641627-1 MB								
F2 (C10-C16)			<10		ug/g		10	20-OCT-17
F3a (C16-C22)			<25		ug/g		25	20-OCT-17
F3b (C22-C34)			<25		ug/g		25	20-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3862841								
WG2641627-1 MB								
F3 (C16-C34)			<50		ug/g		50	20-OCT-17
F4 (C34-C50)			<50		ug/g		50	20-OCT-17
Surrogate: 2-Bromobenzotrifluoride			55.5	MBS	%		60-140	20-OCT-17
Batch R3864167								
WG2645864-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			107.9		%		70-130	24-OCT-17
F3 (C16-C34)			110.1		%		70-130	24-OCT-17
F4 (C34-C50)			115.0		%		70-130	24-OCT-17
WG2645864-3 DUP		**WG2645864-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	24-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
WG2645864-2 LCS								
F2 (C10-C16)			104.8		%		70-130	24-OCT-17
F3a (C16-C22)			104.0		%		70-130	24-OCT-17
F3b (C22-C34)			105.7		%		70-130	24-OCT-17
F3 (C16-C34)			104.9		%		70-130	24-OCT-17
F4 (C34-C50)			106.0		%		70-130	24-OCT-17
WG2645864-1 MB								
F2 (C10-C16)			<10		ug/g		10	24-OCT-17
F3a (C16-C22)			<25		ug/g		25	24-OCT-17
F3b (C22-C34)			<25		ug/g		25	24-OCT-17
F3 (C16-C34)			<50		ug/g		50	24-OCT-17
F4 (C34-C50)			<50		ug/g		50	24-OCT-17
Surrogate: 2-Bromobenzotrifluoride			95.0		%		60-140	24-OCT-17
HG-200.2-CVAA-WT	**Soil**							
Batch R3859655								
WG2643153-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			104.2		%		70-130	19-OCT-17
WG2643153-6 DUP		**WG2643153-5**						
Mercury (Hg)		0.0309	0.0315		ug/g	2.1	40	19-OCT-17
WG2643153-3 LCS								
Mercury (Hg)			105.5		%		80-120	19-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R3859655								
WG2643153-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	19-OCT-17
MET-200.2-CCMS-WT	**Soil**							
Batch R3860352								
WG2643153-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			87.7		%		70-130	19-OCT-17
Arsenic (As)			95.2		%		70-130	19-OCT-17
Barium (Ba)			101.1		%		70-130	19-OCT-17
Beryllium (Be)			88.1		%		70-130	19-OCT-17
Bismuth (Bi)			84.5		%		70-130	19-OCT-17
Boron (B)			3.0		mg/kg		0-8.2	19-OCT-17
Cadmium (Cd)			96.3		%		70-130	19-OCT-17
Calcium (Ca)			94.2		%		70-130	19-OCT-17
Chromium (Cr)			97.0		%		70-130	19-OCT-17
Cobalt (Co)			95.7		%		70-130	19-OCT-17
Copper (Cu)			97.0		%		70-130	19-OCT-17
Iron (Fe)			97.9		%		70-130	19-OCT-17
Lead (Pb)			87.2		%		70-130	19-OCT-17
Magnesium (Mg)			99.0		%		70-130	19-OCT-17
Molybdenum (Mo)			91.5		%		70-130	19-OCT-17
Nickel (Ni)			96.3		%		70-130	19-OCT-17
Selenium (Se)			0.34		mg/kg		0.11-0.51	19-OCT-17
Silver (Ag)			0.21		mg/kg		0.13-0.33	19-OCT-17
Thallium (Tl)			0.107		mg/kg		0.077-0.18	19-OCT-17
Uranium (U)			80.4		%		70-130	19-OCT-17
Vanadium (V)			97.1		%		70-130	19-OCT-17
Zinc (Zn)			92.5		%		70-130	19-OCT-17
WG2643153-6 DUP		**WG2643153-5**						
Antimony (Sb)		0.15	0.16		ug/g	6.0	30	19-OCT-17
Arsenic (As)		9.34	10.1		ug/g	7.8	30	19-OCT-17
Barium (Ba)		17.9	20.1		ug/g	11	40	19-OCT-17
Beryllium (Be)		0.21	0.25		ug/g	17	30	19-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	19-OCT-17
Boron (B)		6.7	7.3		ug/g	9.1	30	19-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3860352								
WG2643153-6 DUP		**WG2643153-5**						
Cadmium (Cd)		1.29	1.40		ug/g	8.2	30	19-OCT-17
Calcium (Ca)		156000	164000		ug/g	4.9	30	19-OCT-17
Chromium (Cr)		7.95	9.31		ug/g	16	30	19-OCT-17
Cobalt (Co)		3.82	4.24		ug/g	11	30	19-OCT-17
Copper (Cu)		23.5	26.7		ug/g	12	30	19-OCT-17
Iron (Fe)		16000	17500		ug/g	9.1	30	19-OCT-17
Lead (Pb)		95.6	101		ug/g	5.9	40	19-OCT-17
Magnesium (Mg)		63600	66100		ug/g	3.8	30	19-OCT-17
Molybdenum (Mo)		0.74	0.87		ug/g	16	40	19-OCT-17
Nickel (Ni)		10.3	11.2		ug/g	8.7	30	19-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	19-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	19-OCT-17
Thallium (Tl)		0.079	0.090		ug/g	13	30	19-OCT-17
Uranium (U)		0.463	0.472		ug/g	1.8	30	19-OCT-17
Vanadium (V)		17.9	20.3		ug/g	13	30	19-OCT-17
Zinc (Zn)		548	608		ug/g	10	30	19-OCT-17
WG2643153-4 LCS								
Antimony (Sb)			106.9		%		80-120	19-OCT-17
Arsenic (As)			105.8		%		80-120	19-OCT-17
Barium (Ba)			109.4		%		80-120	19-OCT-17
Beryllium (Be)			94.4		%		80-120	19-OCT-17
Bismuth (Bi)			101.1		%		80-120	19-OCT-17
Boron (B)			84.9		%		80-120	19-OCT-17
Cadmium (Cd)			104.0		%		80-120	19-OCT-17
Calcium (Ca)			101.6		%		80-120	19-OCT-17
Chromium (Cr)			107.0		%		80-120	19-OCT-17
Cobalt (Co)			106.3		%		80-120	19-OCT-17
Copper (Cu)			102.8		%		80-120	19-OCT-17
Iron (Fe)			104.3		%		80-120	19-OCT-17
Lead (Pb)			101.7		%		80-120	19-OCT-17
Magnesium (Mg)			110.0		%		80-120	19-OCT-17
Molybdenum (Mo)			102.4		%		80-120	19-OCT-17
Nickel (Ni)			104.0		%		80-120	19-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3860352								
WG2643153-4 LCS								
Selenium (Se)			107.9		%		80-120	19-OCT-17
Silver (Ag)			97.7		%		80-120	19-OCT-17
Thallium (Tl)			101.4		%		80-120	19-OCT-17
Uranium (U)			90.4		%		80-120	19-OCT-17
Vanadium (V)			109.9		%		80-120	19-OCT-17
Zinc (Zn)			99.5		%		80-120	19-OCT-17
WG2643153-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	19-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	19-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	19-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	19-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	19-OCT-17
Boron (B)			<5.0		mg/kg		5	19-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	19-OCT-17
Calcium (Ca)			<50		mg/kg		50	19-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	19-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	19-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	19-OCT-17
Iron (Fe)			<50		mg/kg		50	19-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	19-OCT-17
Magnesium (Mg)			<20		mg/kg		20	19-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	19-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	19-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	19-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	19-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	19-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	19-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	19-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	19-OCT-17
MOISTURE-WT	**Soil**							
Batch R3858272								
WG2641065-3 DUP		**L2006742-30**						
% Moisture		9.98	9.64		%	3.5	20	18-OCT-17
WG2641065-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R3858272								
WG2641065-2 LCS								
% Moisture			99.0		%		90-110	18-OCT-17
WG2641065-1 MB								
% Moisture			<0.10		%		0.1	18-OCT-17
Batch R3858277								
WG2641149-3 DUP		**L2005633-7**						
% Moisture		24.1	24.1		%	0.0	20	18-OCT-17
WG2641149-2 LCS								
% Moisture			100.1		%		90-110	18-OCT-17
WG2641149-1 MB								
% Moisture			<0.10		%		0.1	18-OCT-17
Batch R3858280								
WG2641585-3 DUP		**L2003830-14**						
% Moisture		17.9	17.8		%	0.5	20	17-OCT-17
WG2641585-2 LCS								
% Moisture			99.5		%		90-110	17-OCT-17
WG2641585-1 MB								
% Moisture			<0.10		%		0.1	17-OCT-17
Batch R3858285								
WG2641076-3 DUP		**L2006981-54**						
% Moisture		9.21	9.72		%	5.4	20	17-OCT-17
WG2641076-2 LCS								
% Moisture			99.7		%		90-110	17-OCT-17
WG2641076-1 MB								
% Moisture			<0.10		%		0.1	17-OCT-17
PAH-511-WT	**Soil**							
Batch R3862874								
WG2641066-7 DUP		**WG2641066-6**						
1-Methylnaphthalene		0.060	0.066		ug/g	9.6	40	24-OCT-17
2-Methylnaphthalene		0.073	0.082		ug/g	11	40	24-OCT-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Anthracene		0.101	0.116		ug/g	14	40	24-OCT-17
Benzo(a)anthracene		0.339	0.386		ug/g	13	40	24-OCT-17
Benzo(a)pyrene		0.279	0.335		ug/g	18	40	24-OCT-17
Benzo(b)fluoranthene		0.398	0.468		ug/g	16	40	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3862874								
WG2641066-7 DUP		**WG2641066-6**						
Benzo(g,h,i)perylene		0.184	0.245		ug/g	28	40	24-OCT-17
Benzo(k)fluoranthene		0.190	0.209		ug/g	9.4	40	24-OCT-17
Chrysene		0.376	0.446		ug/g	17	40	24-OCT-17
Dibenzo(ah)anthracene		0.051	0.070		ug/g	31	40	24-OCT-17
Fluoranthene		0.836	0.912		ug/g	8.7	40	24-OCT-17
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Indeno(1,2,3-cd)pyrene		0.186	0.232		ug/g	22	40	24-OCT-17
Naphthalene		0.074	0.081		ug/g	8.2	40	24-OCT-17
Phenanthrene		0.497	0.534		ug/g	7.2	40	24-OCT-17
Pyrene		0.645	0.702		ug/g	8.5	40	24-OCT-17
WG2641066-2 LCS								
1-Methylnaphthalene			88.3		%		50-140	23-OCT-17
2-Methylnaphthalene			88.7		%		50-140	23-OCT-17
Acenaphthene			88.2		%		50-140	23-OCT-17
Acenaphthylene			90.6		%		50-140	23-OCT-17
Anthracene			84.8		%		50-140	23-OCT-17
Benzo(a)anthracene			93.3		%		50-140	23-OCT-17
Benzo(a)pyrene			86.6		%		50-140	23-OCT-17
Benzo(b)fluoranthene			89.3		%		50-140	23-OCT-17
Benzo(g,h,i)perylene			69.5		%		50-140	23-OCT-17
Benzo(k)fluoranthene			96.5		%		50-140	23-OCT-17
Chrysene			87.4		%		50-140	23-OCT-17
Dibenzo(ah)anthracene			79.5		%		50-140	23-OCT-17
Fluoranthene			89.1		%		50-140	23-OCT-17
Fluorene			84.7		%		50-140	23-OCT-17
Indeno(1,2,3-cd)pyrene			80.1		%		50-140	23-OCT-17
Naphthalene			90.3		%		50-140	23-OCT-17
Phenanthrene			86.3		%		50-140	23-OCT-17
Pyrene			89.5		%		50-140	23-OCT-17
WG2641066-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	23-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	23-OCT-17
Acenaphthene			<0.050		ug/g		0.05	23-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	23-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3862874								
WG2641066-1 MB								
Anthracene			<0.050		ug/g		0.05	23-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	23-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	23-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	23-OCT-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	23-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	23-OCT-17
Chrysene			<0.050		ug/g		0.05	23-OCT-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	23-OCT-17
Fluoranthene			<0.050		ug/g		0.05	23-OCT-17
Fluorene			<0.050		ug/g		0.05	23-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	23-OCT-17
Naphthalene			<0.050		ug/g		0.05	23-OCT-17
Phenanthrene			<0.050		ug/g		0.05	23-OCT-17
Pyrene			<0.050		ug/g		0.05	23-OCT-17
Surrogate: 2-Fluorobiphenyl			95.0		%		50-140	23-OCT-17
Surrogate: p-Terphenyl d14			100.6		%		50-140	23-OCT-17
WG2641066-8 MS		**WG2641066-6**						
1-Methylnaphthalene			84.6		%		50-140	24-OCT-17
2-Methylnaphthalene			85.2		%		50-140	24-OCT-17
Acenaphthene			84.5		%		50-140	24-OCT-17
Acenaphthylene			86.4		%		50-140	24-OCT-17
Anthracene			84.9		%		50-140	24-OCT-17
Benzo(a)anthracene			78.5		%		50-140	24-OCT-17
Benzo(a)pyrene			69.5		%		50-140	24-OCT-17
Benzo(b)fluoranthene			71.1		%		50-140	24-OCT-17
Benzo(g,h,i)perylene			72.2		%		50-140	24-OCT-17
Benzo(k)fluoranthene			73.8		%		50-140	24-OCT-17
Chrysene			79.5		%		50-140	24-OCT-17
Dibenzo(ah)anthracene			80.8		%		50-140	24-OCT-17
Fluoranthene			67.8		%		50-140	24-OCT-17
Fluorene			86.6		%		50-140	24-OCT-17
Indeno(1,2,3-cd)pyrene			70.7		%		50-140	24-OCT-17
Naphthalene			85.4		%		50-140	24-OCT-17
Phenanthrene			71.9		%		50-140	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3862874								
WG2641066-8 MS		**WG2641066-6**						
Pyrene			73.8		%		50-140	24-OCT-17
PCB-511-WT	**Soil**							
Batch R3862926								
WG2641066-4 DUP		**WG2641066-3**						
Aroclor 1242		<0.0170	<0.0170	RPD-NA	ug/g	N/A	40	23-OCT-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	23-OCT-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	23-OCT-17
Aroclor 1260		<0.0120	<0.0120	RPD-NA	ug/g	N/A	40	23-OCT-17
WG2641066-2 LCS								
Aroclor 1242			91.3		%		60-140	23-OCT-17
Aroclor 1248			93.7		%		60-140	23-OCT-17
Aroclor 1254			92.8		%		60-140	23-OCT-17
Aroclor 1260			99.3		%		60-140	23-OCT-17
WG2641066-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	23-OCT-17
Aroclor 1248			<0.010		ug/g		0.01	23-OCT-17
Aroclor 1254			<0.010		ug/g		0.01	23-OCT-17
Aroclor 1260			<0.010		ug/g		0.01	23-OCT-17
Surrogate: d14-Terphenyl			101.8		%		60-140	23-OCT-17
WG2641066-5 MS		**WG2641066-3**						
Aroclor 1242			86.9		%		60-140	23-OCT-17
Aroclor 1254			88.7		%		60-140	23-OCT-17
Aroclor 1260			94.4		%		60-140	23-OCT-17
PH-WT	**Soil**							
Batch R3857902								
WG2641028-1 DUP		**L2007170-3**						
pH		7.41	7.29	J	pH units	0.12	0.3	17-OCT-17
WG2641525-1 LCS								
pH			7.01		pH units		6.9-7.1	17-OCT-17
Batch R3859059								
WG2641083-1 DUP		**L2007635-32**						
pH		7.05	7.07	J	pH units	0.02	0.3	18-OCT-17
WG2642331-1 LCS								
pH			7.00		pH units		6.9-7.1	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R3859807								
WG2643169-4 DUP		**WG2643169-3**						
Calcium (Ca)		4.4	4.4		mg/L	1.3	30	19-OCT-17
Sodium (Na)		17.5	17.6		mg/L	0.7	30	19-OCT-17
Magnesium (Mg)		1.7	1.7		mg/L	1.4	30	19-OCT-17
WG2643169-2 IRM		**WT SAR1**						
Calcium (Ca)			88.0		%		70-130	19-OCT-17
Sodium (Na)			98.0		%		70-130	19-OCT-17
Magnesium (Mg)			89.0		%		70-130	19-OCT-17
WG2643169-1 MB								
Calcium (Ca)			<1.0		mg/L		1	19-OCT-17
Sodium (Na)			<1.0		mg/L		1	19-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	19-OCT-17
Batch R3860522								
WG2644313-4 DUP		**WG2644313-3**						
Calcium (Ca)		2.5	2.1		mg/L	16	30	20-OCT-17
Sodium (Na)		1.2	1.1		mg/L	10	30	20-OCT-17
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	20-OCT-17
WG2644313-2 IRM		**WT SAR1**						
Calcium (Ca)			86.7		%		70-130	20-OCT-17
Sodium (Na)			101.1		%		70-130	20-OCT-17
Magnesium (Mg)			87.1		%		70-130	20-OCT-17
WG2644313-1 MB								
Calcium (Ca)			<1.0		mg/L		1	20-OCT-17
Sodium (Na)			<1.0		mg/L		1	20-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	20-OCT-17
TOC-R511-WT	**Soil**							
Batch R3857798								
WG2641061-3 CRM		**WT-TOC-CRM**						
Total Organic Carbon			106.8		%		70-130	17-OCT-17
WG2641061-4 DUP		**L1995878-2**						
Total Organic Carbon		3.77	3.81		%	1.2	35	17-OCT-17
WG2641061-2 LCS								
Total Organic Carbon			103.7		%		80-120	17-OCT-17
Total Organic Carbon			103.7		%		80-120	17-OCT-17
Total Organic Carbon			103.7		%		80-120	17-OCT-17
WG2641061-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-R511-WT	**Soil**							
Batch R3857798								
WG2641061-1 MB								
Total Organic Carbon			<0.10		%		0.1	17-OCT-17
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-4 DUP		**WG2641128-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	18-OCT-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-4 DUP		**WG2641128-3**						
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	18-OCT-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	18-OCT-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	18-OCT-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	18-OCT-17
WG2641128-2 LCS								
1,1,1,2-Tetrachloroethane			99.6		%		60-130	18-OCT-17
1,1,2,2-Tetrachloroethane			96.7		%		60-130	18-OCT-17
1,1,1-Trichloroethane			98.8		%		60-130	18-OCT-17
1,1,2-Trichloroethane			98.1		%		60-130	18-OCT-17
1,1-Dichloroethane			96.0		%		60-130	18-OCT-17
1,1-Dichloroethylene			84.6		%		60-130	18-OCT-17
1,2-Dibromoethane			97.4		%		70-130	18-OCT-17
1,2-Dichlorobenzene			104.4		%		70-130	18-OCT-17
1,2-Dichloroethane			96.9		%		60-130	18-OCT-17
1,2-Dichloropropane			100.9		%		70-130	18-OCT-17
1,3-Dichlorobenzene			104.1		%		70-130	18-OCT-17
1,4-Dichlorobenzene			106.0		%		70-130	18-OCT-17
Acetone			99.0		%		60-140	18-OCT-17
Benzene			99.9		%		70-130	18-OCT-17
Bromodichloromethane			96.1		%		50-140	18-OCT-17
Bromoform			95.7		%		70-130	18-OCT-17
Bromomethane			86.2		%		50-140	18-OCT-17
Carbon tetrachloride			97.4		%		70-130	18-OCT-17
Chlorobenzene			102.9		%		70-130	18-OCT-17
Chloroform			99.0		%		70-130	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-2 LCS								
cis-1,2-Dichloroethylene			97.2		%		70-130	18-OCT-17
cis-1,3-Dichloropropene			102.5		%		70-130	18-OCT-17
Dibromochloromethane			101.8		%		60-130	18-OCT-17
Dichlorodifluoromethane			44.0	MES	%		50-140	18-OCT-17
Ethylbenzene			103.2		%		70-130	18-OCT-17
n-Hexane			100.5		%		70-130	18-OCT-17
Methylene Chloride			95.7		%		70-130	18-OCT-17
MTBE			100.5		%		70-130	18-OCT-17
m+p-Xylenes			104.3		%		70-130	18-OCT-17
Methyl Ethyl Ketone			97.9		%		60-140	18-OCT-17
Methyl Isobutyl Ketone			98.0		%		60-140	18-OCT-17
o-Xylene			103.3		%		70-130	18-OCT-17
Styrene			102.5		%		70-130	18-OCT-17
Tetrachloroethylene			101.6		%		60-130	18-OCT-17
Toluene			101.8		%		70-130	18-OCT-17
trans-1,2-Dichloroethylene			97.7		%		60-130	18-OCT-17
trans-1,3-Dichloropropene			102.5		%		70-130	18-OCT-17
Trichloroethylene			101.2		%		60-130	18-OCT-17
Trichlorofluoromethane			90.3		%		50-140	18-OCT-17
Vinyl chloride			79.2		%		60-140	18-OCT-17
WG2641128-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1-Dichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
1,2-Dibromoethane			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichloropropane			<0.050		ug/g		0.05	18-OCT-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
Acetone			<0.50		ug/g		0.5	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-1 MB								
Benzene			<0.0068		ug/g		0.0068	18-OCT-17
Bromodichloromethane			<0.050		ug/g		0.05	18-OCT-17
Bromoform			<0.050		ug/g		0.05	18-OCT-17
Bromomethane			<0.050		ug/g		0.05	18-OCT-17
Carbon tetrachloride			<0.050		ug/g		0.05	18-OCT-17
Chlorobenzene			<0.050		ug/g		0.05	18-OCT-17
Chloroform			<0.050		ug/g		0.05	18-OCT-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	18-OCT-17
Dibromochloromethane			<0.050		ug/g		0.05	18-OCT-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	18-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	18-OCT-17
n-Hexane			<0.050		ug/g		0.05	18-OCT-17
Methylene Chloride			<0.050		ug/g		0.05	18-OCT-17
MTBE			<0.050		ug/g		0.05	18-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	18-OCT-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	18-OCT-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	18-OCT-17
o-Xylene			<0.020		ug/g		0.02	18-OCT-17
Styrene			<0.050		ug/g		0.05	18-OCT-17
Tetrachloroethylene			<0.050		ug/g		0.05	18-OCT-17
Toluene			<0.080		ug/g		0.08	18-OCT-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	18-OCT-17
Trichloroethylene			<0.010		ug/g		0.01	18-OCT-17
Trichlorofluoromethane			<0.050		ug/g		0.05	18-OCT-17
Vinyl chloride			<0.020		ug/g		0.02	18-OCT-17
Surrogate: 1,4-Difluorobenzene			100.6		%		50-140	18-OCT-17
Surrogate: 4-Bromofluorobenzene			99.5		%		50-140	18-OCT-17
WG2641128-5 MS		**WG2641128-3**						
1,1,1,2-Tetrachloroethane			99.2		%		50-140	18-OCT-17
1,1,2,2-Tetrachloroethane			97.0		%		50-140	18-OCT-17
1,1,1-Trichloroethane			99.2		%		50-140	18-OCT-17
1,1,2-Trichloroethane			99.98		%		50-140	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-5 MS		**WG2641128-3**						
1,1-Dichloroethane			97.1		%		50-140	18-OCT-17
1,1-Dichloroethylene			86.3		%		50-140	18-OCT-17
1,2-Dibromoethane			99.2		%		50-140	18-OCT-17
1,2-Dichlorobenzene			102.7		%		50-140	18-OCT-17
1,2-Dichloroethane			99.4		%		50-140	18-OCT-17
1,2-Dichloropropane			102.3		%		50-140	18-OCT-17
1,3-Dichlorobenzene			102.5		%		50-140	18-OCT-17
1,4-Dichlorobenzene			104.6		%		50-140	18-OCT-17
Acetone			99.0		%		50-140	18-OCT-17
Benzene			100.3		%		50-140	18-OCT-17
Bromodichloromethane			97.6		%		50-140	18-OCT-17
Bromoform			96.6		%		50-140	18-OCT-17
Bromomethane			91.2		%		50-140	18-OCT-17
Carbon tetrachloride			96.9		%		50-140	18-OCT-17
Chlorobenzene			102.3		%		50-140	18-OCT-17
Chloroform			100.2		%		50-140	18-OCT-17
cis-1,2-Dichloroethylene			98.1		%		50-140	18-OCT-17
cis-1,3-Dichloropropene			102.6		%		50-140	18-OCT-17
Dibromochloromethane			103.2		%		50-140	18-OCT-17
Dichlorodifluoromethane			53.8		%		50-140	18-OCT-17
Ethylbenzene			101.6		%		50-140	18-OCT-17
n-Hexane			101.0		%		50-140	18-OCT-17
Methylene Chloride			98.4		%		50-140	18-OCT-17
MTBE			100.3		%		50-140	18-OCT-17
m+p-Xylenes			102.5		%		50-140	18-OCT-17
Methyl Ethyl Ketone			100.8		%		50-140	18-OCT-17
Methyl Isobutyl Ketone			100.2		%		50-140	18-OCT-17
o-Xylene			101.6		%		50-140	18-OCT-17
Styrene			95.5		%		50-140	18-OCT-17
Tetrachloroethylene			99.2		%		50-140	18-OCT-17
Toluene			101.1		%		50-140	18-OCT-17
trans-1,2-Dichloroethylene			98.3		%		50-140	18-OCT-17
trans-1,3-Dichloropropene			103.6		%		50-140	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858369								
WG2641128-5 MS		**WG2641128-3**						
Trichloroethylene			100.6		%		50-140	18-OCT-17
Trichlorofluoromethane			93.3		%		50-140	18-OCT-17
Vinyl chloride			85.6		%		50-140	18-OCT-17
Batch R3858453								
WG2641040-4 DUP		**WG2641040-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,2,2-Tetrachloroethane		<0.20	<0.25	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	18-OCT-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858453								
WG2641040-4 DUP		**WG2641040-3**						
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	18-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	18-OCT-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	18-OCT-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	18-OCT-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	18-OCT-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	18-OCT-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	18-OCT-17
WG2641040-2 LCS								
1,1,1,2-Tetrachloroethane			100.9		%		60-130	18-OCT-17
1,1,2,2-Tetrachloroethane			103.5		%		60-130	18-OCT-17
1,1,1-Trichloroethane			100.2		%		60-130	18-OCT-17
1,1,2-Trichloroethane			106.2		%		60-130	18-OCT-17
1,1-Dichloroethane			100.9		%		60-130	18-OCT-17
1,1-Dichloroethylene			88.5		%		60-130	18-OCT-17
1,2-Dibromoethane			106.1		%		70-130	18-OCT-17
1,2-Dichlorobenzene			105.8		%		70-130	18-OCT-17
1,2-Dichloroethane			106.6		%		60-130	18-OCT-17
1,2-Dichloropropane			106.6		%		70-130	18-OCT-17
1,3-Dichlorobenzene			102.6		%		70-130	18-OCT-17
1,4-Dichlorobenzene			105.7		%		70-130	18-OCT-17
Acetone			113.7		%		60-140	18-OCT-17
Benzene			104.5		%		70-130	18-OCT-17
Bromodichloromethane			102.7		%		50-140	18-OCT-17
Bromoform			102.2		%		70-130	18-OCT-17
Bromomethane			97.0		%		50-140	18-OCT-17
Carbon tetrachloride			98.2		%		70-130	18-OCT-17
Chlorobenzene			102.8		%		70-130	18-OCT-17
Chloroform			104.6		%		70-130	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858453								
WG2641040-2 LCS								
cis-1,2-Dichloroethylene			104.0		%		70-130	18-OCT-17
cis-1,3-Dichloropropene			107.2		%		70-130	18-OCT-17
Dibromochloromethane			106.7		%		60-130	18-OCT-17
Dichlorodifluoromethane			46.0	MES	%		50-140	18-OCT-17
Ethylbenzene			99.0		%		70-130	18-OCT-17
n-Hexane			101.3		%		70-130	18-OCT-17
Methylene Chloride			105.9		%		70-130	18-OCT-17
MTBE			98.2		%		70-130	18-OCT-17
m+p-Xylenes			101.3		%		70-130	18-OCT-17
Methyl Ethyl Ketone			113.9		%		60-140	18-OCT-17
Methyl Isobutyl Ketone			108.5		%		60-140	18-OCT-17
o-Xylene			100.0		%		70-130	18-OCT-17
Styrene			107.9		%		70-130	18-OCT-17
Tetrachloroethylene			98.2		%		60-130	18-OCT-17
Toluene			98.6		%		70-130	18-OCT-17
trans-1,2-Dichloroethylene			99.5		%		60-130	18-OCT-17
trans-1,3-Dichloropropene			104.3		%		70-130	18-OCT-17
Trichloroethylene			102.8		%		60-130	18-OCT-17
Trichlorofluoromethane			95.1		%		50-140	18-OCT-17
Vinyl chloride			86.4		%		60-140	18-OCT-17
WG2641040-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1-Dichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
1,2-Dibromoethane			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichloroethane			<0.050		ug/g		0.05	18-OCT-17
1,2-Dichloropropane			<0.050		ug/g		0.05	18-OCT-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	18-OCT-17
Acetone			<0.50		ug/g		0.5	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858453								
WG2641040-1 MB								
Benzene			<0.0068		ug/g		0.0068	18-OCT-17
Bromodichloromethane			<0.050		ug/g		0.05	18-OCT-17
Bromoform			<0.050		ug/g		0.05	18-OCT-17
Bromomethane			<0.050		ug/g		0.05	18-OCT-17
Carbon tetrachloride			<0.050		ug/g		0.05	18-OCT-17
Chlorobenzene			<0.050		ug/g		0.05	18-OCT-17
Chloroform			<0.050		ug/g		0.05	18-OCT-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	18-OCT-17
Dibromochloromethane			<0.050		ug/g		0.05	18-OCT-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	18-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	18-OCT-17
n-Hexane			<0.050		ug/g		0.05	18-OCT-17
Methylene Chloride			<0.050		ug/g		0.05	18-OCT-17
MTBE			<0.050		ug/g		0.05	18-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	18-OCT-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	18-OCT-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	18-OCT-17
o-Xylene			<0.020		ug/g		0.02	18-OCT-17
Styrene			<0.050		ug/g		0.05	18-OCT-17
Tetrachloroethylene			<0.050		ug/g		0.05	18-OCT-17
Toluene			<0.080		ug/g		0.08	18-OCT-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	18-OCT-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	18-OCT-17
Trichloroethylene			<0.010		ug/g		0.01	18-OCT-17
Trichlorofluoromethane			<0.050		ug/g		0.05	18-OCT-17
Vinyl chloride			<0.020		ug/g		0.02	18-OCT-17
Surrogate: 1,4-Difluorobenzene			109.2		%		50-140	18-OCT-17
Surrogate: 4-Bromofluorobenzene			101.6		%		50-140	18-OCT-17
WG2641040-5 MS		**WG2641040-3**						
1,1,1,2-Tetrachloroethane			101.2		%		50-140	18-OCT-17
1,1,2,2-Tetrachloroethane			111.7		%		50-140	18-OCT-17
1,1,1-Trichloroethane			97.3		%		50-140	18-OCT-17
1,1,2-Trichloroethane			119.0		%		50-140	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858453								
WG2641040-5 MS		**WG2641040-3**						
1,1-Dichloroethane			100.3		%		50-140	18-OCT-17
1,1-Dichloroethylene			86.2		%		50-140	18-OCT-17
1,2-Dibromoethane			119.3		%		50-140	18-OCT-17
1,2-Dichlorobenzene			101.1		%		50-140	18-OCT-17
1,2-Dichloroethane			111.8		%		50-140	18-OCT-17
1,2-Dichloropropane			108.3		%		50-140	18-OCT-17
1,3-Dichlorobenzene			94.6		%		50-140	18-OCT-17
1,4-Dichlorobenzene			96.2		%		50-140	18-OCT-17
Acetone			122.6		%		50-140	18-OCT-17
Benzene			103.7		%		50-140	18-OCT-17
Bromodichloromethane			103.6		%		50-140	18-OCT-17
Bromoform			109.2		%		50-140	18-OCT-17
Bromomethane			96.2		%		50-140	18-OCT-17
Carbon tetrachloride			93.5		%		50-140	18-OCT-17
Chlorobenzene			101.0		%		50-140	18-OCT-17
Chloroform			105.3		%		50-140	18-OCT-17
cis-1,2-Dichloroethylene			104.4		%		50-140	18-OCT-17
cis-1,3-Dichloropropene			103.2		%		50-140	18-OCT-17
Dibromochloromethane			115.8		%		50-140	18-OCT-17
Dichlorodifluoromethane			48.3	MES	%		50-140	18-OCT-17
Ethylbenzene			93.3		%		50-140	18-OCT-17
n-Hexane			93.6		%		50-140	18-OCT-17
Methylene Chloride			109.1		%		50-140	18-OCT-17
MTBE			97.3		%		50-140	18-OCT-17
m+p-Xylenes			91.7		%		50-140	18-OCT-17
Methyl Ethyl Ketone			130.0		%		50-140	18-OCT-17
Methyl Isobutyl Ketone			125.3		%		50-140	18-OCT-17
o-Xylene			93.6		%		50-140	18-OCT-17
Styrene			104.2		%		50-140	18-OCT-17
Tetrachloroethylene			91.7		%		50-140	18-OCT-17
Toluene			99.7		%		50-140	18-OCT-17
trans-1,2-Dichloroethylene			95.1		%		50-140	18-OCT-17
trans-1,3-Dichloropropene			109.9		%		50-140	18-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3858453								
WG2641040-5 MS		**WG2641040-3**						
Trichloroethylene			97.5		%		50-140	18-OCT-17
Trichlorofluoromethane			93.6		%		50-140	18-OCT-17
Vinyl chloride			86.5		%		50-140	18-OCT-17

Quality Control Report

Workorder: L2007635 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MBS	Surrogate recovery in Method Blank was outside ALS DQO. Moderately low-biased results in the MB do not significantly affect its purpose.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GRAIN SIZE DETERMINATIONS

Client:	CH2M HILL		Sample Location:	
Project Number:	11546		Sample ID:	MW17-108S-1-3
Sampler:			Sample Depth:	
Technician:	CB6		Date Sampled:	11-10-17
Lab ID Number:	L2007635-16		Date Submitted:	16-10-17
			Date Completed:	25-10-17

Total Sample Weight	184	grams	Specific Gravity:	2.650
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000
% Past #10	0.440	* 100	Grav Factor:	1.606
Sub Factor	1.620			

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	23.000	12.500	19.000	12.500	87.500
9.5 mm. DIA.:	34.000	18.478	9.500	30.978	69.022
NO. 4 SIEVE :	24.000	13.043	4.500	44.022	55.978
NO. 10 SIEVE :	22.000	11.957	2.000	55.978	44.022
NO. 20 SIEVE :	9.000	7.924	0.850	63.902	36.098
NO. 40 SIEVE :	8.000	7.043	0.425	70.946	29.054
NO. 60 SIEVE :	6.000	5.283	0.250	76.228	23.772
NO. 100 SIEVE:	4.000	3.522	0.150	79.750	20.250
NO. 200 SIEVE:	4.000	3.522	0.075	83.272	16.728

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	9.0	19.1	0.052	19.030	8.377
2.00	9.0	19.1	0.036	19.030	8.377
4.00	8.0	19.1	0.026	15.818	6.963
8.00	7.0	19.1	0.019	12.606	5.549
15.00	7.0	19.0	0.014	12.543	5.522
30.00	7.0	18.9	0.010	12.481	5.494
60.00	6.0	19.4	0.007	9.582	4.218
120.00	5.0	20.0	0.005	6.745	2.969
240.00	5.0	20.5	0.003	7.059	3.107
480.00	5.0	20.6	0.002	7.121	3.135
1440.00	4.0	19.1	0.001	2.970	1.307

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	44.02	> 4.5
% COARSE SAND :	11.96	2.0 - 4.5
% MEDIUM SAND :	14.97	0.425 - 2.0
% FINE SAND :	12.33	0.075 - 0.425
% SILT :	14.23	0.075 - 0.002
% CLAY :	2.50	< 0.002
% CLAY :	3.09	< 0.005

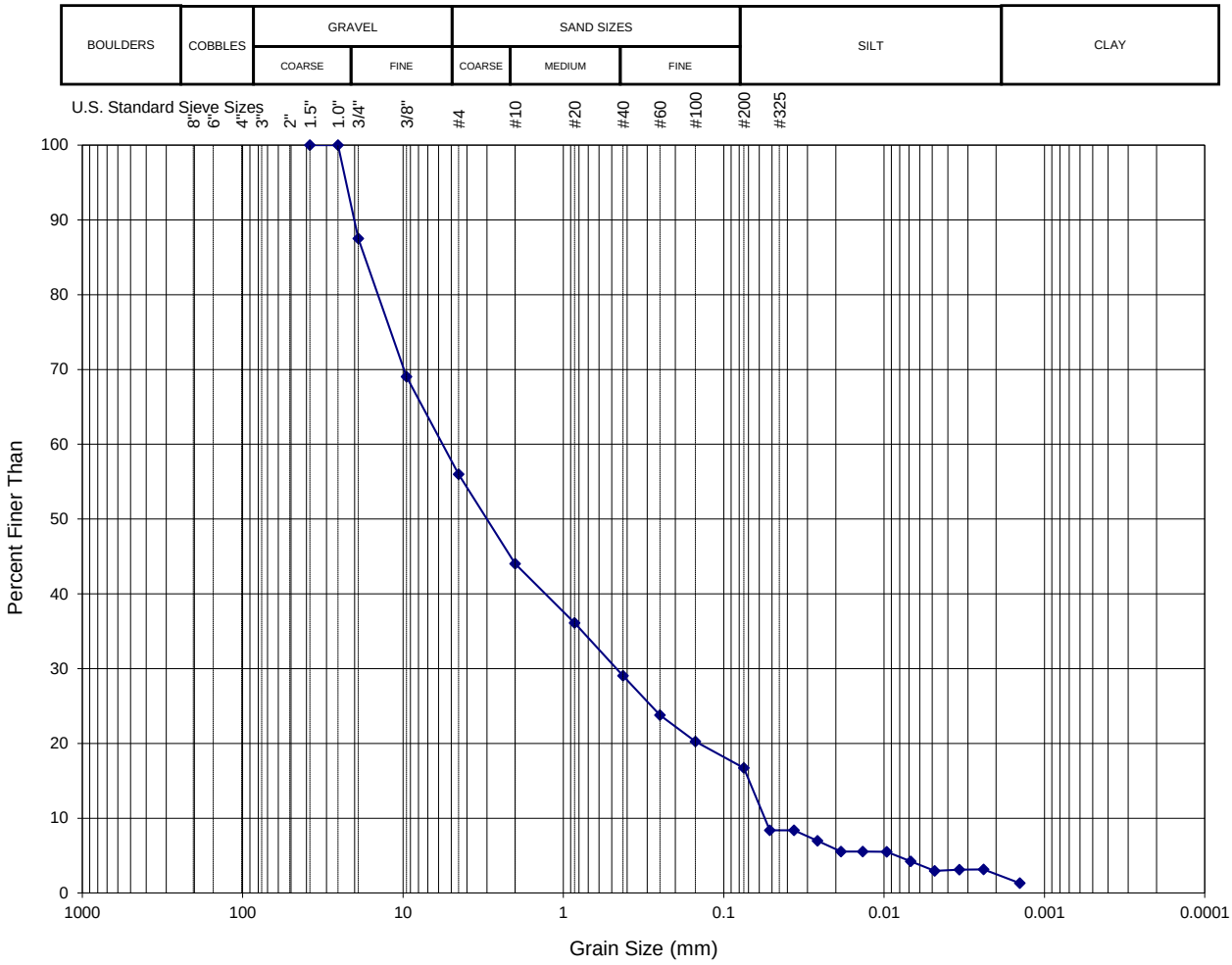
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

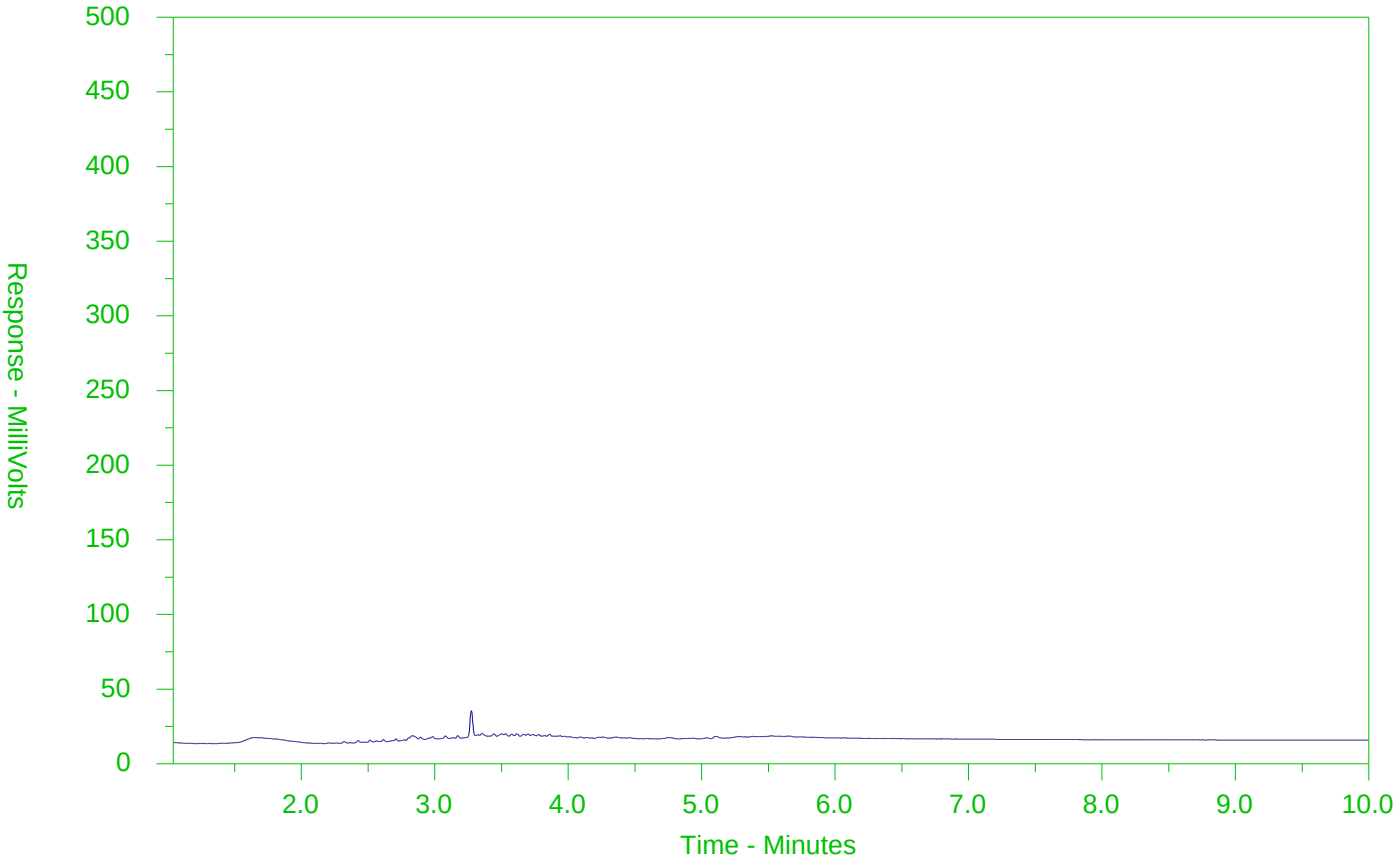
Project Name:	CH2M HILL
Project Number:	11546
Sample Location:	
Sample Number:	MW17-108S-1-3
Sample Depth:	
Lab ID Number:	L2007635-16
Technician:	CB6
Sampler:	
Dates:	
Collected On:	11-10-17
Analyzed:	25-10-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
GRAVEL AND SAND WITH SILT, TRACE CLAY	AND	36 - 50 %	GRAVEL	44	%
COARSE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	39	%
ESTIMATED HAZEN NUMBER: 3.08E-03 cm/s	WITH	11 - 20 %	SILT + CLAY	17	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-2
Client Sample ID: BH17-200-3.5-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

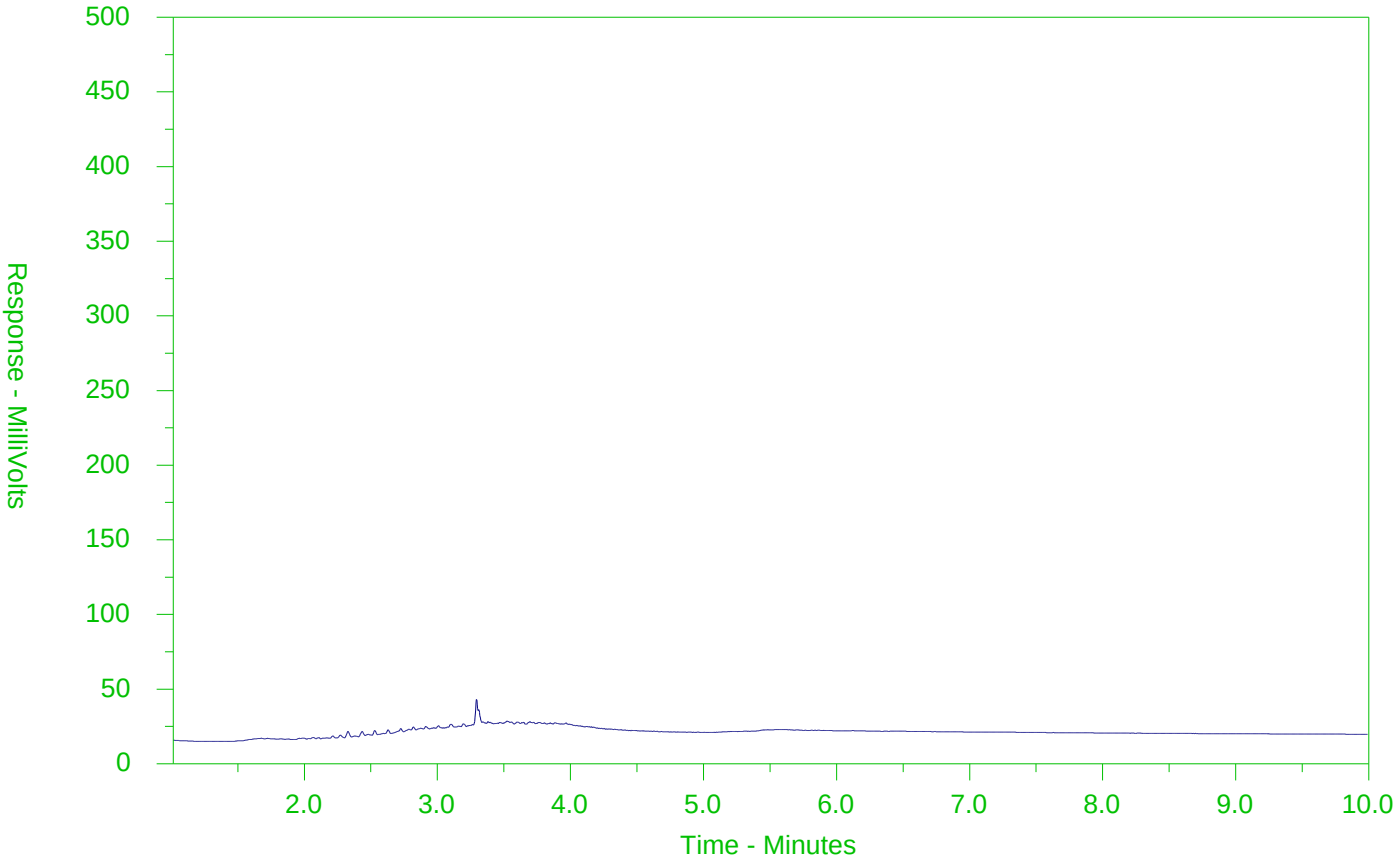
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-4
Client Sample ID: BH17-200-6-6.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

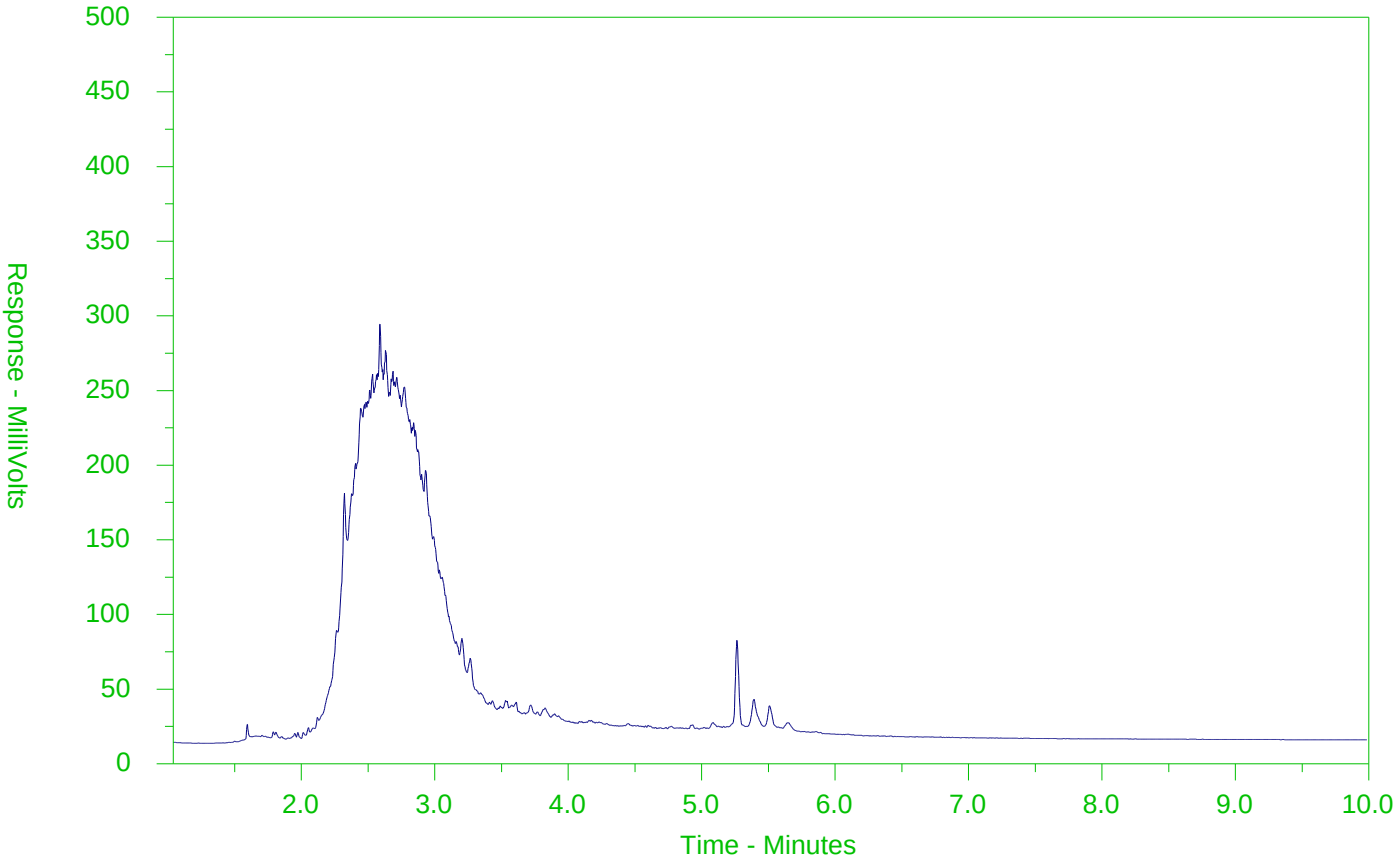
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-5
Client Sample ID: BH17-201-0-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

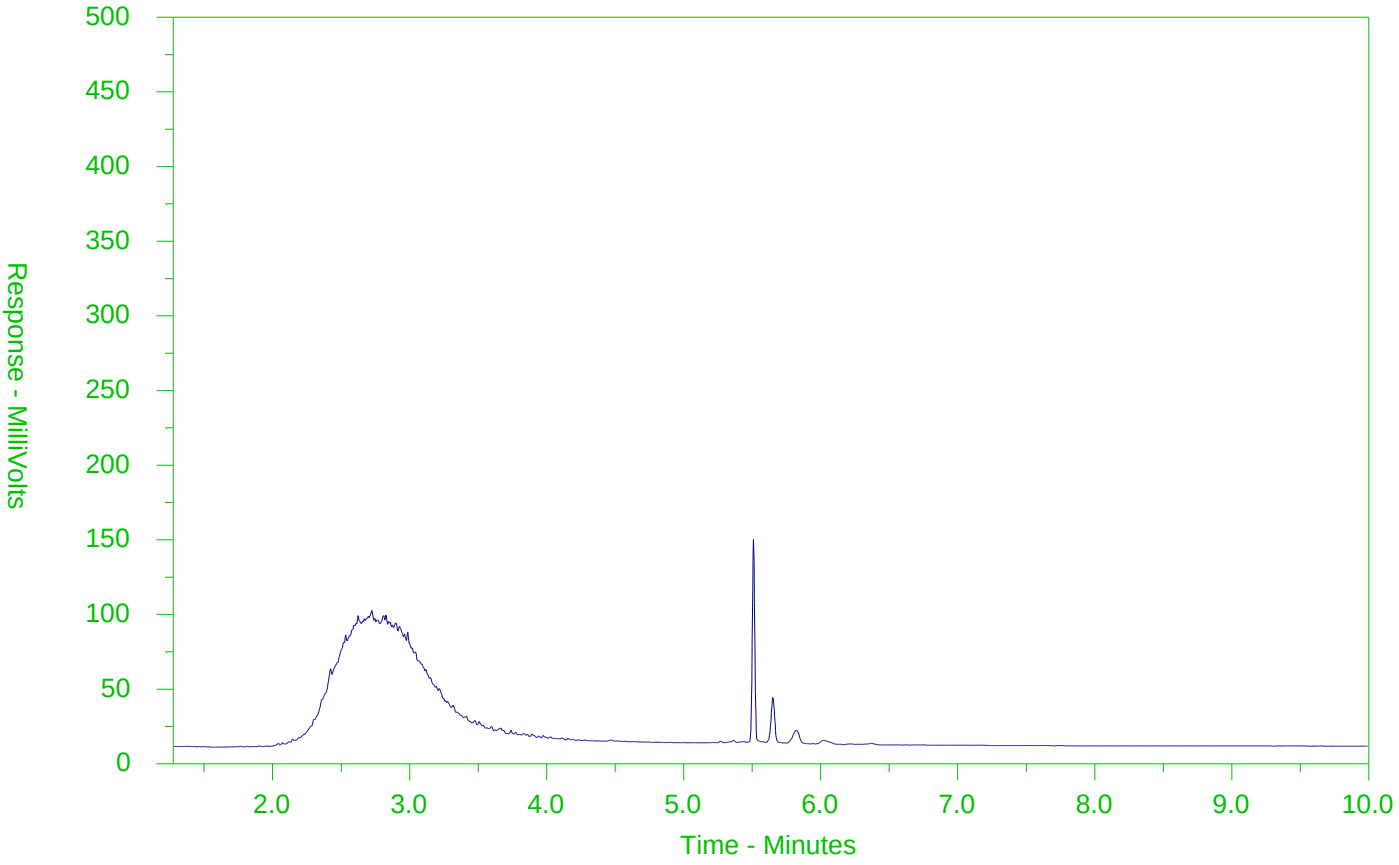
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-6
Client Sample ID: BH17-201-2-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

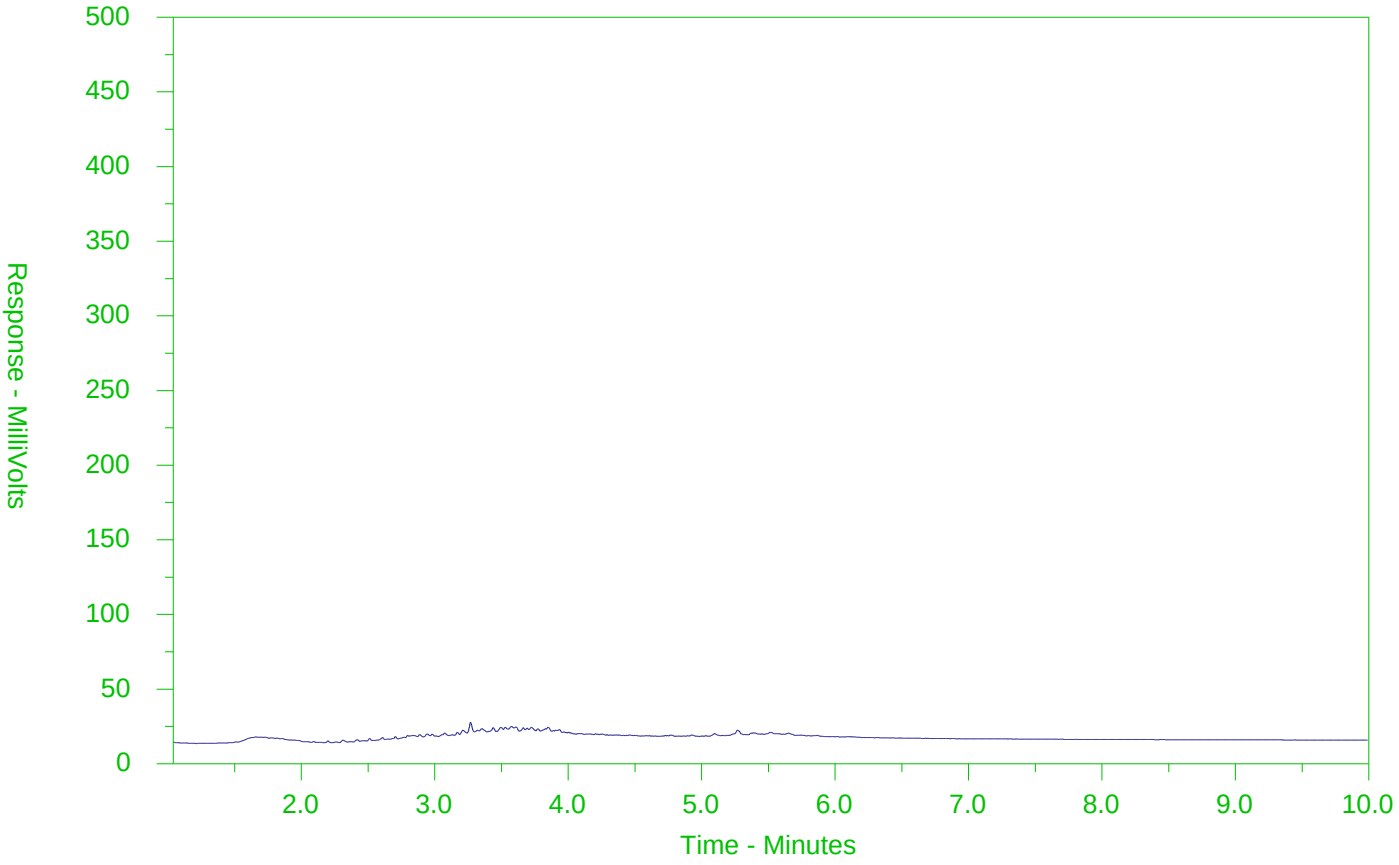
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-10
Client Sample ID: BH17-202-2-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

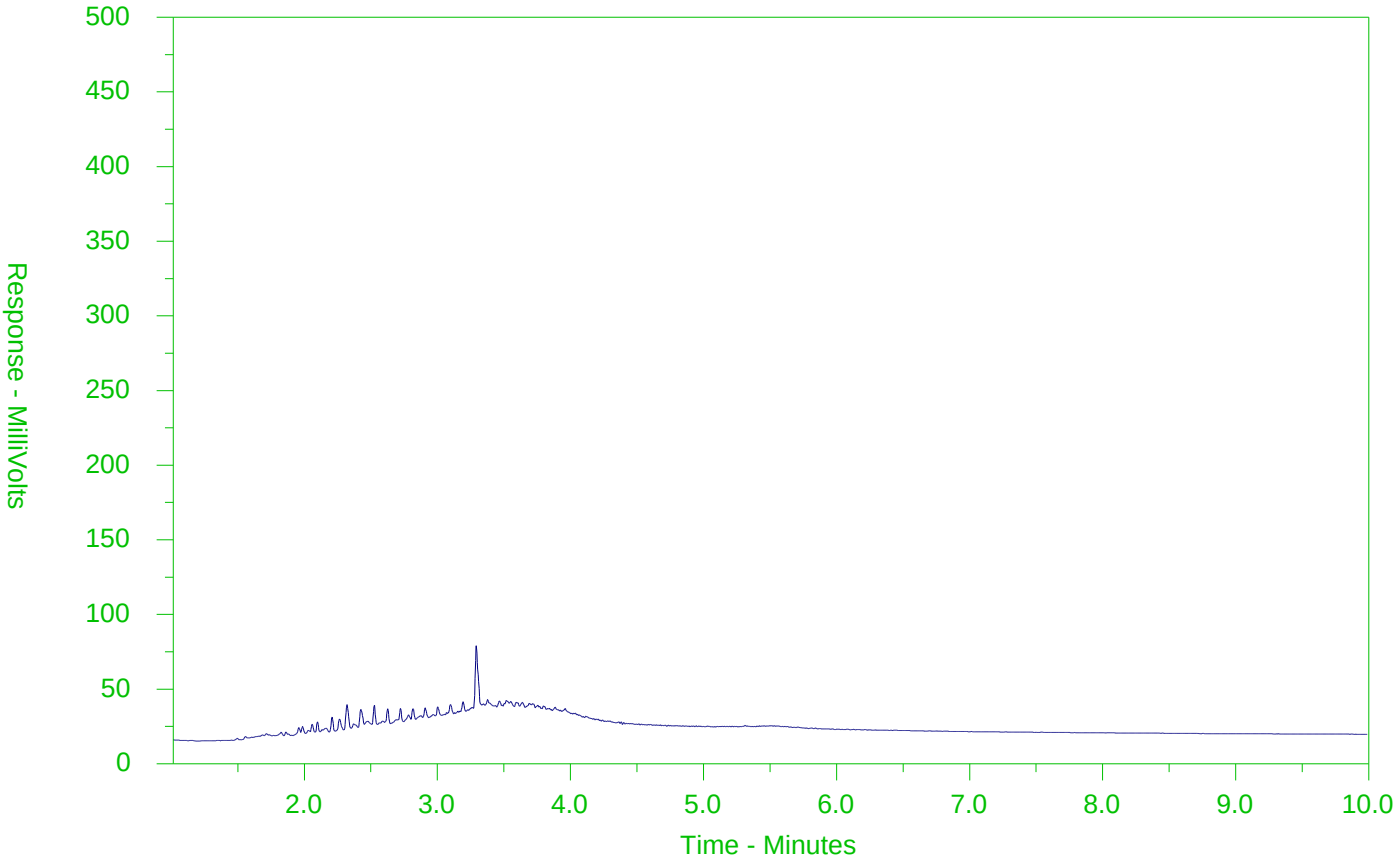
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-12
Client Sample ID: BH17-202-6-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

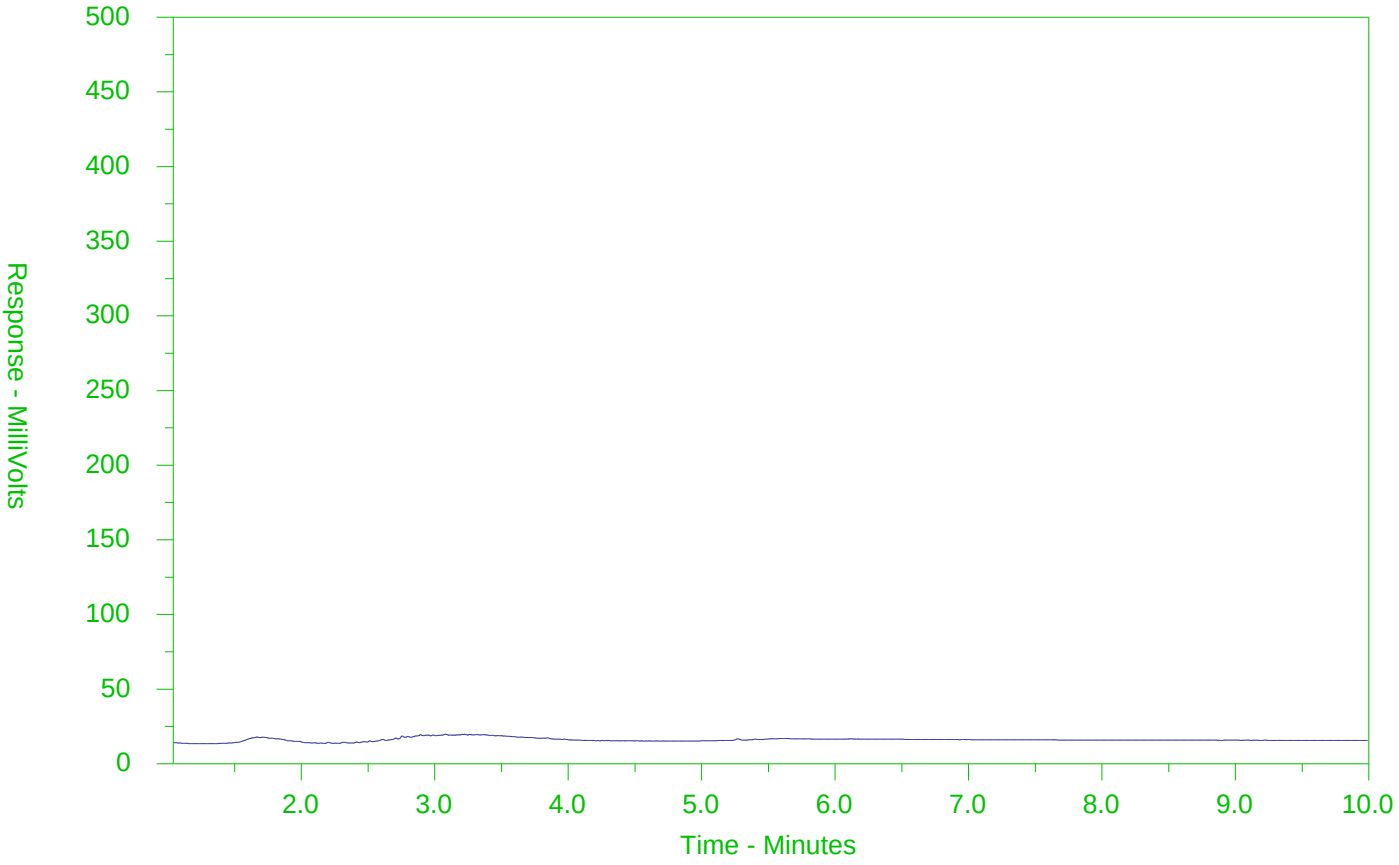
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-13
Client Sample ID: BH17-203-0-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

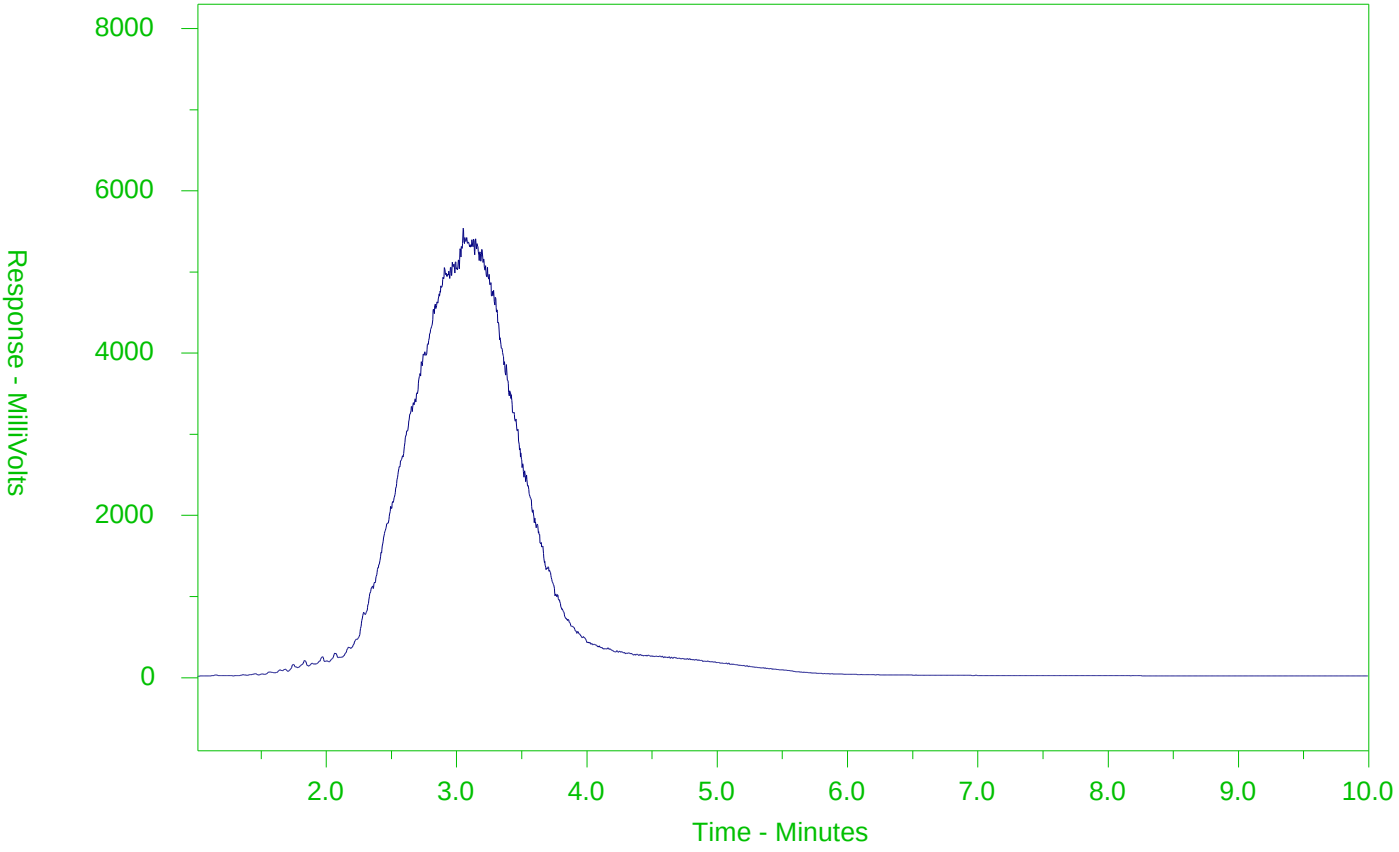
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-19
Client Sample ID: MW17-108S-9-9.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

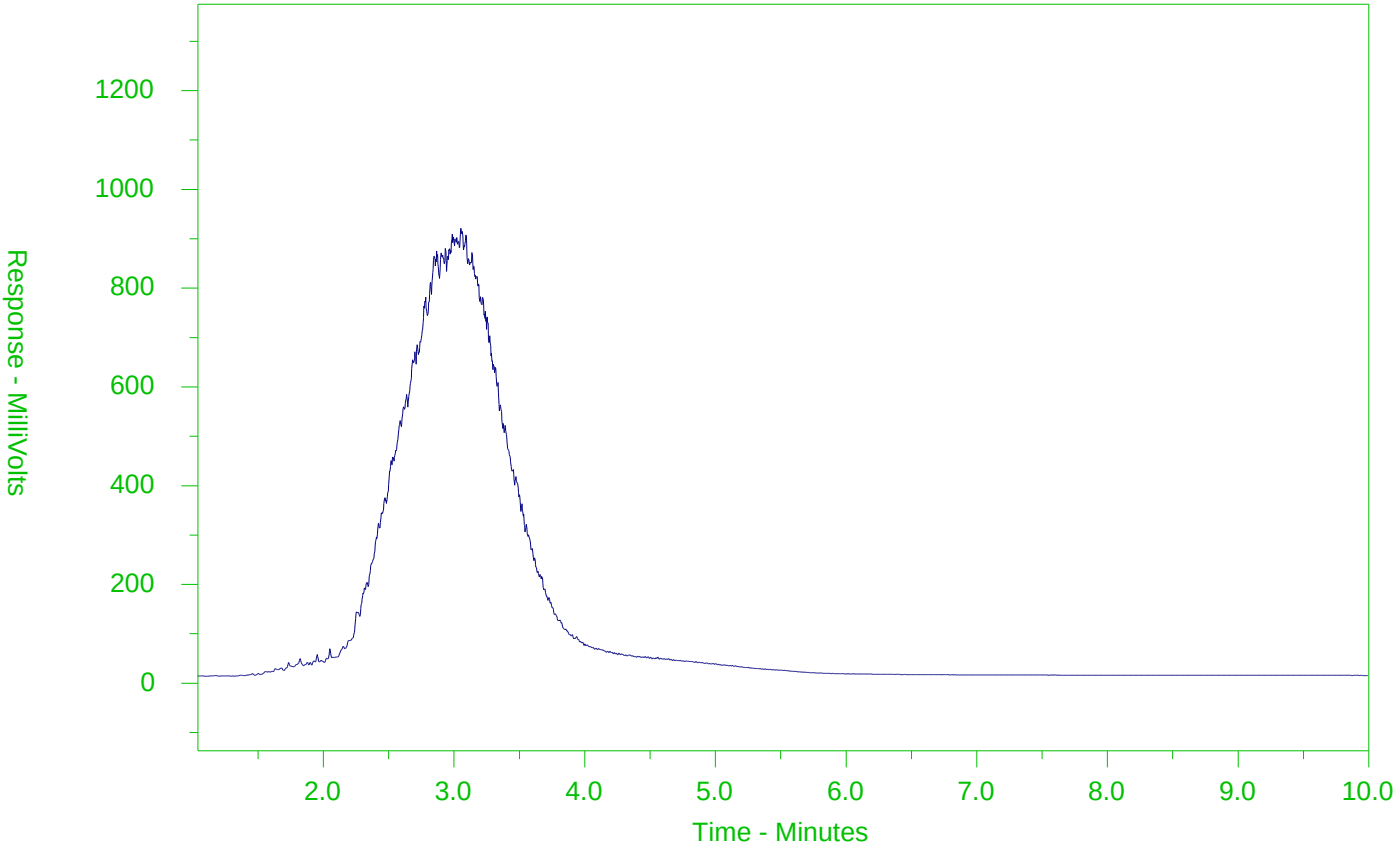
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-20
Client Sample ID: MW17-108S-10-10.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

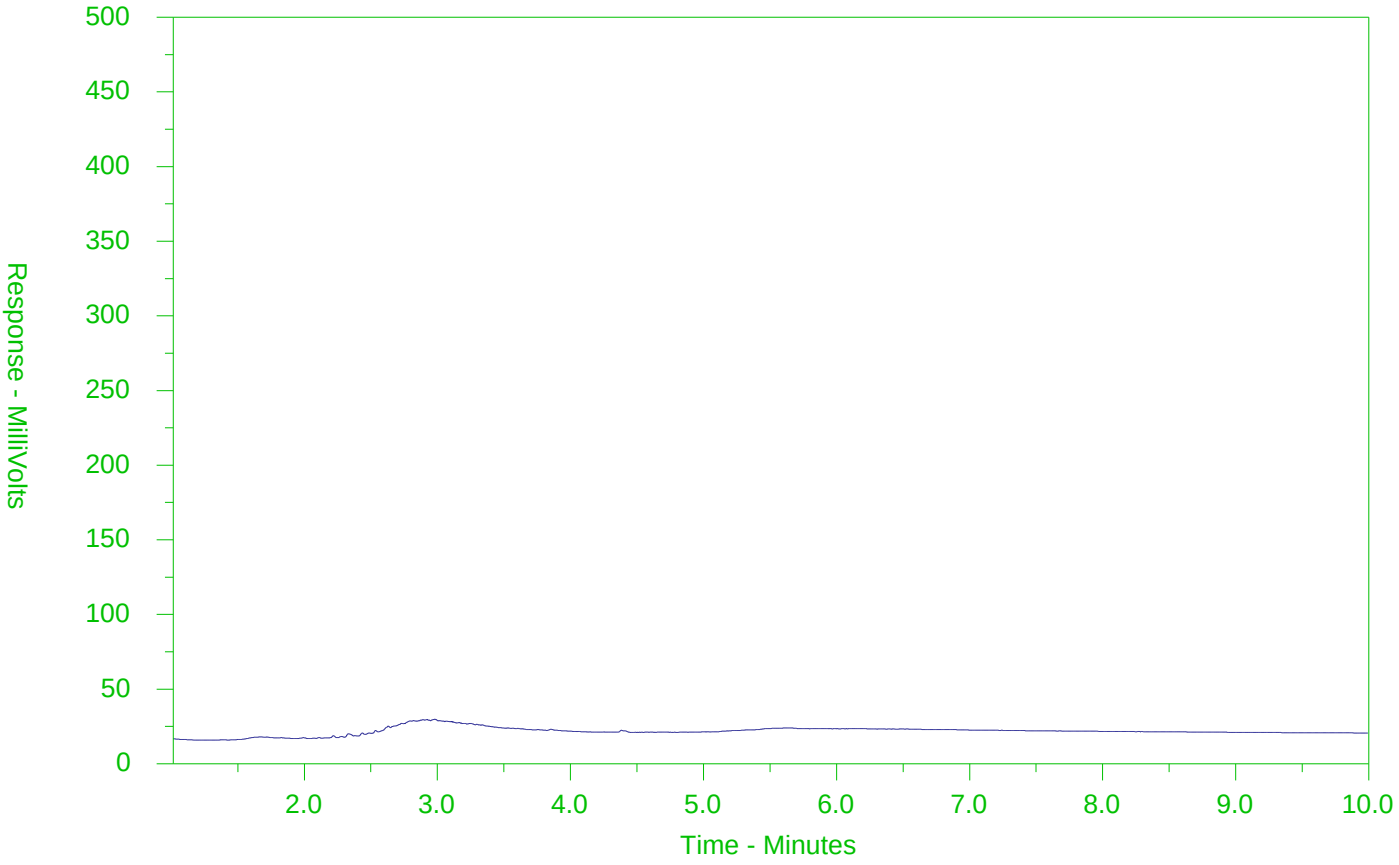
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-22
Client Sample ID: MW17-107S-0.5-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

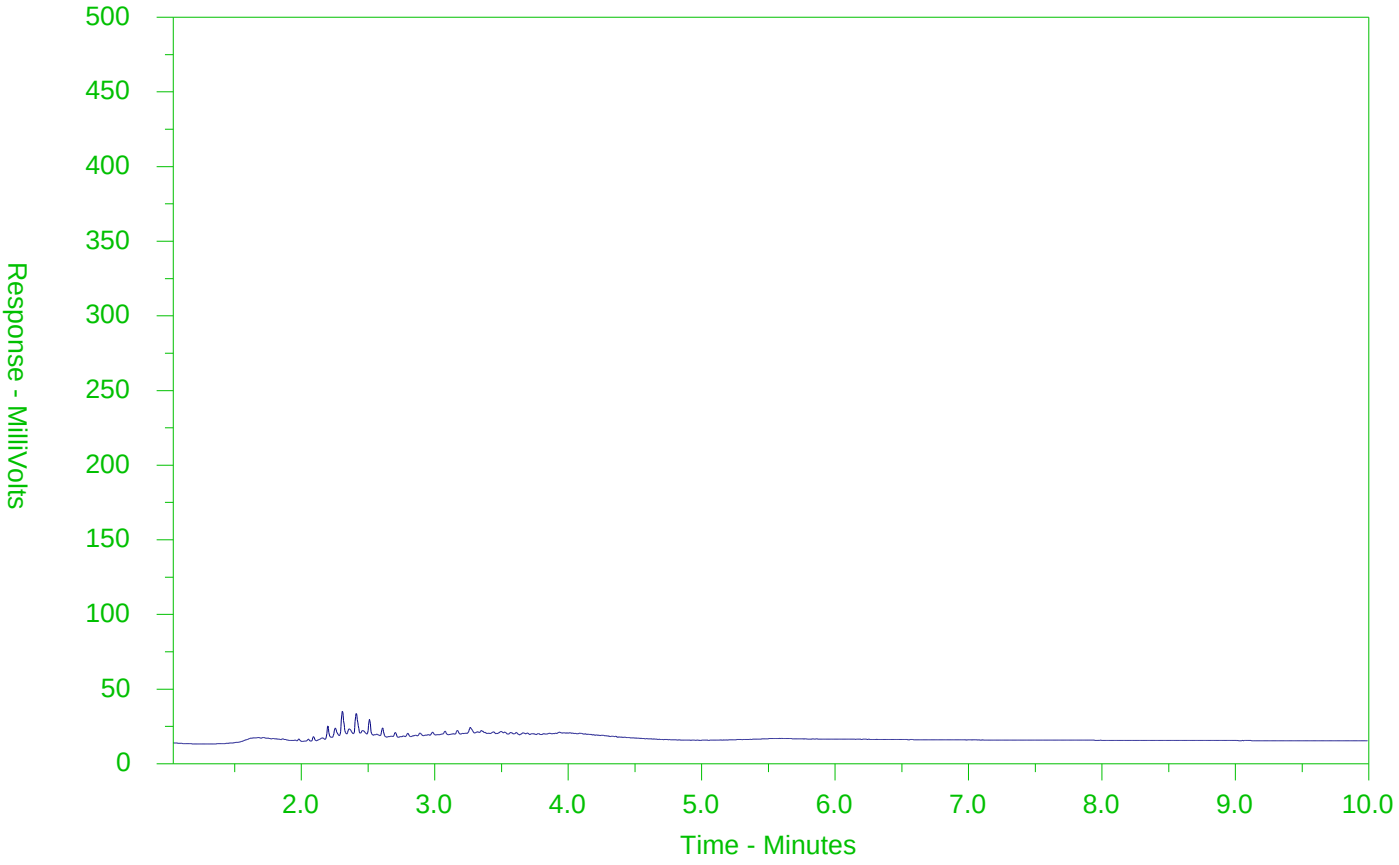
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-23
Client Sample ID: MW17-107S-4.5-5.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

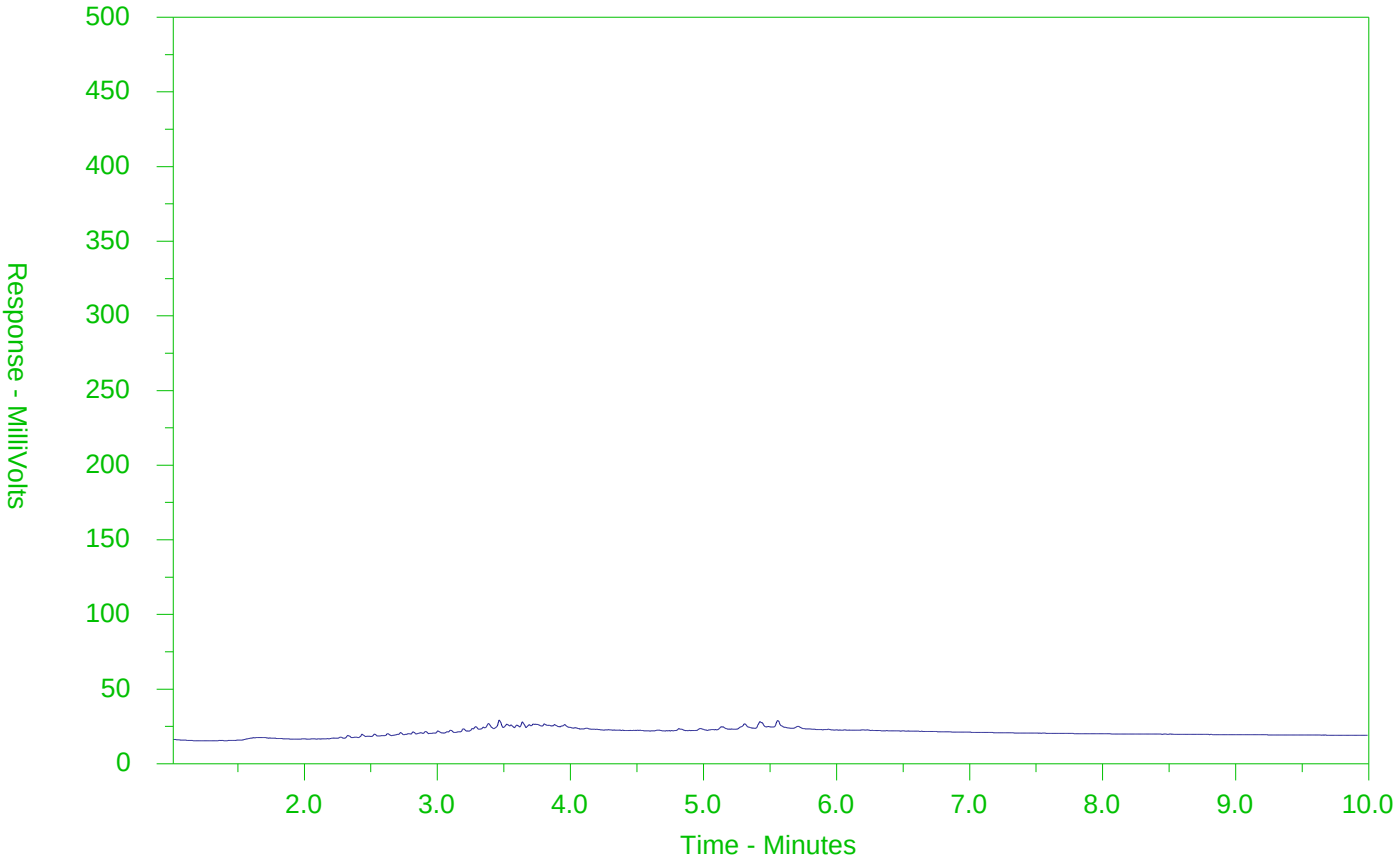
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-26
Client Sample ID: MW17-111S-2-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

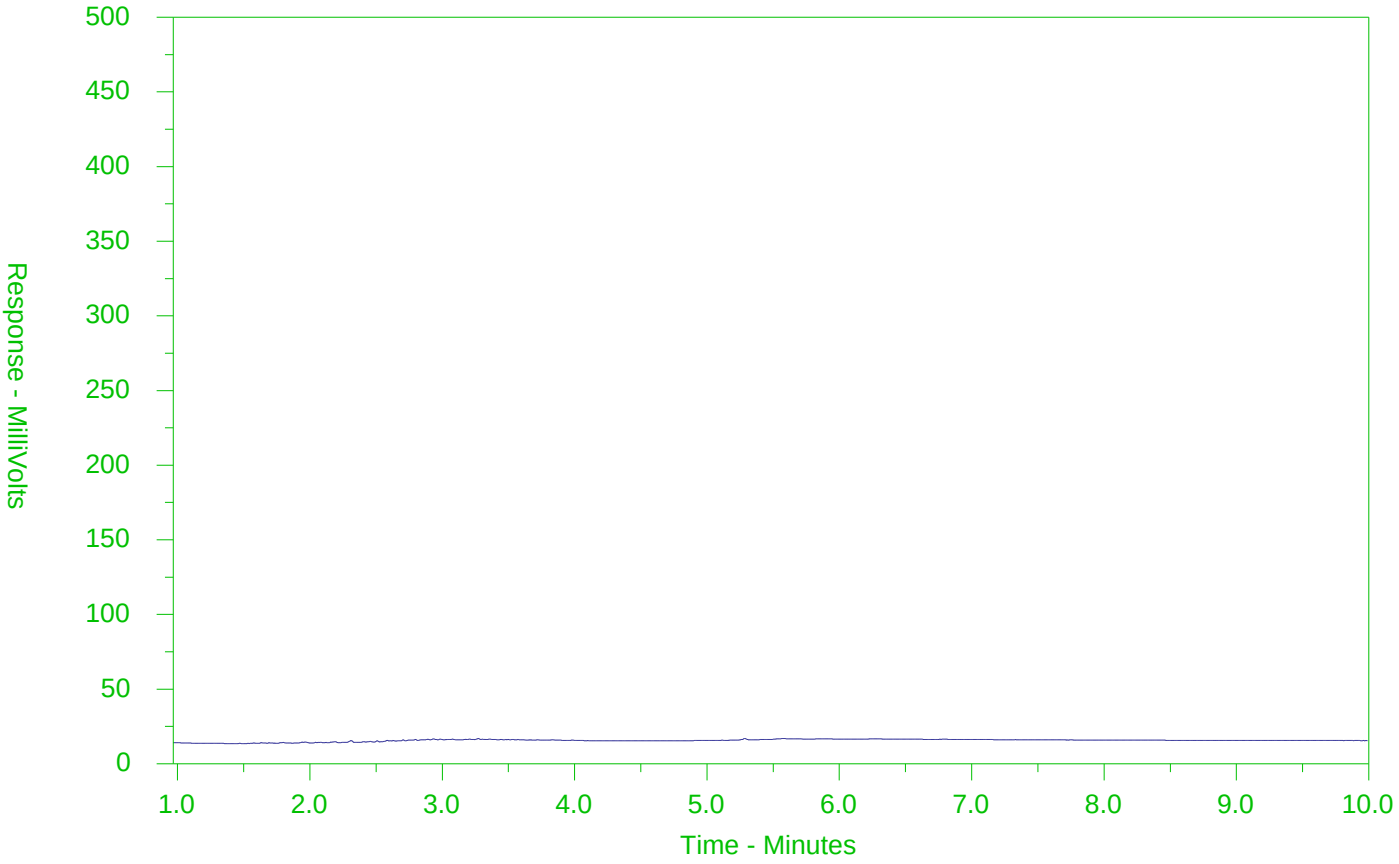
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-28
Client Sample ID: MW17-100S-1-1.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

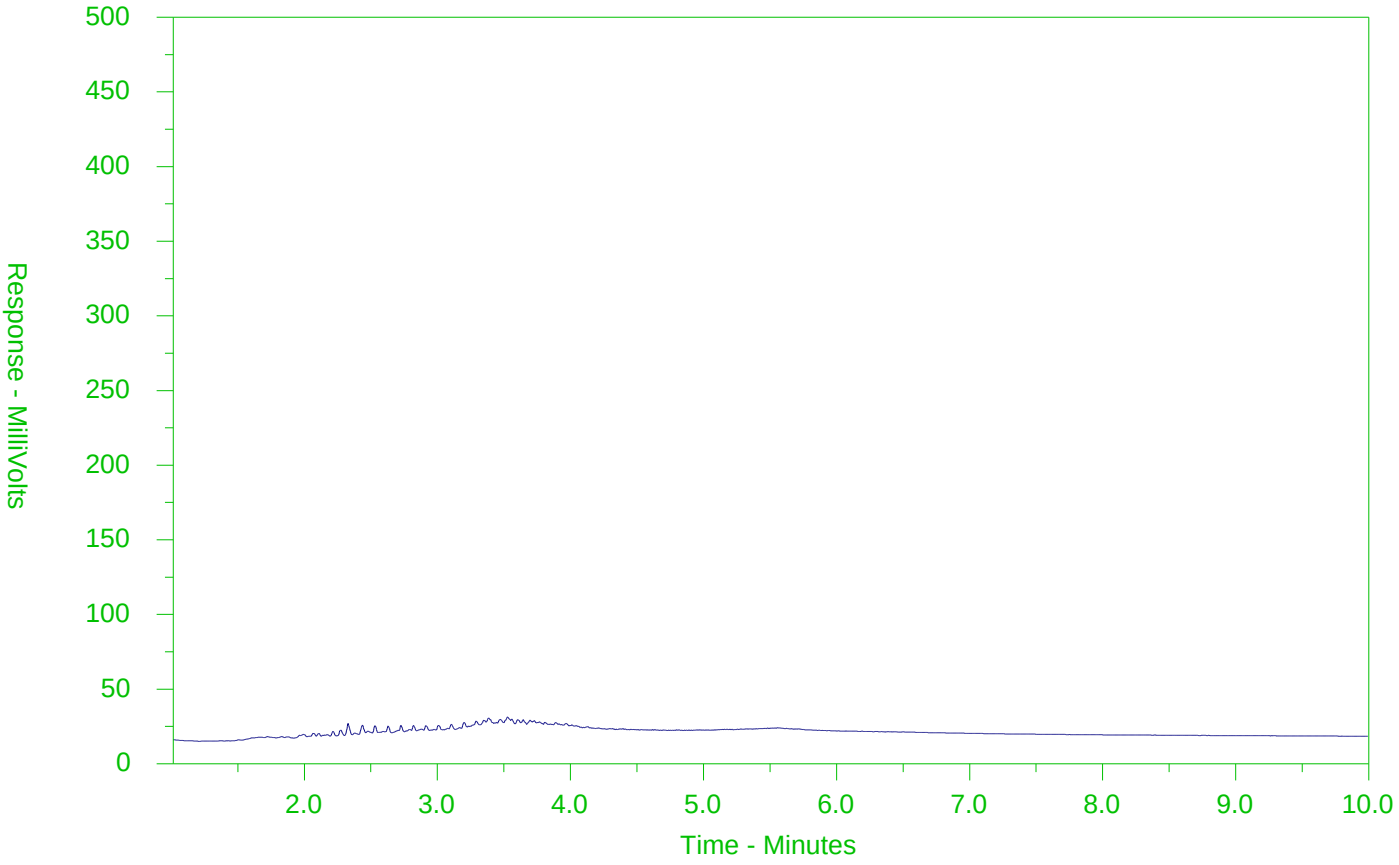
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-30
Client Sample ID: MW17-100S-6-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

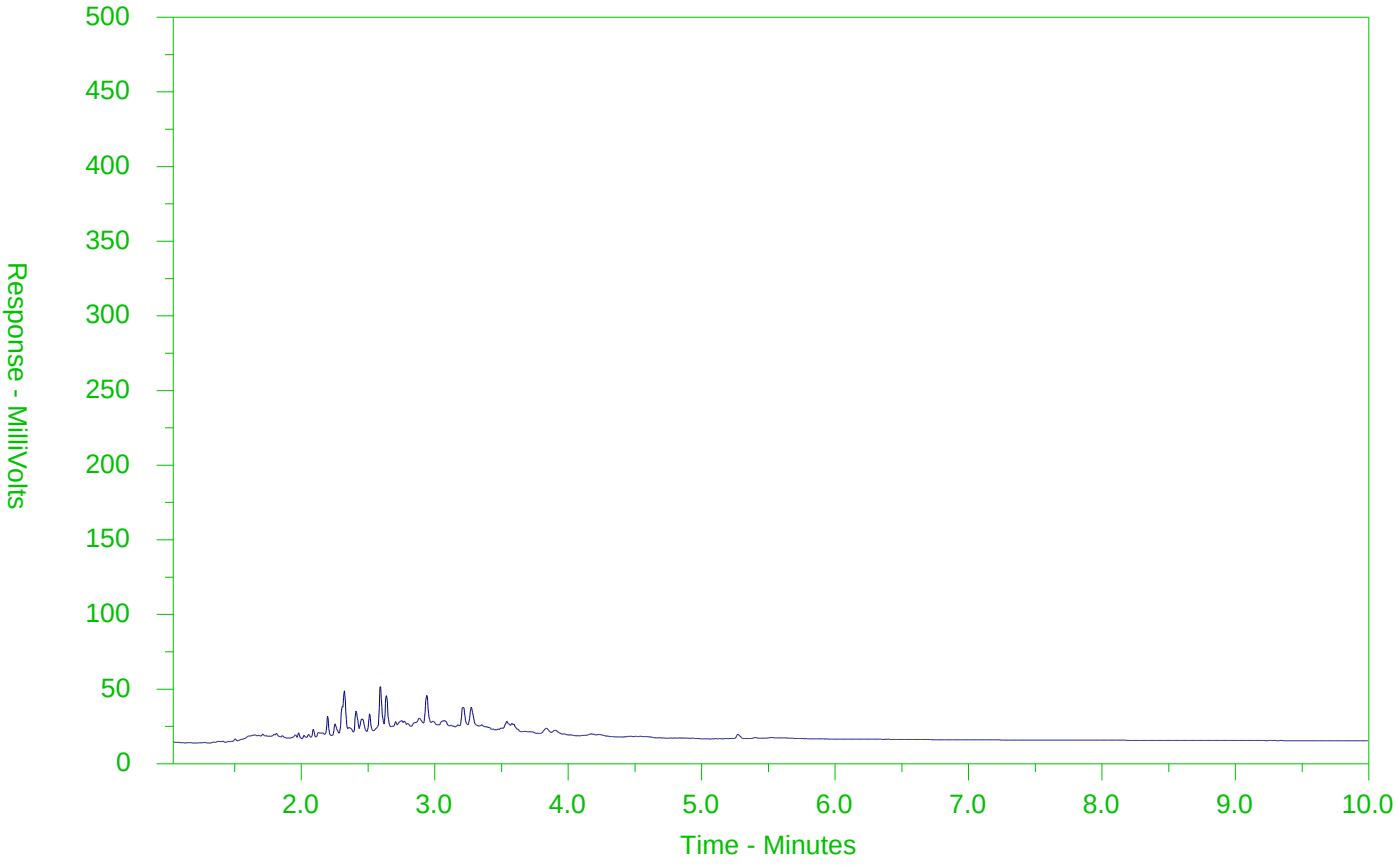
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2007635-31
Client Sample ID: DUP 7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2007635-COFC

COC Number: 17 - 616670

Page 1 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Sliny	Quality Control (QC) Report with Report YES NO	4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] (Priority) — 1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply) (Emergency)
Phone:		Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	
Street:		Email 1 or Fax: Michael.Dark@cpr.ca	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:		Email 2: kyrie	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:		Email 3	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	644757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2007635 | ALS Contact: Matty | Sampler: M. Sliny

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals + Inorg-wat	O.Reg PAH	O.Reg SVOC	O.Reg PHC	O.Reg VOC	O.Reg PCB	Boron / Furans	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	BH17-200-3-3.5	10-Oct-17	1606	Soil	X		X							2
2	BH17-200-3.5-4		1616					X	X					2
3	BH17-200-4-6		1616		X		X							2
4	BH17-200-6-6.5		1629					X	X					3
5	BH17-201-0-2		1710		X	X		X						5
6	BH17-201-2-3		1725		X	X		X						5
7	BH17-201-0-1		1710							X	(H)	X		2
8	BH17-201-1-2		1710							H	H	X		2
9	BH17-202-0-2		1422		X	X								2
10	BH17-202-2-4		1430					X	X					3
11	BH17-202-4-6		1440		X	X								2
12	BH17-202-6-7		1512					X	X					3

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 RPI
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen / SIF Observations Yes / No
Ice Packs / Ice Cubes / Custody seal Intact Yes / No
Cooling Initiated

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				9.9			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 2017/10/16	Time: 1005	Received by:	Date:	Time:	Received by: AP	Date: 10-16-17	Time: 15:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

DA

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2007635-COFC

COC Number: 17 - 616673

Page 2 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Levels Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shirey	Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax: Michael / Derek	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2: Kymik	
Postal Code:		Email 3:	

Invoice To		Invoice Distribution
	Same as Report To YES NO	Select Invoice Distribution: EMAIL MAIL FAX
	Copy of Invoice with Report YES NO	
Company:		Email 1 or Fax
Contact:	Acct Payable	Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Mathy	Sampler: M. Shirey

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	0.2g Metals + Hg; F	0.2g PAH	0.2g SVOCs	0.2g PHC + BTEX	0.2g VOCs	0.2g PCBs	TOC	1,4-Dioxane	Grain Size - Hydrometer							SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
13	BH17-203-0-2'	11-Oct-17	1006	Soil				X	X													3
14	BH17-203-6-8		1042								X											1
15	MW17-108S-0-1		1108								X											1
16	MW17-108S-1-3		1108										X									1
17	MW17-108S-2-4		1115		X		X															2
18	MW17-108S-8-9		1200		X																	1
19	MW17-108S-9-9.5		1220					X	X			X										3
20	MW17-108S-10-10.5		1232			X		X	X			X		Limited sample								3
21	DUP6	↓	—		X		X															2
22	MW17-107S-0.5-2	12-Oct-17	940		X		X	X	X													5
23	MW17-107S-4.5-5.5		1001		X		X	X	X													5
24	MW17-111S-0-1		1455	↓						X												1

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 RPI
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2017/10/16	1005						

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

MAY 2017 FRONT

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2007635-COFC

COC Number: 17 - 616671

Page 3 of 3

Report To	Contact and company name below will appear on the final report	Report Format	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shaw	Quality Control (QC) Report with Report YES NO	Priority (Business Days): 4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] — Emergency: 1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax: M. Shaw / Dirke	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2: Kyhie	
Postal Code:		Email 3	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	614757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Kathy	Sampler: M. Shaw

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	6 Reg Metals + Hg	0 Reg PAH	0 Reg SVOC	0 Reg PHC + BTEX	0 Reg VOC	6 Reg VOCs + F1	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
25	MW17-1115-0-2	12-Oct-17	1455	Soil	X								1
26	MW17-1115-2-4		1509					X	X				3
27	MW17-1115-6-7		1535						X				2
28	MW17-1005-1-1.5		1133		X			X					4
29	MW17-1005-4.5-6		12.14		X								1
30	MW17-1005-6-7		1225					X	X				3
31	DUP 7		—					X	X				3
32	DUP 8	12-Oct-17	—		X								1
33	Trip Blank D1	11-Oct-17	—	Other						X			1

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 RPI
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen / SIF Observations Yes / No
Ice Packs / Ice Cubes / Custody seal intact Yes / No
Cooling Initiated

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 2017/10/17	Time: 1605	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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If any samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 20-OCT-17
Report Date: 12-APR-21 14:46 (MT)
Version: FINAL REV. 3

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2010780

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-616672
Legal Site Desc:

Comments: 12-APR-21:
L2010780-3, 4, 5, 6, 7, 9, 10 - results for Bismuth, Iron, Calcium and Magnesium included.

23-NOV-17: F2-F4-UW results included.

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-1 MW17-109S-0-1									
Sampled By: M.SHIRY on 16-OCT-17 @ 09:38									
Matrix: SOIL									
Physical Tests									
% Moisture	7.90		0.10	%	24-OCT-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.010		0.010	ug/g	26-OCT-17				
Aroclor 1248	<0.010		0.010	ug/g	26-OCT-17				
Aroclor 1254	<0.010		0.010	ug/g	26-OCT-17				
Aroclor 1260	<0.010		0.010	ug/g	26-OCT-17				
Total PCBs	<0.020		0.020	ug/g	26-OCT-17	1.1	1.1	0.35	0.35
Surrogate: d14-Terphenyl	89.3		60-140	%	26-OCT-17				
L2010780-3 MW17-109S-0-2									
Sampled By: M.SHIRY on 16-OCT-17 @ 09:38									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.127		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
% Moisture	7.83		0.10	%	21-OCT-17				
pH	7.63		0.10	pH units	24-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.31	SAR:M	0.10	SAR	26-OCT-17	12	12	5	5
Calcium (Ca)	2.3		1.0	mg/L	26-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	26-OCT-17				
Sodium (Na)	1.7		1.0	mg/L	26-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
Arsenic (As)	6.0		1.0	ug/g	26-OCT-17	18	18	18	18
Barium (Ba)	16.8		1.0	ug/g	26-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	26-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	6.0		5.0	ug/g	26-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	26-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	108000		50	ug/g	12-APR-21				
Chromium (Cr)	8.1		1.0	ug/g	26-OCT-17	160	160	160	160
Cobalt (Co)	3.3		1.0	ug/g	26-OCT-17	80	100	22	22
Copper (Cu)	12.0		1.0	ug/g	26-OCT-17	230	300	140	180
Iron (Fe)	11400		50	ug/g	12-APR-21				
Lead (Pb)	7.9		1.0	ug/g	26-OCT-17	120	120	120	120
Magnesium (Mg)	32500		20	ug/g	12-APR-21				
Mercury (Hg)	0.0089		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
Nickel (Ni)	6.0		1.0	ug/g	26-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	26-OCT-17	33	33	23	23

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2010780-3	MW17-109S-0-2									
Sampled By:	M.SHIRY on 16-OCT-17 @ 09:38									
Matrix:	SOIL						#1	#2	#3	#4
Metals										
	Vanadium (V)	19.7		1.0	ug/g	26-OCT-17	86	86	86	86
	Zinc (Zn)	56.6		5.0	ug/g	26-OCT-17	340	340	340	340
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	24-OCT-17	8	10	8	10
L2010780-4	MW17-109S-4-5									
Sampled By:	M.SHIRY on 16-OCT-17 @ 09:56									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.153		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	15.0		0.10	%	21-OCT-17				
	pH	8.14		0.10	pH units	24-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.26		0.10	SAR	26-OCT-17	12	12	5	5
	Calcium (Ca)	3.2		1.0	mg/L	26-OCT-17				
	Magnesium (Mg)	1.5		1.0	mg/L	26-OCT-17				
	Sodium (Na)	2.3		1.0	mg/L	26-OCT-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
	Arsenic (As)	2.0		1.0	ug/g	26-OCT-17	18	18	18	18
	Barium (Ba)	18.3		1.0	ug/g	26-OCT-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	26-OCT-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	15.4		5.0	ug/g	26-OCT-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.14		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
	Cadmium (Cd)	11.7		0.50	ug/g	26-OCT-17	*1.9	*1.9	*1.2	*1.2
	Calcium (Ca)	196000		50	ug/g	12-APR-21				
	Chromium (Cr)	6.0		1.0	ug/g	26-OCT-17	160	160	160	160
	Cobalt (Co)	3.7		1.0	ug/g	26-OCT-17	80	100	22	22
	Copper (Cu)	11.8		1.0	ug/g	26-OCT-17	230	300	140	180
	Iron (Fe)	5630		50	ug/g	12-APR-21				
	Lead (Pb)	158		1.0	ug/g	26-OCT-17	*120	*120	*120	*120
	Magnesium (Mg)	103000		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0960		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	1.3		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
	Nickel (Ni)	8.0		1.0	ug/g	26-OCT-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
	Uranium (U)	1.7		1.0	ug/g	26-OCT-17	33	33	23	23
	Vanadium (V)	10.9		1.0	ug/g	26-OCT-17	86	86	86	86
	Zinc (Zn)	3900	DLHC	40	ug/g	28-OCT-17	*340	*340	*340	*340
Speciated Metals										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-4 MW17-109S-4-5 Sampled By: M.SHIRY on 16-OCT-17 @ 09:56 Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	24-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	24-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	24-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	24-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	24-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	24-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	24-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	24-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	24-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	24-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	24-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	24-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.164		0.050	ug/g	24-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	24-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	24-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	24-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	24-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	24-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	24-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	24-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	24-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	24-OCT-17				
m+p-Xylenes	0.032		0.030	ug/g	24-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	25-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	94.6		50-140	%	24-OCT-17				
Surrogate: 1,4-Difluorobenzene	96.8		50-140	%	24-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-4	MW17-109S-4-5									
Sampled By:	M.SHIRY on 16-OCT-17 @ 09:56									
Matrix:	SOIL									
Hydrocarbons										
	F1 (C6-C10)	8.0		5.0	ug/g	24-OCT-17	55	65	55	65
	F1-BTEX	8.0		5.0	ug/g	25-OCT-17	55	65	55	65
	F2 (C10-C16)	38		10	ug/g	25-OCT-17	230	250	98	150
	F3a (C16-C22)	83		25	ug/g	25-OCT-17				
	F3 (C16-C34)	232		50	ug/g	25-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	149		25	ug/g	25-OCT-17				
	F4 (C34-C50)	63		50	ug/g	25-OCT-17	3300	6600	2800	5600
	F4G-SG (GHH-Silica)	360		250	ug/g	24-OCT-17	3300	6600	2800	5600
							3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	341		72	ug/g	25-OCT-17				
	Chrom. to baseline at nC50	NO			No Unit	25-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	86.9		60-140	%	25-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	96.9		60-140	%	24-OCT-17				
L2010780-5	MW17-110S-0-2									
Sampled By:	M.SHIRY on 16-OCT-17 @ 15:38									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.161		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	18.2		0.10	%	21-OCT-17				
	pH	7.32		0.10	pH units	24-OCT-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-OCT-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon										
	Fraction Organic Carbon	0.0051		0.0010	No Unit	26-OCT-17				
	Fraction Organic Carbon	0.0052		0.0010	No Unit	26-OCT-17				
	Fraction Organic Carbon	0.0053		0.0010	No Unit	26-OCT-17				
	Average Fraction Organic Carbon	0.0052		0.0010	No Unit	26-OCT-17				
	Total Organic Carbon	0.51		0.10	%	26-OCT-17				
	Total Organic Carbon	0.52		0.10	%	26-OCT-17				
	Total Organic Carbon	0.53		0.10	%	26-OCT-17				
Saturated Paste Extractables										
	SAR	<0.11	SAR:DL	0.11	SAR	26-OCT-17	12	12	5	5
	Calcium (Ca)	4.5		1.0	mg/L	26-OCT-17				
	Magnesium (Mg)	1.3		1.0	mg/L	26-OCT-17				
	Sodium (Na)	<1.0		1.0	mg/L	26-OCT-17				
Metals										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-5 MW17-110S-0-2									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:38									
Matrix: SOIL									
Metals									
Antimony (Sb)	2.9		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
Arsenic (As)	9.9		1.0	ug/g	26-OCT-17	18	18	18	18
Barium (Ba)	46.2		1.0	ug/g	26-OCT-17	670	670	390	390
Beryllium (Be)	0.56		0.50	ug/g	26-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	9.3		5.0	ug/g	26-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.49		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	26-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	4110		50	ug/g	12-APR-21				
Chromium (Cr)	12.7		1.0	ug/g	26-OCT-17	160	160	160	160
Cobalt (Co)	5.9		1.0	ug/g	26-OCT-17	80	100	22	22
Copper (Cu)	44.0		1.0	ug/g	26-OCT-17	230	300	140	180
Iron (Fe)	28800		50	ug/g	12-APR-21				
Lead (Pb)	149		1.0	ug/g	26-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	1550		20	ug/g	12-APR-21				
Mercury (Hg)	0.0605		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.7		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
Nickel (Ni)	16.2		1.0	ug/g	26-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	26-OCT-17	33	33	23	23
Vanadium (V)	17.1		1.0	ug/g	26-OCT-17	86	86	86	86
Zinc (Zn)	130		5.0	ug/g	26-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	24-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	3.59		0.042	ug/g	27-OCT-17	30	42	*0.99	*3.4
Semi-Volatile Organics									
Acenaphthene	0.098	R	0.050	ug/g	27-OCT-17	21	29	7.9	29
Acenaphthylene	0.091		0.050	ug/g	27-OCT-17	0.15	0.17	0.15	0.17
Anthracene	0.189		0.050	ug/g	27-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.970		0.050	ug/g	27-OCT-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	0.837		0.050	ug/g	27-OCT-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	1.03		0.050	ug/g	27-OCT-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	0.634		0.050	ug/g	27-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.723		0.050	ug/g	27-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	0.237		0.050	ug/g	27-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	27-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	27-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	27-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	27-OCT-17	3.1	3.9	1.6	2
Chrysene	1.43		0.050	ug/g	27-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	0.185		0.050	ug/g	27-OCT-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	27-OCT-17	1	1	1	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-5 MW17-110S-0-2									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:38									
Matrix: SOIL									
Semi-Volatile Organics									
2,4-Dichlorophenol	<0.10		0.10	ug/g	27-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	27-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	27-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	27-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	27-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	27-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	27-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	27-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	27-OCT-17	28	35	5	5
Fluoranthene	1.92		0.050	ug/g	27-OCT-17	9.6	9.6	*0.69	*0.69
Fluorene	0.151		0.050	ug/g	27-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.648		0.050	ug/g	27-OCT-17	0.76	0.95	*0.38	*0.48
1-Methylnaphthalene	1.80		0.030	ug/g	27-OCT-17	30	42	*0.99	3.4
2-Methylnaphthalene	1.79		0.030	ug/g	27-OCT-17	30	42	*0.99	3.4
Naphthalene	1.04		0.050	ug/g	27-OCT-17	9.6	28	*0.6	*0.75
Pentachlorophenol	<0.10		0.10	ug/g	27-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	2.71		0.050	ug/g	27-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	27-OCT-17	9.4	9.4	9.4	9.4
Pyrene	1.56		0.050	ug/g	27-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	27-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	27-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	27-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	83.6		50-140	%	27-OCT-17				
Surrogate: Nitrobenzene d5	83.7		50-140	%	27-OCT-17				
Surrogate: Phenol d5	76.6		30-130	%	27-OCT-17				
Surrogate: p-Terphenyl d14	84.6		50-140	%	27-OCT-17				
Surrogate: 2,4,6-Tribromophenol	69.8		50-140	%	27-OCT-17				
L2010780-6 MW17-110S-4-6									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:54									
Matrix: SOIL									
Physical Tests									
Conductivity	0.163		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
% Moisture	3.10		0.10	%	21-OCT-17				
pH	8.38		0.10	pH units	24-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-OCT-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon									
Fraction Organic Carbon	0.237		0.0010	No Unit	26-OCT-17				
Fraction Organic Carbon	0.242		0.0010	No Unit	26-OCT-17				
Fraction Organic Carbon	0.251		0.0010	No Unit	26-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-6 MW17-110S-4-6									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:54									
Matrix: SOIL									
Organic / Inorganic Carbon									
Average Fraction Organic Carbon	0.243		0.0010	No Unit	26-OCT-17				
Total Organic Carbon	23.7		0.10	%	26-OCT-17				
Total Organic Carbon	24.2		0.10	%	26-OCT-17				
Total Organic Carbon	25.1		0.10	%	26-OCT-17				
Saturated Paste Extractables									
SAR	0.26		0.10	SAR	26-OCT-17	12	12	5	5
Calcium (Ca)	2.8		1.0	mg/L	26-OCT-17				
Magnesium (Mg)	3.2		1.0	mg/L	26-OCT-17				
Sodium (Na)	2.7		1.0	mg/L	26-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.4		1.0	ug/g	26-OCT-17	18	18	18	18
Barium (Ba)	19.0		1.0	ug/g	26-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	26-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.6		5.0	ug/g	26-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.17		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	26-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	134000		50	ug/g	12-APR-21				
Chromium (Cr)	7.3		1.0	ug/g	26-OCT-17	160	160	160	160
Cobalt (Co)	2.8		1.0	ug/g	26-OCT-17	80	100	22	22
Copper (Cu)	5.3		1.0	ug/g	26-OCT-17	230	300	140	180
Iron (Fe)	11200		50	ug/g	12-APR-21				
Lead (Pb)	65.3		1.0	ug/g	26-OCT-17	120	120	120	120
Magnesium (Mg)	77700		20	ug/g	12-APR-21				
Mercury (Hg)	0.0313		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
Nickel (Ni)	6.3		1.0	ug/g	26-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	26-OCT-17	33	33	23	23
Vanadium (V)	14.5		1.0	ug/g	26-OCT-17	86	86	86	86
Zinc (Zn)	398		5.0	ug/g	26-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	24-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	24-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	24-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	24-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	24-OCT-17	0.61	1.7	0.27	0.26

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-6 MW17-110S-4-6									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:54									
Matrix: SOIL									
Volatile Organic Compounds									
Bromomethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	24-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	24-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	24-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	24-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	24-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	24-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	24-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	24-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	24-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	24-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	24-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	24-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	24-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	24-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	24-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	24-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	24-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	24-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	25-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	99.4		50-140	%	24-OCT-17				
Surrogate: 1,4-Difluorobenzene	100.4		50-140	%	24-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	24-OCT-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	26-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	25-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	26-OCT-17				
F3a (C16-C22)	25		25	ug/g	25-OCT-17				

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-6 MW17-110S-4-6									
Sampled By: M.SHIRY on 16-OCT-17 @ 15:54									
Matrix: SOIL									
Hydrocarbons									
F3 (C16-C34)	128		50	ug/g	25-OCT-17	1700	2500	300	1300
F3b (C22-C34)	103		25	ug/g	25-OCT-17				
F3-PAH	128		50	ug/g	26-OCT-17				
F4 (C34-C50)	94		50	ug/g	25-OCT-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	350		250	ug/g	24-OCT-17	3300	6600	2800	5600
						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	222		72	ug/g	26-OCT-17				
Chrom. to baseline at nC50	NO			No Unit	25-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	85.8		60-140	%	25-OCT-17				
Surrogate: 3,4-Dichlorotoluene	90.8		60-140	%	24-OCT-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	25-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	25-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	25-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	25-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	25-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	25-OCT-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	25-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	25-OCT-17	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	25-OCT-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	25-OCT-17	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	25-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	25-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	25-OCT-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	26-OCT-17	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	25-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	25-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	25-OCT-17	9.6	28	0.6	0.75
Phenanthrene	<0.050		0.050	ug/g	25-OCT-17	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	25-OCT-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	85.9		50-140	%	25-OCT-17				
Surrogate: p-Terphenyl d14	84.3		50-140	%	25-OCT-17				
L2010780-7 MW17-104S/D-2-4									
Sampled By: M.SHIRY on 17-OCT-17 @ 10:08									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.241		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
% Moisture	14.4		0.10	%	21-OCT-17				
pH	8.09		0.10	pH units	24-OCT-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.19		0.10	SAR	26-OCT-17	12	12	5	5
Calcium (Ca)	2.2		1.0	mg/L	26-OCT-17				
Magnesium (Mg)	14.5		1.0	mg/L	26-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-7 MW17-104S/D-2-4									
Sampled By: M.SHIRY on 17-OCT-17 @ 10:08									
Matrix: SOIL									
Saturated Paste Extractables									
Sodium (Na)	3.6		1.0	mg/L	26-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
Arsenic (As)	9.3		1.0	ug/g	26-OCT-17	18	18	18	18
Barium (Ba)	106		1.0	ug/g	26-OCT-17	670	670	390	390
Beryllium (Be)	0.57		0.50	ug/g	26-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.4		5.0	ug/g	26-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.48		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	2.35		0.50	ug/g	26-OCT-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	79500		50	ug/g	12-APR-21				
Chromium (Cr)	17.0		1.0	ug/g	26-OCT-17	160	160	160	160
Cobalt (Co)	8.5		1.0	ug/g	26-OCT-17	80	100	22	22
Copper (Cu)	32.7		1.0	ug/g	26-OCT-17	230	300	140	180
Iron (Fe)	23500		50	ug/g	12-APR-21				
Lead (Pb)	142		1.0	ug/g	26-OCT-17	*120	*120	*120	*120
Magnesium (Mg)	48600		20	ug/g	12-APR-21				
Mercury (Hg)	0.0993		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
Nickel (Ni)	24.7		1.0	ug/g	26-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	26-OCT-17	33	33	23	23
Vanadium (V)	31.1		1.0	ug/g	26-OCT-17	86	86	86	86
Zinc (Zn)	725		5.0	ug/g	26-OCT-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	25-OCT-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	30-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	30-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	30-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	30-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	30-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	30-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	30-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	30-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	30-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	30-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	30-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	30-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	30-OCT-17	3.1	3.9	1.6	2
Chrysene	<0.050		0.050	ug/g	30-OCT-17	9.6	9.6	7	7.8

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-7 MW17-104S/D-2-4									
Sampled By: M.SHIRY on 17-OCT-17 @ 10:08									
Matrix: SOIL									
Semi-Volatile Organics									
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	30-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	30-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	30-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	30-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	30-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	30-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	30-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	30-OCT-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	30-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	30-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	30-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	30-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	30-OCT-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	30-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	30-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	30-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	30-OCT-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	30-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	30-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	30-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	30-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	83.6		50-140	%	30-OCT-17				
Surrogate: Nitrobenzene d5	82.0		50-140	%	30-OCT-17				
Surrogate: Phenol d5	78.2		30-130	%	30-OCT-17				
Surrogate: p-Terphenyl d14	87.3		50-140	%	30-OCT-17				
Surrogate: 2,4,6-Tribromophenol	67.1		50-140	%	30-OCT-17				
L2010780-8 MW17-104S/D-4-6									
Sampled By: M.SHIRY on 17-OCT-17 @ 10:18									
Matrix: SOIL									
Physical Tests									
% Moisture	4.03		0.10	%	21-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	24-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	24-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	24-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	24-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	24-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	24-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	24-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	24-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2010780-8	MW17-104S/D-4-6									
Sampled By:	M.SHIRY on 17-OCT-17 @ 10:18									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	24-OCT-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	24-OCT-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	24-OCT-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	24-OCT-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	24-OCT-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	24-OCT-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	24-OCT-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	24-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	24-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	24-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	24-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	24-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	24-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	24-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	25-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	92.7		50-140	%	24-OCT-17				
	Surrogate: 1,4-Difluorobenzene	94.5		50-140	%	24-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	24-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	25-OCT-17	55	65	55	65
	F2 (C10-C16)	14		10	ug/g	25-OCT-17	230	250	98	150
	F3a (C16-C22)	<25		25	ug/g	25-OCT-17				
	F3 (C16-C34)	59		50	ug/g	25-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	39		25	ug/g	25-OCT-17				
	F4 (C34-C50)	<50		50	ug/g	25-OCT-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	72		72	ug/g	25-OCT-17				
	Chrom. to baseline at nC50	YES			No Unit	25-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	79.8		60-140	%	25-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	103.1		60-140	%	24-OCT-17				

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2010780-9	MW17-104S/D-4-6-H									
Sampled By:	M.SHIRY on 17-OCT-17 @ 10:18									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.225		0.0040	mS/cm	17-NOV-17	1.4	1.4	0.7	0.7
	% Moisture	4.14		0.10	%	13-NOV-17				
	pH	8.30		0.10	pH units	15-NOV-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	15-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.20		0.10	SAR	17-NOV-17	12	12	5	5
	Calcium (Ca)	4.9		1.0	mg/L	17-NOV-17				
	Magnesium (Mg)	10.2		1.0	mg/L	17-NOV-17				
	Sodium (Na)	3.5		1.0	mg/L	17-NOV-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	17-NOV-17	40	50	7.5	7.5
	Arsenic (As)	3.3		1.0	ug/g	17-NOV-17	18	18	18	18
	Barium (Ba)	12.3		1.0	ug/g	17-NOV-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	17-NOV-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	10.4		5.0	ug/g	17-NOV-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.13		0.10	ug/g	17-NOV-17	2	2	1.5	1.5
	Cadmium (Cd)	0.71		0.50	ug/g	17-NOV-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	165000		50	ug/g	12-APR-21				
	Chromium (Cr)	8.3		1.0	ug/g	17-NOV-17	160	160	160	160
	Cobalt (Co)	2.6		1.0	ug/g	17-NOV-17	80	100	22	22
	Copper (Cu)	12.8		1.0	ug/g	17-NOV-17	230	300	140	180
	Iron (Fe)	10700		50	ug/g	12-APR-21				
	Lead (Pb)	92.0		1.0	ug/g	17-NOV-17	120	120	120	120
	Magnesium (Mg)	87600		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0218		0.0050	ug/g	17-NOV-17	3.9	20	0.27	1.8
	Molybdenum (Mo)	<1.0		1.0	ug/g	17-NOV-17	40	40	6.9	6.9
	Nickel (Ni)	8.1		1.0	ug/g	17-NOV-17	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	17-NOV-17	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	17-NOV-17	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	17-NOV-17	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	17-NOV-17	33	33	23	23
	Vanadium (V)	13.2		1.0	ug/g	17-NOV-17	86	86	86	86
	Zinc (Zn)	475		5.0	ug/g	17-NOV-17	*340	*340	*340	*340
Speciated Metals										
	Chromium, Hexavalent	<0.20		0.20	ug/g	15-NOV-17	8	10	8	10
L2010780-10	BH17-204-0.5-2									
Sampled By:	M.SHIRY on 18-OCT-17 @ 12:45									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.346		0.0040	mS/cm	26-OCT-17	1.4	1.4	0.7	0.7
	% Moisture	12.3		0.10	%	21-OCT-17				
	pH	10.64		0.10	pH units	24-OCT-17				
Cyanides										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-10 BH17-204-0.5-2 Sampled By: M.SHIRY on 18-OCT-17 @ 12:45 Matrix: SOIL									
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	25-OCT-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.43	SAR:M	0.10	SAR	26-OCT-17	12	12	5	5
Calcium (Ca)	33.4		1.0	mg/L	26-OCT-17				
Magnesium (Mg)	<1.0		1.0	mg/L	26-OCT-17				
Sodium (Na)	9.1		1.0	mg/L	26-OCT-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	26-OCT-17	40	50	7.5	7.5
Arsenic (As)	2.5		1.0	ug/g	26-OCT-17	18	18	18	18
Barium (Ba)	33.8		1.0	ug/g	26-OCT-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	26-OCT-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	6.0		5.0	ug/g	26-OCT-17	120	120	120	120
Boron (B), Hot Water Ext.	0.22		0.10	ug/g	26-OCT-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	26-OCT-17	1.9	1.9	1.2	1.2
Calcium (Ca)	13700		50	ug/g	12-APR-21				
Chromium (Cr)	8.7		1.0	ug/g	26-OCT-17	160	160	160	160
Cobalt (Co)	2.9		1.0	ug/g	26-OCT-17	80	100	22	22
Copper (Cu)	12.8		1.0	ug/g	26-OCT-17	230	300	140	180
Iron (Fe)	9690		50	ug/g	12-APR-21				
Lead (Pb)	10.0		1.0	ug/g	26-OCT-17	120	120	120	120
Magnesium (Mg)	3640		20	ug/g	12-APR-21				
Mercury (Hg)	0.0054		0.0050	ug/g	26-OCT-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	26-OCT-17	40	40	6.9	6.9
Nickel (Ni)	9.1		1.0	ug/g	26-OCT-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	26-OCT-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	26-OCT-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	26-OCT-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	26-OCT-17	33	33	23	23
Vanadium (V)	12.3		1.0	ug/g	26-OCT-17	86	86	86	86
Zinc (Zn)	37.5		5.0	ug/g	26-OCT-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	25-OCT-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	24-OCT-17	16	28	16	28
Benzene	0.0120		0.0068	ug/g	24-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	24-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	24-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	24-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	24-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	24-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	24-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	1.2	1.7	1.2	1.7

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-10 BH17-204-0.5-2									
Sampled By: M.SHIRY on 18-OCT-17 @ 12:45									
Matrix: SOIL									
Volatile Organic Compounds									
1,3-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	24-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	24-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	24-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	24-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	24-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	0.039		0.018	ug/g	24-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	0.053		0.050	ug/g	24-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	24-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	24-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	24-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	24-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	24-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	24-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	24-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	24-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	24-OCT-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	24-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	0.333		0.020	ug/g	24-OCT-17				
m+p-Xylenes	0.158		0.030	ug/g	24-OCT-17				
Xylenes (Total)	0.491		0.050	ug/g	25-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	100.5		50-140	%	24-OCT-17				
Surrogate: 1,4-Difluorobenzene	105.0		50-140	%	24-OCT-17				
Hydrocarbons									
F1 (C6-C10)	13.8		5.0	ug/g	24-OCT-17	55	65	55	65
F1-BTEX	13.2		5.0	ug/g	30-OCT-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	24-OCT-17	230	250	98	150
F2-Naphth	<10		10	ug/g	30-OCT-17				
F3a (C16-C22)	<25		25	ug/g	24-OCT-17				
F3 (C16-C34)	70		50	ug/g	24-OCT-17	1700	2500	300	1300
F3b (C22-C34)	54		25	ug/g	24-OCT-17				
F3-PAH	68		50	ug/g	30-OCT-17				
F4 (C34-C50)	<50		50	ug/g	24-OCT-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	83		72	ug/g	30-OCT-17				
Chrom. to baseline at nC50	YES			No Unit	24-OCT-17				
Surrogate: 2-Bromobenzotrifluoride	91.5		60-140	%	24-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-10 BH17-204-0.5-2									
Sampled By: M.SHIRY on 18-OCT-17 @ 12:45									
Matrix: SOIL									
Hydrocarbons									
Surrogate: 3,4-Dichlorotoluene	112.8		60-140	%	24-OCT-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	0.193		0.042	ug/g	30-OCT-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	30-OCT-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	30-OCT-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	30-OCT-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.096		0.050	ug/g	30-OCT-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	0.131		0.050	ug/g	30-OCT-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	0.201		0.050	ug/g	30-OCT-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	0.180		0.050	ug/g	30-OCT-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.106		0.050	ug/g	30-OCT-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	30-OCT-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	30-OCT-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	30-OCT-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	30-OCT-17	3.1	3.9	1.6	2
Chrysene	0.162		0.050	ug/g	30-OCT-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	30-OCT-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	30-OCT-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	30-OCT-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	30-OCT-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	30-OCT-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	30-OCT-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	30-OCT-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	30-OCT-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	30-OCT-17	28	35	5	5
Fluoranthene	0.132		0.050	ug/g	30-OCT-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	30-OCT-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.138		0.050	ug/g	30-OCT-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	0.097		0.030	ug/g	30-OCT-17	30	42	0.99	3.4
2-Methylnaphthalene	0.096		0.030	ug/g	30-OCT-17	30	42	0.99	3.4
Naphthalene	0.066		0.050	ug/g	30-OCT-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	30-OCT-17	2.9	3.3	0.1	0.1
Phenanthrene	0.151		0.050	ug/g	30-OCT-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	30-OCT-17	9.4	9.4	9.4	9.4
Pyrene	0.109		0.050	ug/g	30-OCT-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	30-OCT-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	30-OCT-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	30-OCT-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	85.8		50-140	%	30-OCT-17				
Surrogate: Nitrobenzene d5	83.6		50-140	%	30-OCT-17				
Surrogate: Phenol d5	78.6		30-130	%	30-OCT-17				
Surrogate: p-Terphenyl d14	83.6		50-140	%	30-OCT-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-10 BH17-204-0.5-2 Sampled By: M.SHIRY on 18-OCT-17 @ 12:45 Matrix: SOIL									
Semi-Volatile Organics									
Surrogate: 2,4,6-Tribromophenol	57.3		50-140	%	30-OCT-17				
L2010780-11 TRIP BLANK D2 Sampled By: M.SHIRY on 20-OCT-17 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	<0.10		0.10	%	21-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	25-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	25-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	25-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	25-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	25-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	25-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	25-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	25-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	25-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	25-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	25-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	25-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	25-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	25-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	25-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	25-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	25-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	25-OCT-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	25-OCT-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	25-OCT-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	25-OCT-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	25-OCT-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	25-OCT-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	25-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-11 TRIP BLANK D2									
Sampled By: M.SHIRY on 20-OCT-17									
Matrix: SOIL									
Volatile Organic Compounds									
						4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	25-OCT-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	25-OCT-17				
m+p-Xylenes	<0.030		0.030	ug/g	25-OCT-17				
Xylenes (Total)	<0.050		0.050	ug/g	25-OCT-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	105.2		50-140	%	25-OCT-17				
Surrogate: 1,4-Difluorobenzene	104.8		50-140	%	25-OCT-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	25-OCT-17	55	65	55	65
Surrogate: 3,4-Dichlorotoluene	112.2		60-140	%	25-OCT-17				
L2010780-12 DUP9									
Sampled By: M.SHIRY on 16-OCT-17									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	5.61		0.10	%	21-OCT-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	25-OCT-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	25-OCT-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	25-OCT-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	25-OCT-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	25-OCT-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	25-OCT-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	25-OCT-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	25-OCT-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	25-OCT-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	25-OCT-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	25-OCT-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	25-OCT-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	25-OCT-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	25-OCT-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	25-OCT-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	25-OCT-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	25-OCT-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	25-OCT-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	25-OCT-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	25-OCT-17	1.6	2.3	0.75	1.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2010780-12 DUP9										
Sampled By: M.SHIRY on 16-OCT-17										
Matrix: SOIL										
Volatile Organic Compounds										
	Styrene	<0.050		0.050	ug/g	25-OCT-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	25-OCT-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	25-OCT-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	25-OCT-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	25-OCT-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	25-OCT-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	25-OCT-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	25-OCT-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	25-OCT-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	25-OCT-17				
	m+p-Xylenes	<0.030		0.030	ug/g	25-OCT-17				
	Xylenes (Total)	<0.050		0.050	ug/g	25-OCT-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	99.8		50-140	%	25-OCT-17				
	Surrogate: 1,4-Difluorobenzene	101.1		50-140	%	25-OCT-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	25-OCT-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	25-OCT-17	55	65	55	65
	F2 (C10-C16)	27		10	ug/g	24-OCT-17	230	250	98	150
	F3a (C16-C22)	56		25	ug/g	24-OCT-17				
	F3 (C16-C34)	195		50	ug/g	24-OCT-17	1700	2500	300	1300
	F3b (C22-C34)	140		25	ug/g	24-OCT-17				
	F4 (C34-C50)	84		50	ug/g	24-OCT-17	3300	6600	2800	5600
	F4G-SG (GHH-Silica)	260		250	ug/g	23-OCT-17	3300	6600	2800	5600
							3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	306		72	ug/g	25-OCT-17				
	Chrom. to baseline at nC50	NO			No Unit	24-OCT-17				
	Surrogate: 2-Bromobenzotrifluoride	91.3		60-140	%	24-OCT-17				
	Surrogate: 3,4-Dichlorotoluene	109.6		60-140	%	25-OCT-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - ON-511-T6-SOIL-RPIICC-C/F

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F4G-ADD-WT	Soil	F4G-SG (O.Reg.153/04)	MOE DECPH-E3398/CCME TIER 1

Reference Information

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

TOC-R511-WT	Soil	TOC & FOC-O.Reg 153/04 (July 2011)	CARTER 21.3.2

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

Reference Information

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-616672

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3867108								
WG2648238-4 DUP		**WG2648238-3**						
1-Methylnaphthalene		<6.0	<6.0	RPD-NA	ug/g	N/A	40	26-OCT-17
1,2,4-Trichlorobenzene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	26-OCT-17
2-Chlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
2-Methylnaphthalene		<6.0	<6.0	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4-Dichlorophenol		<0.19	<0.19	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4-Dimethylphenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4-Dinitrophenol		<2.0	<2.0	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4-Dinitrotoluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4,5-Trichlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
2,4,6-Trichlorophenol		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
2,6-Dinitrotoluene		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
3,3'-Dichlorobenzidine		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
4-Chloroaniline		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
Acenaphthene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Acenaphthylene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	26-OCT-17
Anthracene		<0.30	<0.30	RPD-NA	ug/g	N/A	40	26-OCT-17
Benzo(a)anthracene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-OCT-17
Benzo(a)pyrene		<0.20	0.27	RPD-NA	ug/g	N/A	40	26-OCT-17
Benzo(b)fluoranthene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-OCT-17
Benzo(ghi)perylene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Benzo(k)fluoranthene		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-OCT-17
Biphenyl		<0.10	<0.10	RPD-NA	ug/g	N/A	40	26-OCT-17
Bis(2-chloroethyl)ether		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
Bis(2-chloroisopropyl)ether		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
Bis(2-ethylhexyl)phthalate		<10	<10	RPD-NA	ug/g	N/A	40	26-OCT-17
Chrysene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Dibenzo(a,h)anthracene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	26-OCT-17
Diethylphthalate		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
Dimethylphthalate		<0.20	<0.20	RPD-NA	ug/g	N/A	40	26-OCT-17
Fluoranthene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Fluorene		<10	<10	RPD-NA	ug/g	N/A	40	26-OCT-17
Indeno(1,2,3-cd)pyrene		<0.25	<0.25	RPD-NA	ug/g	N/A	40	26-OCT-17
Naphthalene		<2.5	<2.5		ug/g			26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3867108								
WG2648238-4 DUP		**WG2648238-3**						
Naphthalene		<2.5	<2.5	RPD-NA	ug/g	N/A	40	26-OCT-17
Pentachlorophenol		<0.80	<0.80	RPD-NA	ug/g	N/A	40	26-OCT-17
Phenanthrene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Phenol		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
Pyrene		<5.0	<5.0	RPD-NA	ug/g	N/A	40	26-OCT-17
WG2648238-2 LCS								
1-Methylnaphthalene			76.3		%		50-140	26-OCT-17
1,2,4-Trichlorobenzene			85.8		%		50-140	26-OCT-17
2-Chlorophenol			89.2		%		50-140	26-OCT-17
2-Methylnaphthalene			67.5		%		50-140	26-OCT-17
2,4-Dichlorophenol			91.0		%		50-140	26-OCT-17
2,4-Dimethylphenol			94.0		%		30-130	26-OCT-17
2,4-Dinitrophenol			75.9		%		30-130	26-OCT-17
2,4-Dinitrotoluene			80.4		%		50-140	26-OCT-17
2,4,5-Trichlorophenol			75.6		%		50-140	26-OCT-17
2,4,6-Trichlorophenol			75.0		%		50-140	26-OCT-17
2,6-Dinitrotoluene			74.5		%		50-140	26-OCT-17
3,3'-Dichlorobenzidine			68.4		%		30-130	26-OCT-17
4-Chloroaniline			89.0		%		30-130	26-OCT-17
Acenaphthene			71.4		%		50-140	26-OCT-17
Acenaphthylene			74.0		%		50-140	26-OCT-17
Anthracene			87.3		%		50-140	26-OCT-17
Benzo(a)anthracene			91.1		%		50-140	26-OCT-17
Benzo(a)pyrene			89.2		%		50-140	26-OCT-17
Benzo(b)fluoranthene			83.8		%		50-140	26-OCT-17
Benzo(ghi)perylene			82.8		%		50-140	26-OCT-17
Benzo(k)fluoranthene			93.1		%		50-140	26-OCT-17
Biphenyl			71.5		%		50-140	26-OCT-17
Bis(2-chloroethyl)ether			91.1		%		50-140	26-OCT-17
Bis(2-chloroisopropyl)ether			81.7		%		50-140	26-OCT-17
Bis(2-ethylhexyl)phthalate			80.0		%		50-140	26-OCT-17
Chrysene			91.7		%		50-140	26-OCT-17
Dibenzo(a,h)anthracene			80.4		%		50-140	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3867108								
WG2648238-2 LCS								
Diethylphthalate			77.2		%		50-140	26-OCT-17
Dimethylphthalate			70.2		%		50-140	26-OCT-17
Fluoranthene			86.2		%		50-140	26-OCT-17
Fluorene			82.9		%		50-140	26-OCT-17
Indeno(1,2,3-cd)pyrene			84.4		%		50-140	26-OCT-17
Naphthalene			86.1		%		50-140	26-OCT-17
Pentachlorophenol			82.9		%		50-140	26-OCT-17
Phenanthrene			88.2		%		50-140	26-OCT-17
Phenol			91.9		%		30-130	26-OCT-17
Pyrene			87.6		%		50-140	26-OCT-17
WG2648238-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	26-OCT-17
1,2,4-Trichlorobenzene			<0.050		ug/g		0.05	26-OCT-17
2-Chlorophenol			<0.10		ug/g		0.1	26-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	26-OCT-17
2,4-Dichlorophenol			<0.10		ug/g		0.1	26-OCT-17
2,4-Dimethylphenol			<0.10		ug/g		0.1	26-OCT-17
2,4-Dinitrophenol			<1.0		ug/g		1	26-OCT-17
2,4-Dinitrotoluene			<0.10		ug/g		0.1	26-OCT-17
2,4,5-Trichlorophenol			<0.10		ug/g		0.1	26-OCT-17
2,4,6-Trichlorophenol			<0.10		ug/g		0.1	26-OCT-17
2,6-Dinitrotoluene			<0.10		ug/g		0.1	26-OCT-17
3,3'-Dichlorobenzidine			<0.10		ug/g		0.1	26-OCT-17
4-Chloroaniline			<0.10		ug/g		0.1	26-OCT-17
Acenaphthene			<0.050		ug/g		0.05	26-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	26-OCT-17
Anthracene			<0.050		ug/g		0.05	26-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	26-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	26-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	26-OCT-17
Benzo(ghi)perylene			<0.050		ug/g		0.05	26-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	26-OCT-17
Biphenyl			<0.050		ug/g		0.05	26-OCT-17
Bis(2-chloroethyl)ether			<0.10		ug/g		0.1	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3867108								
WG2648238-1 MB								
Bis(2-chloroisopropyl)ether			<0.10		ug/g		0.1	26-OCT-17
Bis(2-ethylhexyl)phthalate			<0.10		ug/g		0.1	26-OCT-17
Chrysene			<0.050		ug/g		0.05	26-OCT-17
Dibenzo(a,h)anthracene			<0.050		ug/g		0.05	26-OCT-17
Diethylphthalate			<0.10		ug/g		0.1	26-OCT-17
Dimethylphthalate			<0.10		ug/g		0.1	26-OCT-17
Fluoranthene			<0.050		ug/g		0.05	26-OCT-17
Fluorene			<0.050		ug/g		0.05	26-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	26-OCT-17
Naphthalene			<0.050		ug/g		0.05	26-OCT-17
Pentachlorophenol			<0.10		ug/g		0.1	26-OCT-17
Phenanthrene			<0.050		ug/g		0.05	26-OCT-17
Phenol			<0.10		ug/g		0.1	26-OCT-17
Pyrene			<0.050		ug/g		0.05	26-OCT-17
Surrogate: 2-Fluorobiphenyl			58.9		%		50-140	26-OCT-17
Surrogate: 2,4,6-Tribromophenol			65.1		%		50-140	26-OCT-17
Surrogate: Nitrobenzene d5			88.4		%		50-140	26-OCT-17
Surrogate: p-Terphenyl d14			86.9		%		50-140	26-OCT-17
Surrogate: Phenol d5			85.0		%		30-130	26-OCT-17
WG2648238-5 MS		**WG2648238-3**						
1-Methylnaphthalene			99.99		%		50-140	26-OCT-17
1,2,4-Trichlorobenzene			85.9		%		50-140	26-OCT-17
2-Chlorophenol			93.9		%		50-140	26-OCT-17
2-Methylnaphthalene			87.8		%		50-140	26-OCT-17
2,4-Dichlorophenol			93.7		%		50-140	26-OCT-17
2,4-Dimethylphenol			96.2		%		30-150	26-OCT-17
2,4-Dinitrophenol			83.0		%		30-150	26-OCT-17
2,4-Dinitrotoluene			97.4		%		50-140	26-OCT-17
2,4,5-Trichlorophenol			92.2		%		50-140	26-OCT-17
2,4,6-Trichlorophenol			95.2		%		50-140	26-OCT-17
2,6-Dinitrotoluene			91.3		%		50-140	26-OCT-17
3,3'-Dichlorobenzidine			78.0		%		30-130	26-OCT-17
4-Chloroaniline			79.6		%		30-130	26-OCT-17
Acenaphthene			83.6		%		50-140	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3867108								
WG2648238-5 MS		**WG2648238-3**						
Acenaphthylene			89.5		%		50-140	26-OCT-17
Anthracene			92.5		%		50-140	26-OCT-17
Benzo(a)anthracene			101.8		%		50-140	26-OCT-17
Benzo(a)pyrene			106.3		%		50-140	26-OCT-17
Benzo(b)fluoranthene			92.7		%		50-140	26-OCT-17
Benzo(ghi)perylene			108.0		%		50-140	26-OCT-17
Benzo(k)fluoranthene			105.1		%		50-140	26-OCT-17
Biphenyl			90.4		%		50-140	26-OCT-17
Bis(2-chloroethyl)ether			91.4		%		50-140	26-OCT-17
Bis(2-chloroisopropyl)ether			89.5		%		50-140	26-OCT-17
Bis(2-ethylhexyl)phthalate			105.0		%		50-140	26-OCT-17
Chrysene			98.8		%		50-140	26-OCT-17
Dibenzo(a,h)anthracene			101.0		%		50-140	26-OCT-17
Diethylphthalate			90.7		%		50-140	26-OCT-17
Dimethylphthalate			81.7		%		50-140	26-OCT-17
Fluoranthene			96.4		%		50-140	26-OCT-17
Fluorene			93.4		%		50-140	26-OCT-17
Indeno(1,2,3-cd)pyrene			110.9		%		50-140	26-OCT-17
Naphthalene			89.7		%		50-140	26-OCT-17
Pentachlorophenol			93.3		%		50-140	26-OCT-17
Phenanthrene			93.3		%		50-140	26-OCT-17
Phenol			93.9		%		30-130	26-OCT-17
Pyrene			99.97		%		50-140	26-OCT-17
B-HWS-R511-WT	**Soil**							
Batch R3866986								
WG2648912-4 DUP		**L2011221-1**						
Boron (B), Hot Water Ext.		0.46	0.44		ug/g	2.6	30	26-OCT-17
WG2648912-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			81.3		%		70-130	26-OCT-17
WG2648912-3 LCS								
Boron (B), Hot Water Ext.			101.2		%		70-130	26-OCT-17
WG2648912-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R3866989								
WG2648915-4 DUP		**L2011593-6**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	26-OCT-17
WG2648915-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			95.7		%		70-130	26-OCT-17
WG2648915-3 LCS								
Boron (B), Hot Water Ext.			98.5		%		70-130	26-OCT-17
WG2648915-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	26-OCT-17
Batch R3886933								
WG2665754-4 DUP		**L2021032-7**						
Boron (B), Hot Water Ext.		0.15	0.16		ug/g	1.5	30	17-NOV-17
WG2665754-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			103.3		%		70-130	17-NOV-17
WG2665754-3 LCS								
Boron (B), Hot Water Ext.			115.7		%		70-130	17-NOV-17
WG2665754-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	17-NOV-17
CN-WAD-R511-WT	**Soil**							
Batch R3865857								
WG2646123-3 DUP		**L2010780-3**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	24-OCT-17
WG2646123-2 LCS								
Cyanide, Weak Acid Diss			87.9		%		80-120	24-OCT-17
WG2646123-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	24-OCT-17
WG2646123-4 MS		**L2010780-3**						
Cyanide, Weak Acid Diss			91.4		%		70-130	24-OCT-17
Batch R3866706								
WG2646274-3 DUP		**L2010996-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	25-OCT-17
WG2646274-2 LCS								
Cyanide, Weak Acid Diss			89.1		%		80-120	25-OCT-17
WG2646274-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	25-OCT-17
WG2646274-4 MS		**L2010996-1**						
Cyanide, Weak Acid Diss			104.2		%		70-130	25-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
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KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-WAD-R511-WT	**Soil**							
Batch R3886390								
WG2662944-3 DUP		**L2020171-2**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	15-NOV-17
WG2662944-2 LCS								
Cyanide, Weak Acid Diss			92.0		%		80-120	15-NOV-17
WG2662944-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	15-NOV-17
WG2662944-4 MS		**L2020171-2**						
Cyanide, Weak Acid Diss			102.8		%		70-130	16-NOV-17
CR-CR6-IC-WT	**Soil**							
Batch R3865017								
WG2645870-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			87.5		%		70-130	24-OCT-17
WG2645870-3 DUP		**L2010780-3**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	24-OCT-17
WG2645870-2 LCS								
Chromium, Hexavalent			89.0		%		80-120	24-OCT-17
WG2645870-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	24-OCT-17
Batch R3865851								
WG2646260-3 CRM		**WT-SQC012**						
Chromium, Hexavalent			79.1		%		70-130	25-OCT-17
WG2646260-4 DUP		**L2010996-1**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	25-OCT-17
WG2646260-2 LCS								
Chromium, Hexavalent			90.9		%		80-120	25-OCT-17
WG2646260-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	25-OCT-17
Batch R3886087								
WG2662948-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			91.2		%		70-130	15-NOV-17
WG2662948-3 DUP		**L2010780-9**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	15-NOV-17
WG2662948-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	15-NOV-17
EC-WT	**Soil**							

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Client: Jacobs Consultancy Canada Inc.
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KITCHENER ON N2G 4Y9
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Soil**							
Batch R3867330								
WG2648918-4 DUP		**WG2648918-3**						
Conductivity		0.379	0.369		mS/cm	2.7	20	26-OCT-17
WG2649199-1 LCS								
Conductivity			100.3		%		90-110	26-OCT-17
WG2648918-1 MB								
Conductivity			<0.0040		mS/cm		0.004	26-OCT-17
Batch R3887111								
WG2665756-4 DUP		**WG2665756-3**						
Conductivity		0.111	0.120		mS/cm	8.0	20	17-NOV-17
WG2665980-1 LCS								
Conductivity			99.8		%		90-110	17-NOV-17
WG2665756-1 MB								
Conductivity			<0.0040		mS/cm		0.004	17-NOV-17
F1-HS-511-WT	**Soil**							
Batch R3865522								
WG2645854-4 DUP		**WG2645854-3**						
F1 (C6-C10)		8.0	8.3		ug/g	4.0	30	24-OCT-17
WG2645854-2 LCS								
F1 (C6-C10)			91.4		%		80-120	24-OCT-17
WG2645854-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	24-OCT-17
Surrogate: 3,4-Dichlorotoluene			95.0		%		60-140	24-OCT-17
WG2645854-7 MS		**WG2645854-6**						
F1 (C6-C10)			97.6		%		60-140	24-OCT-17
F2-F4-UW-WT	**Soil**							
Batch R3864167								
WG2645864-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			107.9		%		70-130	24-OCT-17
F3 (C16-C34)			110.1		%		70-130	24-OCT-17
F4 (C34-C50)			115.0		%		70-130	24-OCT-17
WG2645864-3 DUP		**WG2645864-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	24-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
WG2645864-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3864167								
WG2645864-2 LCS								
F2 (C10-C16)			104.8		%		70-130	24-OCT-17
F3a (C16-C22)			104.0		%		70-130	24-OCT-17
F3b (C22-C34)			105.7		%		70-130	24-OCT-17
F3 (C16-C34)			104.9		%		70-130	24-OCT-17
F4 (C34-C50)			106.0		%		70-130	24-OCT-17
WG2645864-1 MB								
F2 (C10-C16)			<10		ug/g		10	24-OCT-17
F3a (C16-C22)			<25		ug/g		25	24-OCT-17
F3b (C22-C34)			<25		ug/g		25	24-OCT-17
F3 (C16-C34)			<50		ug/g		50	24-OCT-17
F4 (C34-C50)			<50		ug/g		50	24-OCT-17
Surrogate: 2-Bromobenzotrifluoride			95.0		%		60-140	24-OCT-17
Batch R3865557								
WG2645858-3 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			98.8		%		70-130	24-OCT-17
F3 (C16-C34)			102.7		%		70-130	24-OCT-17
F4 (C34-C50)			103.4		%		70-130	24-OCT-17
WG2645858-5 DUP		**WG2645858-4**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	24-OCT-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	24-OCT-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	24-OCT-17
WG2645858-2 LCS								
F2 (C10-C16)			101.4		%		70-130	24-OCT-17
F3a (C16-C22)			98.9		%		70-130	24-OCT-17
F3b (C22-C34)			96.1		%		70-130	24-OCT-17
F3 (C16-C34)			97.5		%		70-130	24-OCT-17
F4 (C34-C50)			102.3		%		70-130	24-OCT-17
WG2645858-1 MB								
F2 (C10-C16)			<10		ug/g		10	24-OCT-17
F3a (C16-C22)			<25		ug/g		25	24-OCT-17
F3b (C22-C34)			<25		ug/g		25	24-OCT-17
F3 (C16-C34)			<50		ug/g		50	24-OCT-17

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Client: Jacobs Consultancy Canada Inc.
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KITCHENER ON N2G 4Y9
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3865557								
WG2645858-1 MB								
F4 (C34-C50)			<50		ug/g		50	24-OCT-17
Surrogate: 2-Bromobenzotrifluoride			88.8		%		60-140	24-OCT-17
F4G-ADD-511-WT	**Soil**							
Batch R3865087								
WG2647469-2 LCS								
F4G-SG (GHH-Silica)			93.3		%		60-140	23-OCT-17
WG2647469-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	23-OCT-17
Batch R3866093								
WG2648555-2 LCS								
F4G-SG (GHH-Silica)			75.6		%		60-140	24-OCT-17
WG2648555-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	24-OCT-17
F4G-ADD-WT	**Soil**							
Batch R3865087								
WG2647469-2 LCS								
F4G-SG (GHH-Silica)			93.3		%		60-120	23-OCT-17
WG2647469-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	23-OCT-17
Batch R3866093								
WG2648555-2 LCS								
F4G-SG (GHH-Silica)			75.6		%		60-120	24-OCT-17
WG2648555-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	24-OCT-17
HG-200.2-CVAA-WT	**Soil**							
Batch R3866724								
WG2648893-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			103.1		%		70-130	26-OCT-17
WG2648893-6 DUP		**WG2648893-5**						
Mercury (Hg)		0.0153	0.0154		ug/g	0.6	40	26-OCT-17
WG2648893-3 LCS								
Mercury (Hg)			108.0		%		80-120	26-OCT-17
WG2648893-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	26-OCT-17

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Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R3866728								
WG2648880-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			102.1		%		70-130	26-OCT-17
WG2648880-6 DUP		**WG2648880-5**						
Mercury (Hg)		0.0200	0.0181		ug/g	10	40	26-OCT-17
WG2648880-3 LCS								
Mercury (Hg)			108.0		%		80-120	26-OCT-17
WG2648880-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	26-OCT-17
Batch R3887021								
WG2665743-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			101.9		%		70-130	17-NOV-17
WG2665743-6 DUP		**WG2665743-5**						
Mercury (Hg)		0.0190	0.0195		ug/g	2.6	40	17-NOV-17
WG2665743-3 LCS								
Mercury (Hg)			98.0		%		80-120	17-NOV-17
WG2665743-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	17-NOV-17
MET-200.2-CCMS-WT	**Soil**							
Batch R3866866								
WG2648893-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			92.5		%		70-130	26-OCT-17
Arsenic (As)			96.9		%		70-130	26-OCT-17
Barium (Ba)			101.4		%		70-130	26-OCT-17
Beryllium (Be)			99.3		%		70-130	26-OCT-17
Bismuth (Bi)			90.6		%		70-130	26-OCT-17
Boron (B)			3.6		mg/kg		0-8.2	26-OCT-17
Cadmium (Cd)			99.3		%		70-130	26-OCT-17
Calcium (Ca)			97.4		%		70-130	26-OCT-17
Chromium (Cr)			99.4		%		70-130	26-OCT-17
Cobalt (Co)			96.3		%		70-130	26-OCT-17
Copper (Cu)			100.7		%		70-130	26-OCT-17
Iron (Fe)			98.2		%		70-130	26-OCT-17
Lead (Pb)			93.0		%		70-130	26-OCT-17
Magnesium (Mg)			100.9		%		70-130	26-OCT-17
Molybdenum (Mo)			92.9		%		70-130	26-OCT-17
Nickel (Ni)			98.3		%		70-130	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3866866								
WG2648893-2 CRM		**WT-CANMET-TILL1**						
Selenium (Se)			0.29		mg/kg		0.11-0.51	26-OCT-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	26-OCT-17
Thallium (Tl)			0.116		mg/kg		0.077-0.18	26-OCT-17
Uranium (U)			87.5		%		70-130	26-OCT-17
Vanadium (V)			99.6		%		70-130	26-OCT-17
Zinc (Zn)			95.3		%		70-130	26-OCT-17
WG2648893-6 DUP		**WG2648893-5**						
Antimony (Sb)		0.12	0.12		ug/g	1.3	30	26-OCT-17
Arsenic (As)		5.81	5.76		ug/g	0.8	30	26-OCT-17
Barium (Ba)		33.0	32.5		ug/g	1.6	40	26-OCT-17
Beryllium (Be)		0.65	0.68		ug/g	3.7	30	26-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	26-OCT-17
Boron (B)		12.3	12.2		ug/g	0.9	30	26-OCT-17
Cadmium (Cd)		0.068	0.056		ug/g	19	30	26-OCT-17
Calcium (Ca)		54900	55500		ug/g	1.1	30	26-OCT-17
Chromium (Cr)		20.6	20.3		ug/g	1.6	30	26-OCT-17
Cobalt (Co)		11.8	11.3		ug/g	3.7	30	26-OCT-17
Copper (Cu)		28.6	28.1		ug/g	1.8	30	26-OCT-17
Iron (Fe)		26900	26600		ug/g	1.0	30	26-OCT-17
Lead (Pb)		8.11	6.15		ug/g	28	40	26-OCT-17
Magnesium (Mg)		12300	12100		ug/g	1.7	30	26-OCT-17
Molybdenum (Mo)		0.32	0.29		ug/g	10	40	26-OCT-17
Nickel (Ni)		25.1	24.6		ug/g	2.1	30	26-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	26-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	26-OCT-17
Thallium (Tl)		0.086	0.095		ug/g	10	30	26-OCT-17
Uranium (U)		0.430	0.444		ug/g	3.3	30	26-OCT-17
Vanadium (V)		26.6	27.3		ug/g	2.4	30	26-OCT-17
Zinc (Zn)		52.2	50.5		ug/g	3.4	30	26-OCT-17
WG2648893-4 LCS								
Antimony (Sb)			92.5		%		80-120	26-OCT-17
Arsenic (As)			90.1		%		80-120	26-OCT-17
Barium (Ba)			91.2		%		80-120	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3866866								
WG2648893-4 LCS								
Beryllium (Be)			91.2		%		80-120	26-OCT-17
Bismuth (Bi)			89.4		%		80-120	26-OCT-17
Boron (B)			88.8		%		80-120	26-OCT-17
Cadmium (Cd)			88.0		%		80-120	26-OCT-17
Calcium (Ca)			91.8		%		80-120	26-OCT-17
Chromium (Cr)			94.0		%		80-120	26-OCT-17
Cobalt (Co)			88.6		%		80-120	26-OCT-17
Copper (Cu)			91.6		%		80-120	26-OCT-17
Iron (Fe)			96.0		%		80-120	26-OCT-17
Lead (Pb)			89.9		%		80-120	26-OCT-17
Magnesium (Mg)			95.5		%		80-120	26-OCT-17
Molybdenum (Mo)			86.8		%		80-120	26-OCT-17
Nickel (Ni)			92.5		%		80-120	26-OCT-17
Selenium (Se)			91.1		%		80-120	26-OCT-17
Silver (Ag)			86.0		%		80-120	26-OCT-17
Thallium (Tl)			87.6		%		80-120	26-OCT-17
Uranium (U)			84.0		%		80-120	26-OCT-17
Vanadium (V)			96.9		%		80-120	26-OCT-17
Zinc (Zn)			82.5		%		80-120	26-OCT-17
WG2648893-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	26-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	26-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	26-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	26-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	26-OCT-17
Boron (B)			<5.0		mg/kg		5	26-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	26-OCT-17
Calcium (Ca)			<50		mg/kg		50	26-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	26-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	26-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	26-OCT-17
Iron (Fe)			<50		mg/kg		50	26-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	26-OCT-17
Magnesium (Mg)			<20		mg/kg		20	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3866866								
WG2648893-1 MB								
Molybdenum (Mo)			<0.10		mg/kg		0.1	26-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	26-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	26-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	26-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	26-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	26-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	26-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	26-OCT-17
Batch R3867737								
WG2648880-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			89.6		%		70-130	26-OCT-17
Arsenic (As)			93.1		%		70-130	26-OCT-17
Barium (Ba)			94.8		%		70-130	26-OCT-17
Beryllium (Be)			96.1		%		70-130	26-OCT-17
Bismuth (Bi)			85.3		%		70-130	26-OCT-17
Boron (B)			3.1		mg/kg		0-8.2	26-OCT-17
Cadmium (Cd)			92.5		%		70-130	26-OCT-17
Calcium (Ca)			88.6		%		70-130	26-OCT-17
Chromium (Cr)			90.2		%		70-130	26-OCT-17
Cobalt (Co)			88.7		%		70-130	26-OCT-17
Copper (Cu)			95.4		%		70-130	26-OCT-17
Iron (Fe)			90.2		%		70-130	26-OCT-17
Lead (Pb)			87.5		%		70-130	26-OCT-17
Magnesium (Mg)			93.2		%		70-130	26-OCT-17
Molybdenum (Mo)			84.9		%		70-130	26-OCT-17
Nickel (Ni)			93.6		%		70-130	26-OCT-17
Selenium (Se)			0.25		mg/kg		0.11-0.51	26-OCT-17
Silver (Ag)			0.20		mg/kg		0.13-0.33	26-OCT-17
Thallium (Tl)			0.105		mg/kg		0.077-0.18	26-OCT-17
Uranium (U)			83.8		%		70-130	26-OCT-17
Vanadium (V)			90.5		%		70-130	26-OCT-17
Zinc (Zn)			86.6		%		70-130	26-OCT-17
WG2648880-6 DUP		**WG2648880-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	28-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3867737								
WG2648880-6 DUP		**WG2648880-5**						
Arsenic (As)		2.34	2.44		ug/g	4.2	30	28-OCT-17
Barium (Ba)		15.8	15.9		ug/g	0.5	40	28-OCT-17
Beryllium (Be)		0.17	0.17		ug/g	1.7	30	28-OCT-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	28-OCT-17
Boron (B)		7.3	5.2	J	ug/g	2.1	10	28-OCT-17
Cadmium (Cd)		0.139	0.135		ug/g	2.7	30	28-OCT-17
Calcium (Ca)		132000	135000		ug/g	1.7	30	28-OCT-17
Chromium (Cr)		7.44	7.35		ug/g	1.3	30	28-OCT-17
Cobalt (Co)		2.34	2.35		ug/g	0.2	30	28-OCT-17
Copper (Cu)		9.15	9.80		ug/g	6.9	30	28-OCT-17
Iron (Fe)		8230	8190		ug/g	0.4	30	28-OCT-17
Lead (Pb)		12.3	12.4		ug/g	1.2	40	28-OCT-17
Magnesium (Mg)		50000	50200		ug/g	0.3	30	28-OCT-17
Molybdenum (Mo)		0.35	0.39		ug/g	11	40	28-OCT-17
Nickel (Ni)		5.28	5.48		ug/g	3.7	30	28-OCT-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	28-OCT-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	28-OCT-17
Thallium (Tl)		<0.050	<0.050	RPD-NA	ug/g	N/A	30	28-OCT-17
Uranium (U)		0.306	0.310		ug/g	1.4	30	28-OCT-17
Vanadium (V)		14.6	14.5		ug/g	0.4	30	28-OCT-17
Zinc (Zn)		48.8	48.1		ug/g	1.4	30	28-OCT-17
WG2648880-4 LCS								
Antimony (Sb)			97.0		%		80-120	26-OCT-17
Arsenic (As)			91.4		%		80-120	26-OCT-17
Barium (Ba)			94.6		%		80-120	26-OCT-17
Beryllium (Be)			94.2		%		80-120	26-OCT-17
Bismuth (Bi)			91.2		%		80-120	26-OCT-17
Boron (B)			93.6		%		80-120	26-OCT-17
Cadmium (Cd)			91.7		%		80-120	26-OCT-17
Calcium (Ca)			95.0		%		80-120	26-OCT-17
Chromium (Cr)			90.9		%		80-120	26-OCT-17
Cobalt (Co)			87.3		%		80-120	26-OCT-17
Copper (Cu)			90.0		%		80-120	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3867737								
WG2648880-4 LCS								
Iron (Fe)			89.3		%		80-120	26-OCT-17
Lead (Pb)			90.7		%		80-120	26-OCT-17
Magnesium (Mg)			94.8		%		80-120	26-OCT-17
Molybdenum (Mo)			87.8		%		80-120	26-OCT-17
Nickel (Ni)			92.1		%		80-120	26-OCT-17
Selenium (Se)			91.6		%		80-120	26-OCT-17
Silver (Ag)			86.9		%		80-120	26-OCT-17
Thallium (Tl)			92.0		%		80-120	26-OCT-17
Uranium (U)			84.6		%		80-120	26-OCT-17
Vanadium (V)			94.7		%		80-120	26-OCT-17
Zinc (Zn)			86.1		%		80-120	26-OCT-17
WG2648880-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	26-OCT-17
Arsenic (As)			<0.10		mg/kg		0.1	26-OCT-17
Barium (Ba)			<0.50		mg/kg		0.5	26-OCT-17
Beryllium (Be)			<0.10		mg/kg		0.1	26-OCT-17
Bismuth (Bi)			<0.20		mg/kg		0.2	26-OCT-17
Boron (B)			<5.0		mg/kg		5	26-OCT-17
Cadmium (Cd)			<0.020		mg/kg		0.02	26-OCT-17
Calcium (Ca)			<50		mg/kg		50	26-OCT-17
Chromium (Cr)			<0.50		mg/kg		0.5	26-OCT-17
Cobalt (Co)			<0.10		mg/kg		0.1	26-OCT-17
Copper (Cu)			<0.50		mg/kg		0.5	26-OCT-17
Iron (Fe)			<50		mg/kg		50	26-OCT-17
Lead (Pb)			<0.50		mg/kg		0.5	26-OCT-17
Magnesium (Mg)			<20		mg/kg		20	26-OCT-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	26-OCT-17
Nickel (Ni)			<0.50		mg/kg		0.5	26-OCT-17
Selenium (Se)			<0.20		mg/kg		0.2	26-OCT-17
Silver (Ag)			<0.10		mg/kg		0.1	26-OCT-17
Thallium (Tl)			<0.050		mg/kg		0.05	26-OCT-17
Uranium (U)			<0.050		mg/kg		0.05	26-OCT-17
Vanadium (V)			<0.20		mg/kg		0.2	26-OCT-17
Zinc (Zn)			<2.0		mg/kg		2	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3887123								
WG2665743-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			91.1		%		70-130	17-NOV-17
Arsenic (As)			98.5		%		70-130	17-NOV-17
Barium (Ba)			108.6		%		70-130	17-NOV-17
Beryllium (Be)			103.2		%		70-130	17-NOV-17
Bismuth (Bi)			97.1		%		70-130	17-NOV-17
Boron (B)			3.4		mg/kg		0-8.2	17-NOV-17
Cadmium (Cd)			103.6		%		70-130	17-NOV-17
Calcium (Ca)			99.8		%		70-130	17-NOV-17
Chromium (Cr)			99.8		%		70-130	17-NOV-17
Cobalt (Co)			99.7		%		70-130	17-NOV-17
Copper (Cu)			98.7		%		70-130	17-NOV-17
Iron (Fe)			99.6		%		70-130	17-NOV-17
Lead (Pb)			96.7		%		70-130	17-NOV-17
Magnesium (Mg)			101.8		%		70-130	17-NOV-17
Molybdenum (Mo)			94.7		%		70-130	17-NOV-17
Nickel (Ni)			100.4		%		70-130	17-NOV-17
Selenium (Se)			0.31		mg/kg		0.11-0.51	17-NOV-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	17-NOV-17
Thallium (Tl)			0.117		mg/kg		0.077-0.18	17-NOV-17
Uranium (U)			97.9		%		70-130	17-NOV-17
Vanadium (V)			99.2		%		70-130	17-NOV-17
Zinc (Zn)			95.8		%		70-130	17-NOV-17
WG2665743-6 DUP		**WG2665743-5**						
Antimony (Sb)		0.14	0.13		ug/g	7.2	30	17-NOV-17
Arsenic (As)		5.18	5.20		ug/g	0.4	30	17-NOV-17
Barium (Ba)		70.0	69.5		ug/g	0.6	40	17-NOV-17
Beryllium (Be)		0.59	0.62		ug/g	5.1	30	17-NOV-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	17-NOV-17
Boron (B)		8.0	8.5		ug/g	5.9	30	17-NOV-17
Cadmium (Cd)		0.091	0.093		ug/g	2.1	30	17-NOV-17
Calcium (Ca)		74300	76100		ug/g	2.4	30	17-NOV-17
Chromium (Cr)		20.0	20.3		ug/g	1.6	30	17-NOV-17
Cobalt (Co)		11.0	11.2		ug/g	1.2	30	17-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3887123								
WG2665743-6 DUP		**WG2665743-5**						
Copper (Cu)		29.1	29.3		ug/g	0.7	30	17-NOV-17
Iron (Fe)		26500	26700		ug/g	0.6	30	17-NOV-17
Lead (Pb)		10.0	9.96		ug/g	0.8	40	17-NOV-17
Magnesium (Mg)		9550	9810		ug/g	2.8	30	17-NOV-17
Molybdenum (Mo)		0.40	0.41		ug/g	1.7	40	17-NOV-17
Nickel (Ni)		23.2	23.3		ug/g	0.4	30	17-NOV-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	17-NOV-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	17-NOV-17
Thallium (Tl)		0.101	0.099		ug/g	2.3	30	17-NOV-17
Uranium (U)		0.453	0.449		ug/g	1.0	30	17-NOV-17
Vanadium (V)		28.2	28.3		ug/g	0.3	30	17-NOV-17
Zinc (Zn)		59.6	60.9		ug/g	2.2	30	17-NOV-17
WG2665743-4 LCS								
Antimony (Sb)			95.0		%		80-120	17-NOV-17
Arsenic (As)			94.2		%		80-120	17-NOV-17
Barium (Ba)			96.5		%		80-120	17-NOV-17
Beryllium (Be)			93.5		%		80-120	17-NOV-17
Bismuth (Bi)			96.6		%		80-120	17-NOV-17
Boron (B)			92.6		%		80-120	17-NOV-17
Cadmium (Cd)			94.6		%		80-120	17-NOV-17
Calcium (Ca)			92.2		%		80-120	17-NOV-17
Chromium (Cr)			94.1		%		80-120	17-NOV-17
Cobalt (Co)			93.1		%		80-120	17-NOV-17
Copper (Cu)			91.3		%		80-120	17-NOV-17
Iron (Fe)			96.9		%		80-120	17-NOV-17
Lead (Pb)			94.5		%		80-120	17-NOV-17
Magnesium (Mg)			96.3		%		80-120	17-NOV-17
Molybdenum (Mo)			93.9		%		80-120	17-NOV-17
Nickel (Ni)			93.4		%		80-120	17-NOV-17
Selenium (Se)			91.6		%		80-120	17-NOV-17
Silver (Ag)			96.9		%		80-120	17-NOV-17
Thallium (Tl)			88.9		%		80-120	17-NOV-17
Uranium (U)			93.7		%		80-120	17-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3887123								
WG2665743-4 LCS								
Vanadium (V)			96.5		%		80-120	17-NOV-17
Zinc (Zn)			86.6		%		80-120	17-NOV-17
WG2665743-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	17-NOV-17
Arsenic (As)			<0.10		mg/kg		0.1	17-NOV-17
Barium (Ba)			<0.50		mg/kg		0.5	17-NOV-17
Beryllium (Be)			<0.10		mg/kg		0.1	17-NOV-17
Bismuth (Bi)			<0.20		mg/kg		0.2	17-NOV-17
Boron (B)			<5.0		mg/kg		5	17-NOV-17
Cadmium (Cd)			<0.020		mg/kg		0.02	17-NOV-17
Calcium (Ca)			<50		mg/kg		50	17-NOV-17
Chromium (Cr)			<0.50		mg/kg		0.5	17-NOV-17
Cobalt (Co)			<0.10		mg/kg		0.1	17-NOV-17
Copper (Cu)			<0.50		mg/kg		0.5	17-NOV-17
Iron (Fe)			<50		mg/kg		50	17-NOV-17
Lead (Pb)			<0.50		mg/kg		0.5	17-NOV-17
Magnesium (Mg)			<20		mg/kg		20	17-NOV-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	17-NOV-17
Nickel (Ni)			<0.50		mg/kg		0.5	17-NOV-17
Selenium (Se)			<0.20		mg/kg		0.2	17-NOV-17
Silver (Ag)			<0.10		mg/kg		0.1	17-NOV-17
Thallium (Tl)			<0.050		mg/kg		0.05	17-NOV-17
Uranium (U)			<0.050		mg/kg		0.05	17-NOV-17
Vanadium (V)			<0.20		mg/kg		0.2	17-NOV-17
Zinc (Zn)			<2.0		mg/kg		2	17-NOV-17
MOISTURE-WT	**Soil**							
Batch R3862813								
WG2645310-3 DUP		**L2010921-1**						
% Moisture		5.14	4.67		%	9.5	20	21-OCT-17
WG2645310-2 LCS								
% Moisture			99.6		%		90-110	21-OCT-17
WG2645310-1 MB								
% Moisture			<0.10		%		0.1	21-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R3862816								
WG2645275-3 DUP		**L2010577-1**						
% Moisture		3.38	3.04		%	11	20	21-OCT-17
WG2645275-2 LCS								
% Moisture			99.5		%		90-110	21-OCT-17
WG2645275-1 MB								
% Moisture			<0.10		%		0.1	21-OCT-17
Batch R3862818								
WG2645273-3 DUP		**L2010780-7**						
% Moisture		14.4	14.6		%	1.4	20	21-OCT-17
WG2645273-2 LCS								
% Moisture			99.8		%		90-110	21-OCT-17
WG2645273-1 MB								
% Moisture			<0.10		%		0.1	21-OCT-17
Batch R3863757								
WG2646379-3 DUP		**L2011240-1**						
% Moisture		17.7	17.1		%	3.3	20	24-OCT-17
WG2646379-2 LCS								
% Moisture			99.6		%		90-110	24-OCT-17
WG2646379-1 MB								
% Moisture			<0.10		%		0.1	24-OCT-17
Batch R3884067								
WG2662839-3 DUP		**L2021603-1**						
% Moisture		8.01	8.10		%	1.1	20	13-NOV-17
WG2662839-2 LCS								
% Moisture			95.5		%		90-110	13-NOV-17
WG2662839-1 MB								
% Moisture			<0.10		%		0.1	13-NOV-17
PAH-511-WT	**Soil**							
Batch R3865946								
WG2645866-3 DUP		**WG2645866-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-OCT-17
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-OCT-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3865946								
WG2645866-3 DUP		**WG2645866-5**						
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-OCT-17
WG2645866-2 LCS								
1-Methylnaphthalene			84.3		%		50-140	25-OCT-17
2-Methylnaphthalene			83.1		%		50-140	25-OCT-17
Acenaphthene			83.4		%		50-140	25-OCT-17
Acenaphthylene			81.9		%		50-140	25-OCT-17
Anthracene			79.8		%		50-140	25-OCT-17
Benzo(a)anthracene			81.9		%		50-140	25-OCT-17
Benzo(a)pyrene			81.8		%		50-140	25-OCT-17
Benzo(b)fluoranthene			78.6		%		50-140	25-OCT-17
Benzo(g,h,i)perylene			80.0		%		50-140	25-OCT-17
Benzo(k)fluoranthene			86.3		%		50-140	25-OCT-17
Chrysene			90.7		%		50-140	25-OCT-17
Dibenzo(ah)anthracene			83.9		%		50-140	25-OCT-17
Fluoranthene			78.0		%		50-140	25-OCT-17
Fluorene			81.6		%		50-140	25-OCT-17
Indeno(1,2,3-cd)pyrene			77.5		%		50-140	25-OCT-17
Naphthalene			86.3		%		50-140	25-OCT-17
Phenanthrene			82.3		%		50-140	25-OCT-17
Pyrene			80.6		%		50-140	25-OCT-17
WG2645866-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	25-OCT-17
2-Methylnaphthalene			<0.030		ug/g		0.03	25-OCT-17
Acenaphthene			<0.050		ug/g		0.05	

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3865946								
WG2645866-1 MB								
Acenaphthene			<0.050		ug/g		0.05	25-OCT-17
Acenaphthylene			<0.050		ug/g		0.05	25-OCT-17
Anthracene			<0.050		ug/g		0.05	25-OCT-17
Benzo(a)anthracene			<0.050		ug/g		0.05	25-OCT-17
Benzo(a)pyrene			<0.050		ug/g		0.05	25-OCT-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	25-OCT-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	25-OCT-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	25-OCT-17
Chrysene			<0.050		ug/g		0.05	25-OCT-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	25-OCT-17
Fluoranthene			<0.050		ug/g		0.05	25-OCT-17
Fluorene			<0.050		ug/g		0.05	25-OCT-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	25-OCT-17
Naphthalene			<0.050		ug/g		0.05	25-OCT-17
Phenanthrene			<0.050		ug/g		0.05	25-OCT-17
Pyrene			<0.050		ug/g		0.05	25-OCT-17
Surrogate: 2-Fluorobiphenyl			83.5		%		50-140	25-OCT-17
Surrogate: p-Terphenyl d14			79.7		%		50-140	25-OCT-17
WG2645866-4 MS		**WG2645866-5**						
1-Methylnaphthalene			78.6		%		50-140	25-OCT-17
2-Methylnaphthalene			77.8		%		50-140	25-OCT-17
Acenaphthene			78.5		%		50-140	25-OCT-17
Acenaphthylene			78.7		%		50-140	25-OCT-17
Anthracene			76.3		%		50-140	25-OCT-17
Benzo(a)anthracene			79.0		%		50-140	25-OCT-17
Benzo(a)pyrene			78.4		%		50-140	25-OCT-17
Benzo(b)fluoranthene			73.9		%		50-140	25-OCT-17
Benzo(g,h,i)perylene			73.9		%		50-140	25-OCT-17
Benzo(k)fluoranthene			82.2		%		50-140	25-OCT-17
Chrysene			83.6		%		50-140	25-OCT-17
Dibenzo(ah)anthracene			78.9		%		50-140	25-OCT-17
Fluoranthene			75.4		%		50-140	25-OCT-17
Fluorene			77.6		%		50-140	25-OCT-17
Indeno(1,2,3-cd)pyrene			73.6		%		50-140	25-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3865946								
WG2645866-4 MS		**WG2645866-5**						
Naphthalene			80.4		%		50-140	25-OCT-17
Phenanthrene			76.6		%		50-140	25-OCT-17
Pyrene			76.6		%		50-140	25-OCT-17
PCB-511-WT	**Soil**							
Batch R3866908								
WG2646431-4 DUP		**WG2646431-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-OCT-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-OCT-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-OCT-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-OCT-17
WG2646431-2 LCS								
Aroclor 1242			84.4		%		60-140	26-OCT-17
Aroclor 1248			90.2		%		60-140	26-OCT-17
Aroclor 1254			92.9		%		60-140	26-OCT-17
Aroclor 1260			111.7		%		60-140	26-OCT-17
WG2646431-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	26-OCT-17
Aroclor 1248			<0.010		ug/g		0.01	26-OCT-17
Aroclor 1254			<0.010		ug/g		0.01	26-OCT-17
Aroclor 1260			<0.010		ug/g		0.01	26-OCT-17
Surrogate: d14-Terphenyl			101.6		%		60-140	26-OCT-17
WG2646431-5 MS		**WG2646431-3**						
Aroclor 1242			87.2		%		60-140	26-OCT-17
Aroclor 1254			91.6		%		60-140	26-OCT-17
Aroclor 1260			110.9		%		60-140	26-OCT-17
PH-WT	**Soil**							
Batch R3865113								
WG2645862-1 DUP		**L2010709-1**						
pH		7.83	7.86	J	pH units	0.03	0.3	24-OCT-17
WG2647033-1 LCS								
pH			6.97		pH units		6.9-7.1	24-OCT-17
Batch R3885603								
WG2662946-1 DUP		**L2010780-9**						
pH		8.30	8.29	J	pH units	0.01	0.3	15-NOV-17
WG2664056-1 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Soil**							
Batch R3885603								
WG2664056-1 LCS								
pH			6.97		pH units		6.9-7.1	15-NOV-17
SAR-R511-WT	**Soil**							
Batch R3867705								
WG2648918-4 DUP		**WG2648918-3**						
Calcium (Ca)		12.9	13.0		mg/L	0.6	30	26-OCT-17
Sodium (Na)		31.9	33.1		mg/L	3.9	30	26-OCT-17
Magnesium (Mg)		2.9	2.9		mg/L	2.1	30	26-OCT-17
WG2648918-2 IRM		**WT SAR1**						
Calcium (Ca)			72.4		%		70-130	26-OCT-17
Sodium (Na)			72.7		%		70-130	26-OCT-17
Magnesium (Mg)			95.9		%		70-130	26-OCT-17
WG2648918-1 MB								
Calcium (Ca)			<1.0		mg/L		1	26-OCT-17
Sodium (Na)			<1.0		mg/L		1	26-OCT-17
Magnesium (Mg)			<1.0		mg/L		1	26-OCT-17
Batch R3887136								
WG2665756-4 DUP		**WG2665756-3**						
Calcium (Ca)		4.5	4.4		mg/L	1.0	30	17-NOV-17
Sodium (Na)		2.8	3.7		mg/L	28	30	17-NOV-17
Magnesium (Mg)		1.2	1.2		mg/L	3.2	30	17-NOV-17
WG2665756-2 IRM		**WT SAR1**						
Calcium (Ca)			108.4		%		70-130	17-NOV-17
Sodium (Na)			100.3		%		70-130	17-NOV-17
Magnesium (Mg)			108.2		%		70-130	17-NOV-17
WG2665756-1 MB								
Calcium (Ca)			<1.0		mg/L		1	17-NOV-17
Sodium (Na)			<1.0		mg/L		1	17-NOV-17
Magnesium (Mg)			<1.0		mg/L		1	17-NOV-17
TOC-R511-WT	**Soil**							
Batch R3866790								
WG2647938-3 CRM		**WT-TOC-CRM**						
Total Organic Carbon			100.0		%		70-130	26-OCT-17
WG2647938-4 DUP		**L2011518-1**						
Total Organic Carbon		0.74	0.73		%	0.0	35	26-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-R511-WT	**Soil**							
Batch R3866790								
WG2647938-2 LCS								
Total Organic Carbon			100.3		%		80-120	26-OCT-17
Total Organic Carbon			100.3		%		80-120	26-OCT-17
Total Organic Carbon			100.3		%		80-120	26-OCT-17
WG2647938-1 MB								
Total Organic Carbon			<0.10		%		0.1	26-OCT-17
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-4 DUP		**WG2645854-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	24-OCT-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-OCT-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-4 DUP		**WG2645854-3**						
n-Hexane		0.164	0.171		ug/g	4.3	40	24-OCT-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
m+p-Xylenes		0.032	0.032		ug/g	0.8	40	24-OCT-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-OCT-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-OCT-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	24-OCT-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-OCT-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	24-OCT-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-OCT-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-OCT-17
WG2645854-2 LCS								
1,1,1,2-Tetrachloroethane			93.8		%		60-130	24-OCT-17
1,1,2,2-Tetrachloroethane			96.3		%		60-130	24-OCT-17
1,1,1-Trichloroethane			89.8		%		60-130	24-OCT-17
1,1,2-Trichloroethane			97.9		%		60-130	24-OCT-17
1,1-Dichloroethane			89.3		%		60-130	24-OCT-17
1,1-Dichloroethylene			80.7		%		60-130	24-OCT-17
1,2-Dibromoethane			98.5		%		70-130	24-OCT-17
1,2-Dichlorobenzene			99.2		%		70-130	24-OCT-17
1,2-Dichloroethane			94.5		%		60-130	24-OCT-17
1,2-Dichloropropane			98.9		%		70-130	24-OCT-17
1,3-Dichlorobenzene			97.3		%		70-130	24-OCT-17
1,4-Dichlorobenzene			99.1		%		70-130	24-OCT-17
Acetone			102.9		%		60-140	24-OCT-17
Benzene			97.5		%		70-130	24-OCT-17
Bromodichloromethane			90.9		%		50-140	24-OCT-17
Bromoform			90.0		%		70-130	24-OCT-17
Bromomethane			89.4		%		50-140	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-2 LCS								
Carbon tetrachloride			89.2		%		70-130	24-OCT-17
Chlorobenzene			97.0		%		70-130	24-OCT-17
Chloroform			95.2		%		70-130	24-OCT-17
cis-1,2-Dichloroethylene			96.4		%		70-130	24-OCT-17
cis-1,3-Dichloropropene			93.5		%		70-130	24-OCT-17
Dibromochloromethane			96.6		%		60-130	24-OCT-17
Dichlorodifluoromethane			48.4	MES	%		50-140	24-OCT-17
Ethylbenzene			92.7		%		70-130	24-OCT-17
n-Hexane			96.3		%		70-130	24-OCT-17
Methylene Chloride			100.3		%		70-130	24-OCT-17
MTBE			94.3		%		70-130	24-OCT-17
m+p-Xylenes			92.7		%		70-130	24-OCT-17
Methyl Ethyl Ketone			102.9		%		60-140	24-OCT-17
Methyl Isobutyl Ketone			92.5		%		60-140	24-OCT-17
o-Xylene			93.5		%		70-130	24-OCT-17
Styrene			93.0		%		70-130	24-OCT-17
Tetrachloroethylene			91.7		%		60-130	24-OCT-17
Toluene			93.9		%		70-130	24-OCT-17
trans-1,2-Dichloroethylene			94.2		%		60-130	24-OCT-17
trans-1,3-Dichloropropene			90.3		%		70-130	24-OCT-17
Trichloroethylene			95.5		%		60-130	24-OCT-17
Trichlorofluoromethane			87.1		%		50-140	24-OCT-17
Vinyl chloride			84.6		%		60-140	24-OCT-17
WG2645854-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	24-OCT-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	24-OCT-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	24-OCT-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	24-OCT-17
1,1-Dichloroethane			<0.050		ug/g		0.05	24-OCT-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-17
1,2-Dibromoethane			<0.050		ug/g		0.05	24-OCT-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-17
1,2-Dichloroethane			<0.050		ug/g		0.05	24-OCT-17
1,2-Dichloropropane			<0.050		ug/g		0.05	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-1 MB								
1,3-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	24-OCT-17
Acetone			<0.50		ug/g		0.5	24-OCT-17
Benzene			<0.0068		ug/g		0.0068	24-OCT-17
Bromodichloromethane			<0.050		ug/g		0.05	24-OCT-17
Bromoform			<0.050		ug/g		0.05	24-OCT-17
Bromomethane			<0.050		ug/g		0.05	24-OCT-17
Carbon tetrachloride			<0.050		ug/g		0.05	24-OCT-17
Chlorobenzene			<0.050		ug/g		0.05	24-OCT-17
Chloroform			<0.050		ug/g		0.05	24-OCT-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	24-OCT-17
Dibromochloromethane			<0.050		ug/g		0.05	24-OCT-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	24-OCT-17
Ethylbenzene			<0.018		ug/g		0.018	24-OCT-17
n-Hexane			<0.050		ug/g		0.05	24-OCT-17
Methylene Chloride			<0.050		ug/g		0.05	24-OCT-17
MTBE			<0.050		ug/g		0.05	24-OCT-17
m+p-Xylenes			<0.030		ug/g		0.03	24-OCT-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	24-OCT-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	24-OCT-17
o-Xylene			<0.020		ug/g		0.02	24-OCT-17
Styrene			<0.050		ug/g		0.05	24-OCT-17
Tetrachloroethylene			<0.050		ug/g		0.05	24-OCT-17
Toluene			<0.080		ug/g		0.08	24-OCT-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-OCT-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	24-OCT-17
Trichloroethylene			<0.010		ug/g		0.01	24-OCT-17
Trichlorofluoromethane			<0.050		ug/g		0.05	24-OCT-17
Vinyl chloride			<0.020		ug/g		0.02	24-OCT-17
Surrogate: 1,4-Difluorobenzene			104.0		%		50-140	24-OCT-17
Surrogate: 4-Bromofluorobenzene			101.3		%		50-140	24-OCT-17
WG2645854-5 MS		**WG2645854-3**						
1,1,1,2-Tetrachloroethane			104.2		%		50-140	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-5 MS		**WG2645854-3**						
1,1,2,2-Tetrachloroethane			104.6		%		50-140	24-OCT-17
1,1,1-Trichloroethane			99.7		%		50-140	24-OCT-17
1,1,2-Trichloroethane			107.7		%		50-140	24-OCT-17
1,1-Dichloroethane			98.2		%		50-140	24-OCT-17
1,1-Dichloroethylene			89.4		%		50-140	24-OCT-17
1,2-Dibromoethane			108.6		%		50-140	24-OCT-17
1,2-Dichlorobenzene			101.2		%		50-140	24-OCT-17
1,2-Dichloroethane			101.5		%		50-140	24-OCT-17
1,2-Dichloropropane			107.7		%		50-140	24-OCT-17
1,3-Dichlorobenzene			99.7		%		50-140	24-OCT-17
1,4-Dichlorobenzene			101.7		%		50-140	24-OCT-17
Acetone			109.1		%		50-140	24-OCT-17
Benzene			106.8		%		50-140	24-OCT-17
Bromodichloromethane			98.7		%		50-140	24-OCT-17
Bromoform			100.7		%		50-140	24-OCT-17
Bromomethane			97.4		%		50-140	24-OCT-17
Carbon tetrachloride			98.2		%		50-140	24-OCT-17
Chlorobenzene			106.9		%		50-140	24-OCT-17
Chloroform			103.8		%		50-140	24-OCT-17
cis-1,2-Dichloroethylene			105.3		%		50-140	24-OCT-17
cis-1,3-Dichloropropene			97.4		%		50-140	24-OCT-17
Dibromochloromethane			107.0		%		50-140	24-OCT-17
Dichlorodifluoromethane			57.8		%		50-140	24-OCT-17
Ethylbenzene			103.6		%		50-140	24-OCT-17
n-Hexane			104.6		%		50-140	24-OCT-17
Methylene Chloride			109.3		%		50-140	24-OCT-17
MTBE			104.7		%		50-140	24-OCT-17
m+p-Xylenes			102.5		%		50-140	24-OCT-17
Methyl Ethyl Ketone			109.8		%		50-140	24-OCT-17
Methyl Isobutyl Ketone			98.2		%		50-140	24-OCT-17
o-Xylene			103.8		%		50-140	24-OCT-17
Styrene			102.7		%		50-140	24-OCT-17
Tetrachloroethylene			101.6		%		50-140	24-OCT-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3865522								
WG2645854-5 MS		**WG2645854-3**						
Toluene			104.9		%		50-140	24-OCT-17
trans-1,2-Dichloroethylene			102.5		%		50-140	24-OCT-17
trans-1,3-Dichloropropene			96.1		%		50-140	24-OCT-17
Trichloroethylene			103.9		%		50-140	24-OCT-17
Trichlorofluoromethane			97.9		%		50-140	24-OCT-17
Vinyl chloride			94.8		%		50-140	24-OCT-17

Quality Control Report

Workorder: L2010780 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2010780 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
% Moisture							
	9	17-OCT-17 10:18	13-NOV-17 20:17	14	27	days	EHT
Conductivity (EC)							
	9	17-OCT-17 10:18	17-NOV-17 00:00	30	31	days	EHT
Cyanides							
Cyanide (WAD)-O.Reg 153/04 (July 2011)							
	9	17-OCT-17 10:18	14-NOV-17 09:00	14	28	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2010780 were received on 20-OCT-17 15:25.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

GRAIN SIZE DETERMINATIONS

Client:	CH2M HILL CANADA LIMITED	Sample Location:	
Project Number:	11546	Sample ID:	MW17-110S-0-2
Sampler:		Sample Depth:	
Technician:	CB6	Date Sampled:	16-10-17
Lab ID Number:	L2010780-5	Date Submitted:	20-10-17
		Date Completed:	11-10-17

Total Sample Weight	156	grams	Specific Gravity:	2.650	
Hydro. Sample Weight	50.000	grams	Liquid Specific Gravity:	1.000	
% Past #10	0.699	* 100	Grav Factor:	1.606	
Sub Factor	2.180				

Sieve Size	Weight Retained (grams)	Percent Retained	Diameter (mm)	Cum. % Retained	Cum. % Passing
38.1 mm. DIA.:	0.000	0.000	38.100	0.000	100.000
25.4 mm. DIA.:	0.000	0.000	25.400	0.000	100.000
19.0 mm. DIA.:	0.000	0.000	19.000	0.000	100.000
9.5 mm. DIA.:	12.000	7.692	9.500	7.692	92.308
NO. 4 SIEVE :	16.000	10.256	4.500	17.949	82.051
NO. 10 SIEVE :	19.000	12.179	2.000	30.128	69.872
NO. 20 SIEVE :	7.000	9.782	0.850	39.910	60.090
NO. 40 SIEVE :	7.000	9.782	0.425	49.692	50.308
NO. 60 SIEVE :	7.000	9.782	0.250	59.474	40.526
NO. 100 SIEVE:	7.000	9.782	0.150	69.256	30.744
NO. 200 SIEVE:	7.000	9.782	0.075	79.038	20.962

Time (min)	Hydrometer Reading	Temperature (C)	Diameter (mm)	% Suspended (Subsample)	% Suspended (Total Sample)
1.00	9.0	20.5	0.051	19.907	13.909
2.00	8.0	20.5	0.036	16.695	11.665
4.00	7.0	20.4	0.026	13.420	9.377
8.00	7.0	20.4	0.018	13.420	9.377
15.00	6.0	20.4	0.013	10.208	7.133
30.00	6.0	20.4	0.010	10.208	7.133
60.00	5.0	20.4	0.007	6.996	4.888
120.00	5.0	20.3	0.005	6.933	4.844
240.00	5.0	20.4	0.003	6.996	4.888
480.00	5.0	19.4	0.002	6.370	4.451
1440.00	4.0	20.8	0.001	4.034	2.819

GRAIN SIZE	% BY WT.	DIA. RANGE (mm)
% GRAVEL :	17.95	> 4.5
% COARSE SAND :	12.18	2.0 - 4.5
% MEDIUM SAND :	19.56	0.425 - 2.0
% FINE SAND :	29.35	0.075 - 0.425
% SILT :	17.09	0.075 - 0.002
% CLAY :	3.88	< 0.002
% CLAY :	4.85	< 0.005

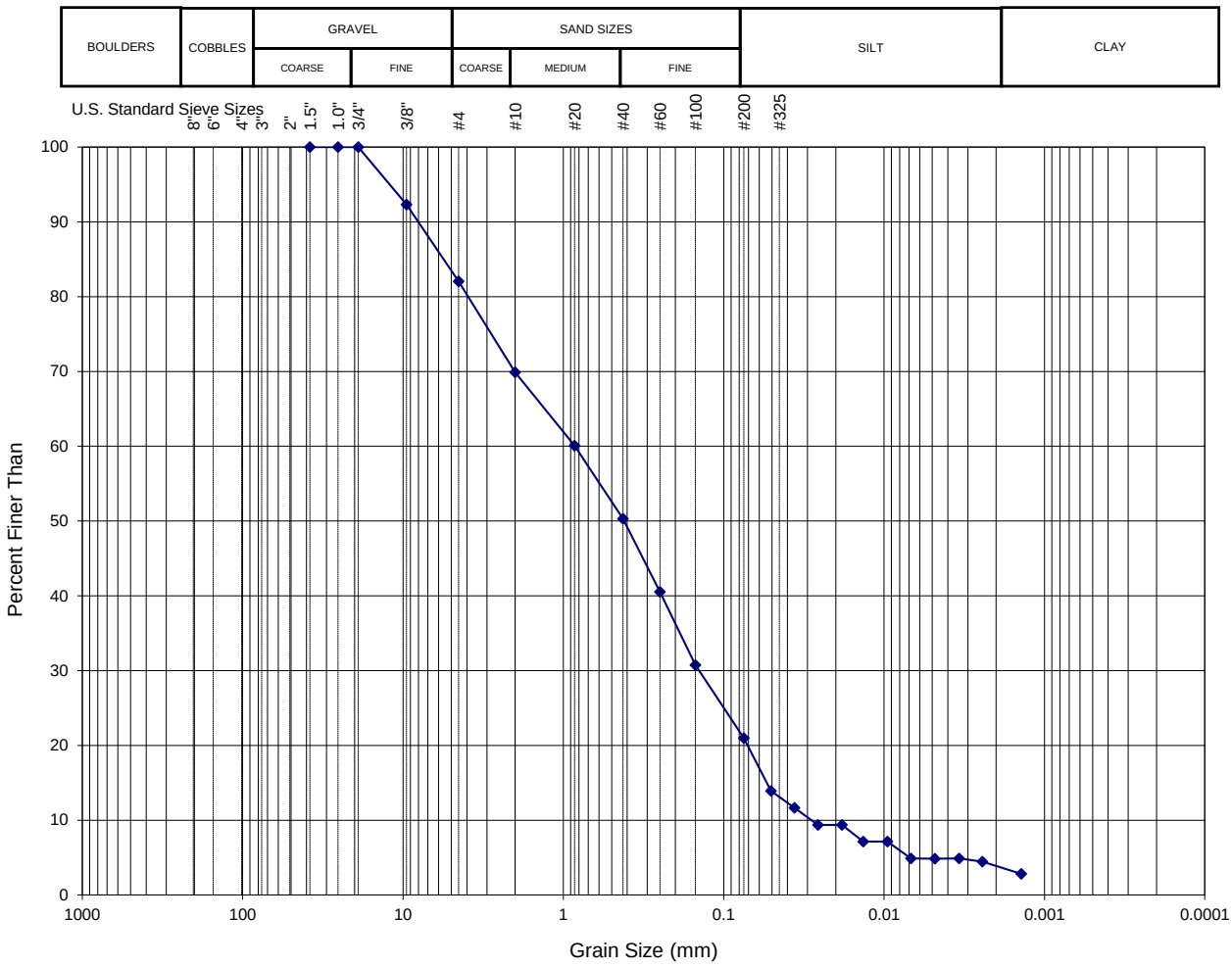
ALS Environmental

WATERLOO

PARTICLE SIZE DISTRIBUTION CURVE

ASTM METHOD D422-63

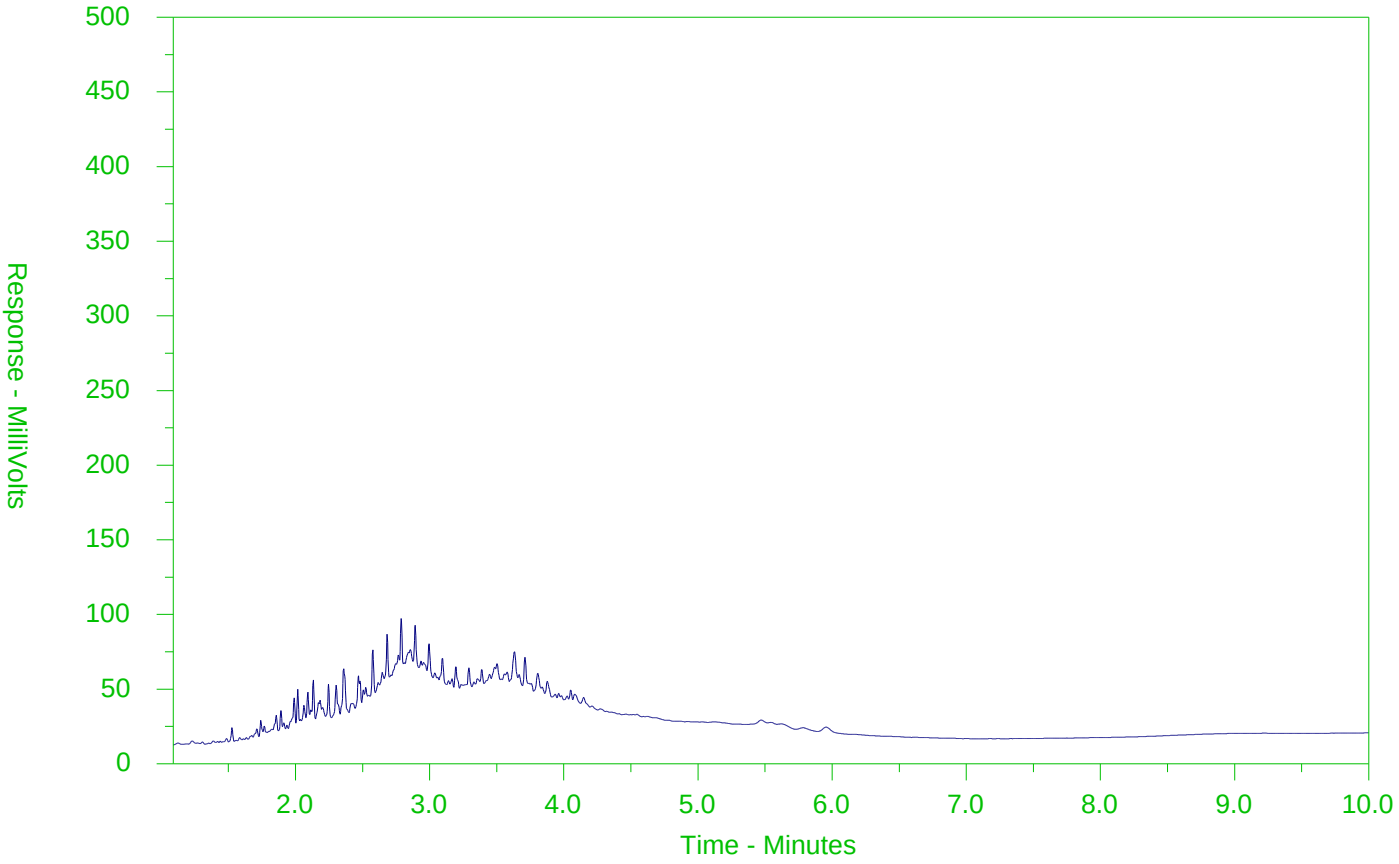
Project Name:	CH2M HILL CANADA LIMITED
Project Number:	11546
Sample Location:	
Sample Number:	MW17-110S-0-2
Sample Depth:	
Lab ID Number:	L2010780-5
Technician:	CB6
Sampler:	
Dates:	
Collected On:	16-10-17
Analyzed:	10-11-17



DESCRIPTION	SOIL CLASSIFICATION DESCRIPTIVE MODIFIERS		SUMMARY		
SAND WITH GRAVEL, WITH SILT, TRACE CLAY	AND	36 - 50 %	GRAVEL	18	%
COARSE GRAINED	ADJECTIVE (e.g. sandy)	21 - 35 %	SAND	61	%
ESTIMATED HAZEN NUMBER: 8.03E-04 cm/s	WITH	11 - 20 %	SILT + CLAY	21	%
NOTE: UNIFIED SOIL CLASSIFICATION SYSTEM	TRACE	1 - 10 %			

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2010780-4
Client Sample ID: MW17-109S-4-5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

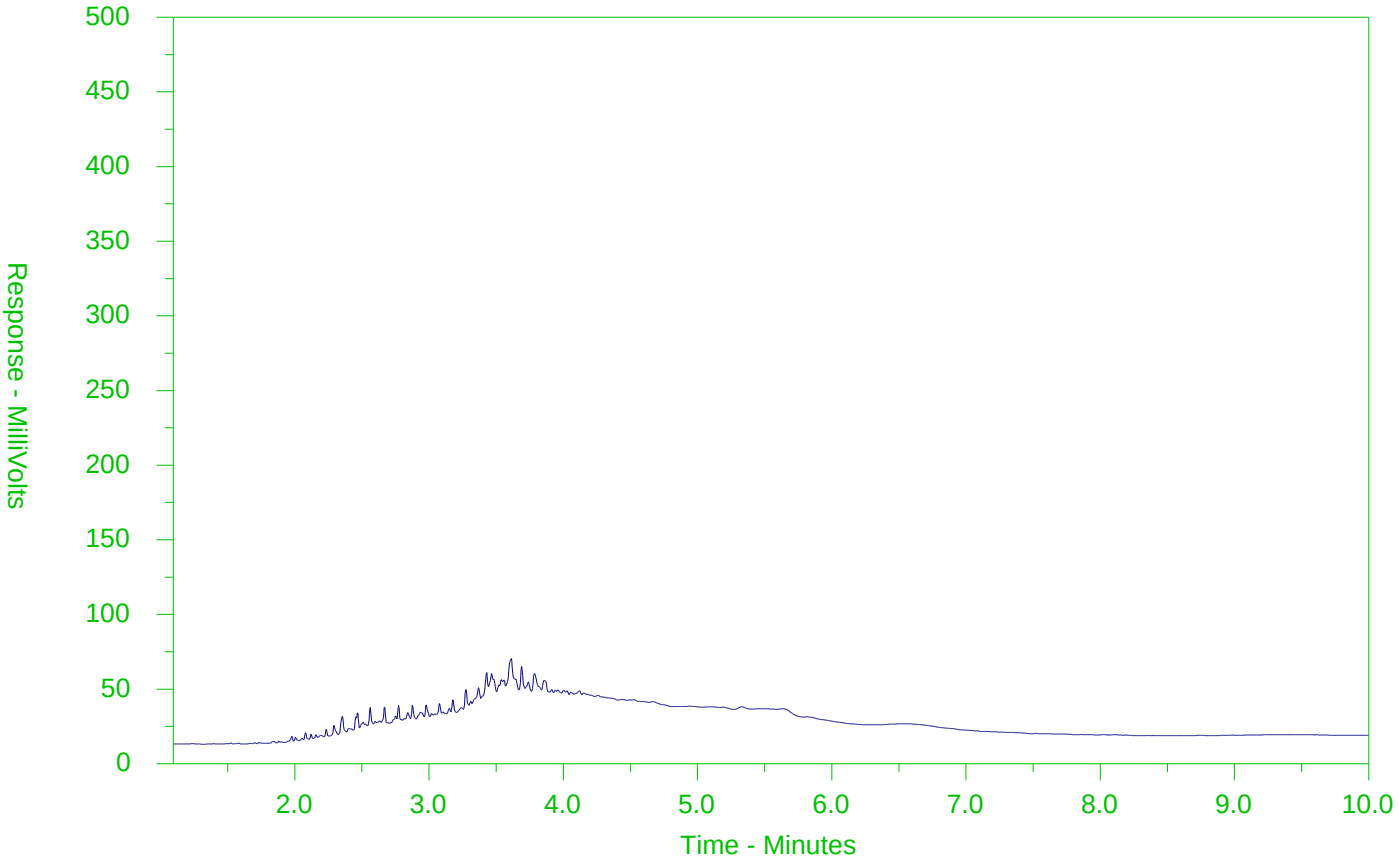
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2010780-6
Client Sample ID: MW17-110S-4-6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

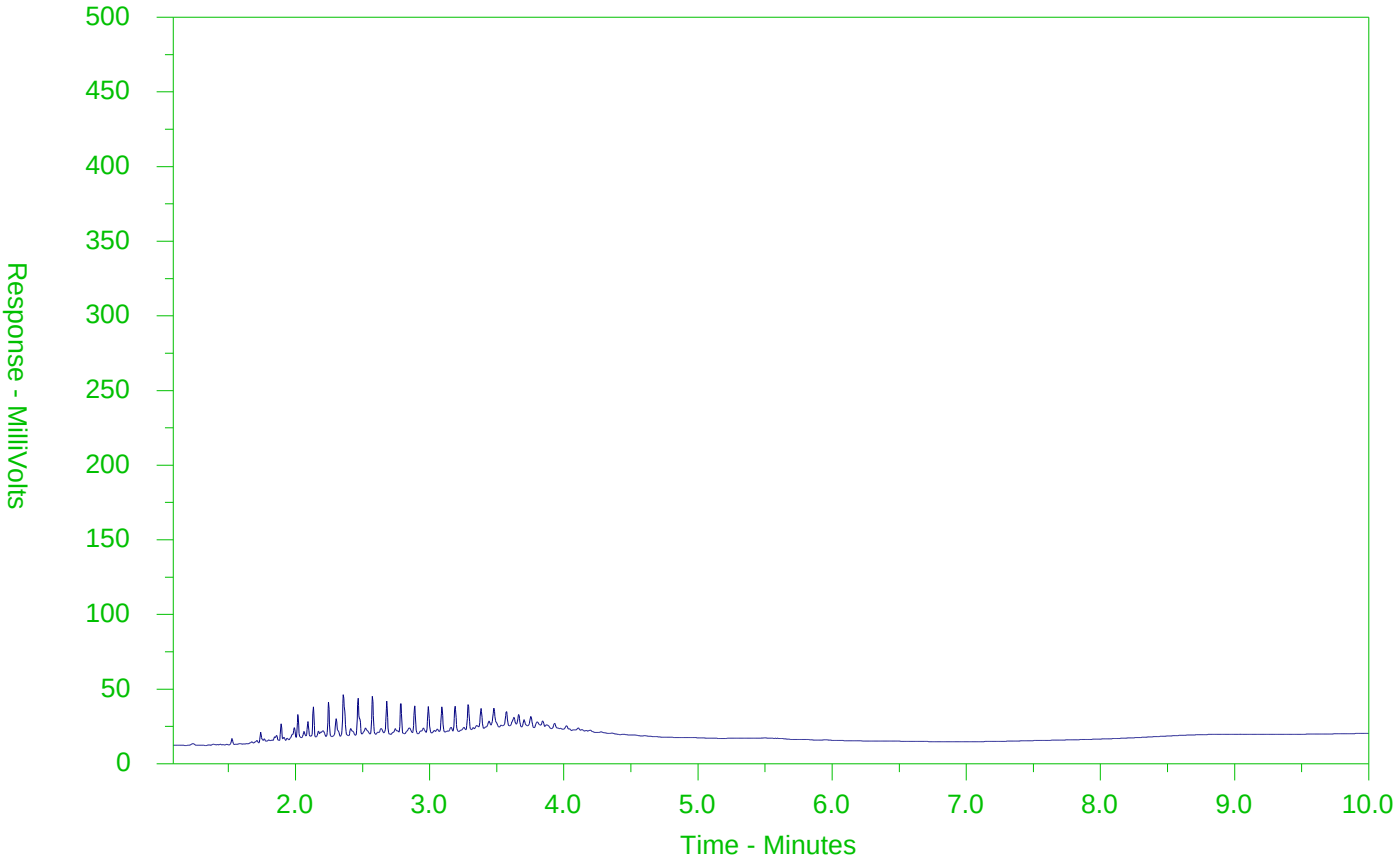
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2010780-8
Client Sample ID: MW17-104S/D-4-6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

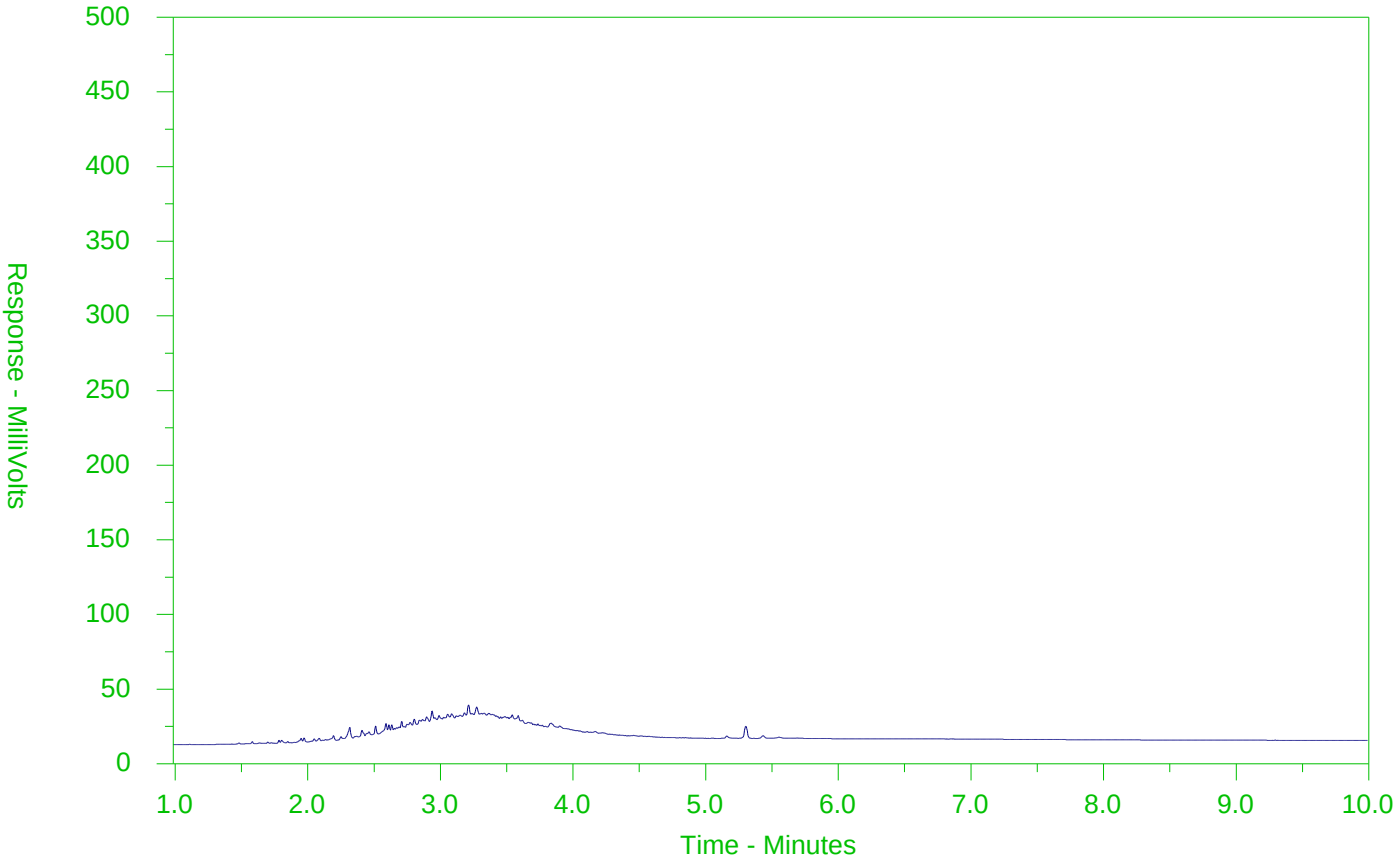
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2010780-10
Client Sample ID: BH17-204-0.5-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

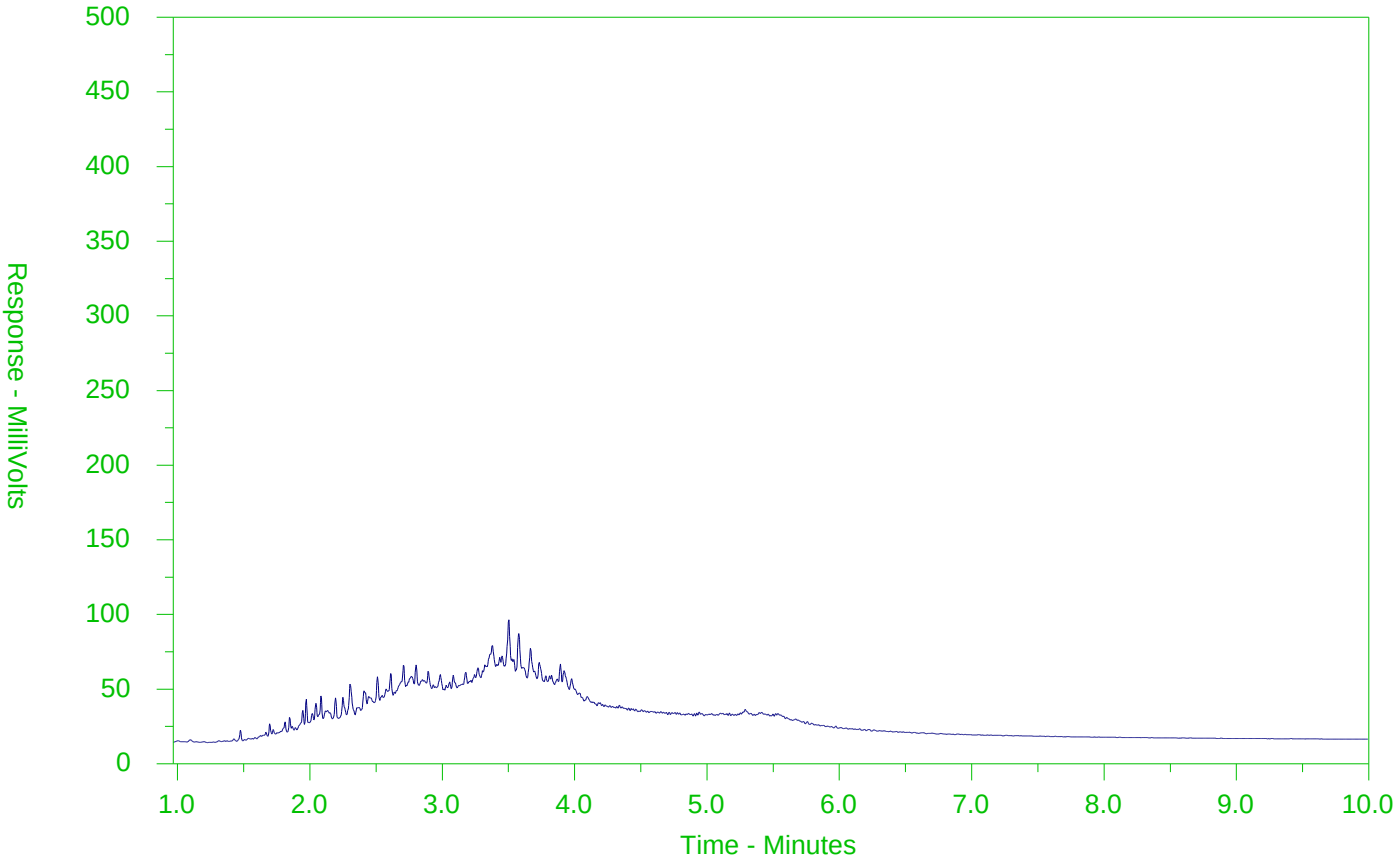
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2010780-12
Client Sample ID: DUP9



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2010780-COFC

COC Number: 17 - 616672
Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular (R) Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shirey	Quality Control (QC) Report with Report YES NO	Priority (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax: Michael, Dirk	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2: Kyrie	
Postal Code:		Email 3	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2010780 RW	ALS Contact: Mathy	Sampler: M. Shirey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O.Reg Metals + Temp	O.Reg PAH	O.Reg SVOCs	O.Reg PHC & BTEX	O.Reg VOC	PCBs	Dioxins + Furans	TOC	Grain Size + Hydro	O.Reg VOC + F1						SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW17-1095-0-1	16-Oct-17	958	Soil						X	X									X		2
2	MW17-1095-1-2		938							H	H									X		2
3	MW17-1095-0-2		938		X																	1
4	MW17-1095-4-5		956		X			X	X													4
5	MW17-1105-0-2		1538		X		X					X	X									4
6	MW17-1105-4-6		1554		X	X		X	X			X										6
7	MW17-1045/D-2-4	17-Oct-17	1008		X		X															2
8	MW17-1045/D-4-6		1018					X	X													3
9	MW17-1045/D-4-6H		1018		X		X													X		2
10	BH17-204-0.5-2	18-Oct-17	1245		X		X	X	X											X		5
11	Trip Blank 02	20-Oct-17	—	Other										X								1
12	DUP9	16-Oct-17	—	Soil				Y	X													3

Drinking Water (DW) Samples? (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Table 6 RPI
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				2.3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	20/10/20	8:00					20-OCT-17	1525

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

AK

Jacobs Consultancy Canada Inc.
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 30-OCT-17
Report Date: 12-APR-21 14:57 (MT)
Version: FINAL REV. 3

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2015398

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 15-613140, 15-613141
Legal Site Desc:

Comments: 12-APR-21:
L2015398-3, 4, 5, 7, 9, 12, 15, 16 - results for Bismuth, Iron, Calcium and Magnesium included.

23-NOV-17: F2-F4-UW results included.

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-1 MW17-101S/D-0.5-1.5 Sampled By: M. SHIRY on 20-OCT-17 @ 08:47 Matrix: SOIL									
Physical Tests									
% Moisture	4.64		0.10	%	01-NOV-17				
Polychlorinated Biphenyls									
Aroclor 1242	<0.010		0.010	ug/g	09-NOV-17				
Aroclor 1248	<0.010		0.010	ug/g	09-NOV-17				
Aroclor 1254	<0.010		0.010	ug/g	09-NOV-17				
Aroclor 1260	<0.010		0.010	ug/g	09-NOV-17				
Total PCBs	<0.020		0.020	ug/g	09-NOV-17	1.1	1.1	0.35	0.35
Surrogate: d14-Terphenyl	94.9		60-140	%	09-NOV-17				
L2015398-3 MW17-101S/D-2-3 Sampled By: M. SHIRY on 20-OCT-17 @ 09:08 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.215		0.0040	mS/cm	03-NOV-17	1.4	1.4	0.7	0.7
% Moisture	5.48		0.10	%	01-NOV-17				
pH	8.31		0.10	pH units	02-NOV-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	06-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.51		0.10	SAR	03-NOV-17	12	12	5	5
Calcium (Ca)	3.1		1.0	mg/L	03-NOV-17				
Magnesium (Mg)	3.2		1.0	mg/L	03-NOV-17				
Sodium (Na)	5.3		1.0	mg/L	03-NOV-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	6.0		1.0	ug/g	03-NOV-17	18	18	18	18
Barium (Ba)	36.9		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.5		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.14		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	6.60		0.50	ug/g	03-NOV-17	*1.9	*1.9	*1.2	*1.2
Calcium (Ca)	164000		50	ug/g	12-APR-21				
Chromium (Cr)	8.3		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	3.7		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	29.2		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	11300		50	ug/g	12-APR-21				
Lead (Pb)	96.2		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	73800		20	ug/g	12-APR-21				
Mercury (Hg)	0.124		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	16.7		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-3 MW17-101S/D-2-3									
Sampled By: M. SHIRY on 20-OCT-17 @ 09:08									
Matrix: SOIL									
Metals									
Vanadium (V)	13.0		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	1240		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	06-NOV-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
Chrysene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	06-NOV-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	06-NOV-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	06-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	06-NOV-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	06-NOV-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9

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#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-3 MW17-101S/D-2-3									
Sampled By: M. SHIRY on 20-OCT-17 @ 09:08									
Matrix: SOIL									
Semi-Volatile Organics									
Surrogate: 2-Fluorobiphenyl	121.5		50-140	%	06-NOV-17				
Surrogate: Nitrobenzene d5	119.4		50-140	%	06-NOV-17				
Surrogate: Phenol d5	117.1		30-130	%	06-NOV-17				
Surrogate: p-Terphenyl d14	122.1		50-140	%	06-NOV-17				
Surrogate: 2,4,6-Tribromophenol	107.4		50-140	%	06-NOV-17				
L2015398-4 MW17-101S/D-4-5.5									
Sampled By: M. SHIRY on 20-OCT-17 @ 10:01									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.249		0.0040	mS/cm	03-NOV-17	1.4	1.4	0.7	0.7
% Moisture	4.98		0.10	%	01-NOV-17				
pH	8.38		0.10	pH units	02-NOV-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	06-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	1.00		0.10	SAR	03-NOV-17	12	12	5	5
Calcium (Ca)	3.5		1.0	mg/L	03-NOV-17				
Magnesium (Mg)	3.2		1.0	mg/L	03-NOV-17				
Sodium (Na)	10.8		1.0	mg/L	03-NOV-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	5.7		1.0	ug/g	03-NOV-17	18	18	18	18
Barium (Ba)	23.1		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	7.3		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.15		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	0.85		0.50	ug/g	03-NOV-17	1.9	1.9	1.2	1.2
Calcium (Ca)	167000		50	ug/g	12-APR-21				
Chromium (Cr)	10.3		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	3.9		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	29.6		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	9780		50	ug/g	12-APR-21				
Lead (Pb)	58.4		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	72000		20	ug/g	12-APR-21				
Mercury (Hg)	0.0180		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	9.6		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	12.2		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	410		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-4 MW17-101S/D-4-5.5									
Sampled By: M. SHIRY on 20-OCT-17 @ 10:01									
Matrix: SOIL									
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	02-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	02-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	02-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	02-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	02-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	02-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	02-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	02-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	02-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	02-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	02-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	02-NOV-17	0.059	0.081	0.05	0.081
1,4-Dioxane	<0.20		0.20	mg/kg	02-NOV-17	1.8	1.8	1.8	1.8
Ethylbenzene	<0.018		0.018	ug/g	02-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	02-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	02-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	02-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	02-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	02-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	02-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	02-NOV-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	02-NOV-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	02-NOV-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	02-NOV-17				
m+p-Xylenes	<0.030		0.030	ug/g	02-NOV-17				
Xylenes (Total)	<0.050		0.050	ug/g	02-NOV-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	96.3		50-140	%	02-NOV-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-4	MW17-101S/D-4-5.5									
Sampled By:	M. SHIRY on 20-OCT-17 @ 10:01									
Matrix:	SOIL									
Volatile Organic Compounds										
	Surrogate: 1,4-Difluorobenzene	103.3		50-140	%	02-NOV-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	02-NOV-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	06-NOV-17	55	65	55	65
	F2 (C10-C16)	50		10	ug/g	06-NOV-17	230	250	98	150
	F2-Naphth	50		10	ug/g	06-NOV-17				
	F3a (C16-C22)	199		25	ug/g	06-NOV-17				
	F3 (C16-C34)	723		50	ug/g	06-NOV-17	1700	2500	*300	1300
	F3b (C22-C34)	524		25	ug/g	06-NOV-17				
	F3-PAH	727		50	ug/g	06-NOV-17				
	F4 (C34-C50)	156		50	ug/g	06-NOV-17	3300	6600	2800	5600
	F4G-SG (GHH-Silica)	390		250	ug/g	03-NOV-17	3300	6600	2800	5600
							3300	6600	2800	5600
	F4G-SG (GHH-Silica)	400		250	ug/g	03-NOV-17	3300	6600	2800	5600
							3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	934		72	ug/g	06-NOV-17				
	Chrom. to baseline at nC50	NO			No Unit	06-NOV-17				
	Surrogate: 2-Bromobenzotrifluoride	93.4		60-140	%	06-NOV-17				
	Surrogate: 3,4-Dichlorotoluene	83.6		60-140	%	02-NOV-17				
Polycyclic Aromatic Hydrocarbons										
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics										
	Acenaphthene	<0.050		0.050	ug/g	06-NOV-17	21	29	7.9	29
	Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
	Anthracene	<0.050		0.050	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	<0.06	DLQ	0.060	ug/g	06-NOV-17	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.3	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
	Benzo(ghi)perylene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
	Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
	4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
	Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
	2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
	Chrysene	0.213		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
	Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	06-NOV-17	0.1	0.1	0.1	0.1
	3,3'-Dichlorobenzidine	<0.3	DLQ	0.30	ug/g	06-NOV-17	1	1	1	1
	2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
	Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
	2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
	2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
	2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
	2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-4 MW17-101S/D-4-5.5									
Sampled By: M. SHIRY on 20-OCT-17 @ 10:01									
Matrix: SOIL									
Semi-Volatile Organics									
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	06-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	06-NOV-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
Pyrene	0.109		0.050	ug/g	06-NOV-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	123.2		50-140	%	06-NOV-17				
Surrogate: Nitrobenzene d5	115.7		50-140	%	06-NOV-17				
Surrogate: Phenol d5	116.1		30-130	%	06-NOV-17				
Surrogate: p-Terphenyl d14	117.9		50-140	%	06-NOV-17				
Surrogate: 2,4,6-Tribromophenol	112.9		50-140	%	06-NOV-17				
L2015398-5 MW17-105S/D-0-0.3									
Sampled By: M. SHIRY on 24-OCT-17 @ 11:48									
Matrix: SOIL									
Physical Tests									
Conductivity	0.174		0.0040	mS/cm	03-NOV-17	1.4	1.4	0.7	0.7
% Moisture	9.94		0.10	%	02-NOV-17				
pH	7.66		0.10	pH units	02-NOV-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	<0.12	SAR:DL	0.12	SAR	03-NOV-17	12	12	5	5
Calcium (Ca)	4.9		1.0	mg/L	03-NOV-17				
Magnesium (Mg)	<1.0		1.0	mg/L	03-NOV-17				
Sodium (Na)	<1.0		1.0	mg/L	03-NOV-17				
Metals									
Antimony (Sb)	2.9		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	11.3		1.0	ug/g	03-NOV-17	18	18	18	18
Barium (Ba)	80.0		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	4.8		1.0	ug/g	12-APR-21				
Boron (B)	12.6		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.57		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	1.34		0.50	ug/g	03-NOV-17	1.9	1.9	*1.2	*1.2
Calcium (Ca)	55900		50	ug/g	12-APR-21				
Chromium (Cr)	16.4		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	5.9		1.0	ug/g	03-NOV-17	80	100	22	22

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-5 MW17-105S/D-0-0.3									
Sampled By: M. SHIRY on 24-OCT-17 @ 11:48									
Matrix: SOIL									
Metals									
Copper (Cu)	38.0		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	30100		50	ug/g	12-APR-21				
Lead (Pb)	175		1.0	ug/g	03-NOV-17	*120	*120	*120	*120
Magnesium (Mg)	25900		20	ug/g	12-APR-21				
Mercury (Hg)	0.0537		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.9		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	17.4		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	24.8		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	901		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
L2015398-6 MW17-105S/D-0.5-1.5									
Sampled By: M. SHIRY on 24-OCT-17 @ 11:48									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	8.04		0.10	%	02-NOV-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	1.26		0.21	ug/g	06-NOV-17	30	42	*0.99	3.4
Semi-Volatile Organics									
Acenaphthene	0.27	DLM	0.25	ug/g	06-NOV-17	21	29	7.9	29
Acenaphthylene	<0.25	DLM	0.25	ug/g	06-NOV-17	**0.15	**0.17	**0.15	**0.17
Anthracene	0.63	DLM	0.25	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	1.37	DLM	0.25	ug/g	06-NOV-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	1.21	DLM	0.25	ug/g	06-NOV-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	1.36	DLM	0.25	ug/g	06-NOV-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	0.81	DLM	0.25	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	1.07	DLM	0.25	ug/g	06-NOV-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	<0.25	DLM	0.25	ug/g	06-NOV-17	52	210	0.31	1.1
4-Chloroaniline	<0.50	DLM	0.50	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.50	DLM	0.50	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.50	DLM	0.50	ug/g	06-NOV-17	11	13	0.67	1.8
2-Chlorophenol	<0.50	DLM	0.50	ug/g	06-NOV-17	3.1	3.9	1.6	2
Chrysene	1.46	DLM	0.25	ug/g	06-NOV-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.25	DLM	0.25	ug/g	06-NOV-17	**0.1	**0.1	**0.1	**0.1
3,3'-Dichlorobenzidine	<0.50	DLM	0.50	ug/g	06-NOV-17	1	1	1	1
2,4-Dichlorophenol	<0.50	DLM	0.50	ug/g	06-NOV-17	**0.19	**0.27	**0.19	**0.27
Diethylphthalate	<0.50	DLM	0.50	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.50	DLM	0.50	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.50	DLM	0.50	ug/g	06-NOV-17	38	53	38	53
2,4-Dinitrophenol	<5.0	DLM	5.0	ug/g	06-NOV-17	**2	**2.9	**2	**2.9

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-6	MW17-105S/D-0.5-1.5									
Sampled By:	M. SHIRY on 24-OCT-17 @ 11:48									
Matrix:	SOIL									
Semi-Volatile Organics										
	2,4-Dinitrotoluene	<0.50	DLM	0.50	ug/g	06-NOV-17				
	2,6-Dinitrotoluene	<0.50	DLM	0.50	ug/g	06-NOV-17				
	2,4+2,6-Dinitrotoluene	<0.71		0.71	ug/g	06-NOV-17	**0.5	**0.5	**0.5	**0.5
	Bis(2-ethylhexyl)phthalate	<0.50	DLM	0.50	ug/g	06-NOV-17	28	35	5	5
	Fluoranthene	2.50	DLM	0.25	ug/g	06-NOV-17	9.6	9.6	*0.69	*0.69
	Fluorene	0.27	DLM	0.25	ug/g	06-NOV-17	62	69	62	69
	Indeno(1,2,3-cd)pyrene	1.04	DLM	0.25	ug/g	06-NOV-17	*0.76	*0.95	*0.38	*0.48
	1-Methylnaphthalene	0.58	DLM	0.15	ug/g	06-NOV-17	30	42	0.99	3.4
	2-Methylnaphthalene	0.67	DLM	0.15	ug/g	06-NOV-17	30	42	0.99	3.4
	Naphthalene	0.59	DLM	0.25	ug/g	06-NOV-17	9.6	28	0.6	0.75
	Pentachlorophenol	<0.50	DLM	0.50	ug/g	06-NOV-17	2.9	3.3	**0.1	**0.1
	Phenanthrene	2.97	DLM	0.25	ug/g	06-NOV-17	12	16	6.2	7.8
	Phenol	<0.50	DLM	0.50	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
	Pyrene	2.18	DLM	0.25	ug/g	06-NOV-17	96	96	78	78
	1,2,4-Trichlorobenzene	<0.25	DLM	0.25	ug/g	06-NOV-17	3.2	16	0.36	1.4
	2,4,5-Trichlorophenol	<0.50	DLM	0.50	ug/g	06-NOV-17	9.1	10	4.4	5.5
	2,4,6-Trichlorophenol	<0.50	DLM	0.50	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	134.2		50-140	%	06-NOV-17				
	Surrogate: Nitrobenzene d5	122.4		50-140	%	06-NOV-17				
	Surrogate: Phenol d5	117.1		30-130	%	06-NOV-17				
	Surrogate: p-Terphenyl d14	127.0		50-140	%	06-NOV-17				
	Surrogate: 2,4,6-Tribromophenol	126.2		50-140	%	06-NOV-17				
L2015398-7	MW17-105S/D-4-6									
Sampled By:	M. SHIRY on 24-OCT-17 @ 12:12									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.128		0.0040	mS/cm	03-NOV-17	1.4	1.4	0.7	0.7
	% Moisture	1.11		0.10	%	02-NOV-17				
	pH	8.16		0.10	pH units	02-NOV-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon										
	Fraction Organic Carbon	0.0067		0.0010	No Unit	02-NOV-17				
	Fraction Organic Carbon	0.0067		0.0010	No Unit	02-NOV-17				
	Fraction Organic Carbon	0.0068		0.0010	No Unit	02-NOV-17				
	Average Fraction Organic Carbon	0.0068		0.0010	No Unit	02-NOV-17				
	Total Organic Carbon	0.67		0.10	%	02-NOV-17				
	Total Organic Carbon	0.67		0.10	%	02-NOV-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-7 MW17-105S/D-4-6									
Sampled By: M. SHIRY on 24-OCT-17 @ 12:12									
Matrix: SOIL									
Organic / Inorganic Carbon									
Total Organic Carbon	0.68		0.10	%	02-NOV-17				
Saturated Paste Extractables									
SAR	0.34	SAR:M	0.10	SAR	03-NOV-17	12	12	5	5
Calcium (Ca)	1.5		1.0	mg/L	03-NOV-17				
Magnesium (Mg)	<1.0		1.0	mg/L	03-NOV-17				
Sodium (Na)	1.5		1.0	mg/L	03-NOV-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	4.1		1.0	ug/g	03-NOV-17	18	18	18	18
Barium (Ba)	16.1		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	8.2		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.21		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	1.04		0.50	ug/g	03-NOV-17	1.9	1.9	1.2	1.2
Calcium (Ca)	157000		50	ug/g	12-APR-21				
Chromium (Cr)	9.8		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	3.7		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	24.8		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	11400		50	ug/g	12-APR-21				
Lead (Pb)	80.5		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	66800		20	ug/g	12-APR-21				
Mercury (Hg)	0.0352		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	13.0		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	15.6		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	590		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	02-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	02-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	02-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	02-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	02-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	02-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	02-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	02-NOV-17	0.47	0.18	0.05	0.17

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2015398-7	MW17-105S/D-4-6									
Sampled By:	M. SHIRY on 24-OCT-17 @ 12:12									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	1,2-Dibromoethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	02-NOV-17	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	02-NOV-17	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	02-NOV-17	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	06-NOV-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	02-NOV-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	02-NOV-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	02-NOV-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	02-NOV-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	02-NOV-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	02-NOV-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	02-NOV-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	02-NOV-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	02-NOV-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	02-NOV-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	02-NOV-17				
	m+p-Xylenes	<0.030		0.030	ug/g	02-NOV-17				
	Xylenes (Total)	<0.050		0.050	ug/g	06-NOV-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	101.2		50-140	%	02-NOV-17				
	Surrogate: 1,4-Difluorobenzene	107.3		50-140	%	02-NOV-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	02-NOV-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65
	F2 (C10-C16)	23		10	ug/g	07-NOV-17	230	250	98	150
	F2-Naphth	23		10	ug/g	07-NOV-17				
	F3a (C16-C22)	43		25	ug/g	07-NOV-17				
	F3 (C16-C34)	120		50	ug/g	07-NOV-17	1700	2500	300	1300
	F3b (C22-C34)	77		25	ug/g	07-NOV-17				
	F3-PAH	120		50	ug/g	07-NOV-17				
	F4 (C34-C50)	<50		50	ug/g	07-NOV-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	143		72	ug/g	07-NOV-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-7 MW17-105S/D-4-6									
Sampled By: M. SHIRY on 24-OCT-17 @ 12:12									
Matrix: SOIL									
Hydrocarbons									
Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	96.6		60-140	%	07-NOV-17				
Surrogate: 3,4-Dichlorotoluene	93.7		60-140	%	02-NOV-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	06-NOV-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
Benzo(ghi)perylene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
Chrysene	0.103		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	06-NOV-17	0.1	0.1	0.1	0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	06-NOV-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
Fluoranthene	<0.050		0.050	ug/g	06-NOV-17	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	06-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	06-NOV-17	0.76	0.95	0.38	0.48
1-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
Naphthalene	<0.050		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
Phenanthrene	<0.050		0.050	ug/g	06-NOV-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
Pyrene	<0.050		0.050	ug/g	06-NOV-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	118.0		50-140	%	06-NOV-17				
Surrogate: Nitrobenzene d5	113.9		50-140	%	06-NOV-17				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

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#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-7 MW17-105S/D-4-6									
Sampled By: M. SHIRY on 24-OCT-17 @ 12:12									
Matrix: SOIL									
Semi-Volatile Organics									
Surrogate: Phenol d5	113.0		30-130	%	06-NOV-17				
Surrogate: p-Terphenyl d14	118.8		50-140	%	06-NOV-17				
Surrogate: 2,4,6-Tribromophenol	107.2		50-140	%	06-NOV-17				
L2015398-8 MW17-105S/D-6-7									
Sampled By: M. SHIRY on 24-OCT-17 @ 12:32									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	1.57		0.10	%	02-NOV-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	02-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	02-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	02-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	02-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	02-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	02-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	02-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	02-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	02-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	02-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	02-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	02-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	02-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	06-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	02-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	02-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	02-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	02-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	02-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	02-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	02-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	02-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	02-NOV-17	0.05	0.11	0.05	0.05

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2015398-8	MW17-105S/D-6-7									
Sampled By:	M. SHIRY on 24-OCT-17 @ 12:32									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	Trichloroethylene	<0.010		0.010	ug/g	02-NOV-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	02-NOV-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	02-NOV-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	02-NOV-17				
	m+p-Xylenes	<0.030		0.030	ug/g	02-NOV-17				
	Xylenes (Total)	<0.050		0.050	ug/g	06-NOV-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	96.1		50-140	%	02-NOV-17				
	Surrogate: 1,4-Difluorobenzene	102.5		50-140	%	02-NOV-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	02-NOV-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	07-NOV-17	230	250	98	150
	F3a (C16-C22)	<25		25	ug/g	07-NOV-17				
	F3 (C16-C34)	<50		50	ug/g	07-NOV-17	1700	2500	300	1300
	F3b (C22-C34)	<25		25	ug/g	07-NOV-17				
	F4 (C34-C50)	<50		50	ug/g	07-NOV-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	07-NOV-17				
	Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
	Surrogate: 2-Bromobenzotrifluoride	101.5		60-140	%	07-NOV-17				
	Surrogate: 3,4-Dichlorotoluene	88.7		60-140	%	02-NOV-17				
L2015398-9	MW17-103S/D-1-1.5									
Sampled By:	M. SHIRY on 25-OCT-17 @ 15:23									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.170		0.0040	mS/cm	03-NOV-17	1.4	1.4	0.7	0.7
	% Moisture	7.71		0.10	%	02-NOV-17				
	pH	7.41		0.10	pH units	02-NOV-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	<0.13	SAR:DL	0.13	SAR	03-NOV-17	12	12	5	5
	Calcium (Ca)	4.8		1.0	mg/L	03-NOV-17				
	Magnesium (Mg)	<1.0		1.0	mg/L	03-NOV-17				
	Sodium (Na)	<1.0		1.0	mg/L	03-NOV-17				
Metals										
	Antimony (Sb)	1.8		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
	Arsenic (As)	3.3		1.0	ug/g	03-NOV-17	18	18	18	18
	Barium (Ba)	35.4		1.0	ug/g	03-NOV-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	5.2		5.0	ug/g	03-NOV-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.23		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
	Cadmium (Cd)	<0.50		0.50	ug/g	03-NOV-17	1.9	1.9	1.2	1.2
	Calcium (Ca)	10300		50	ug/g	12-APR-21				
	Chromium (Cr)	18.9		1.0	ug/g	03-NOV-17	160	160	160	160

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-9 MW17-103S/D-1-1.5									
Sampled By: M. SHIRY on 25-OCT-17 @ 15:23									
Matrix: SOIL									
Metals									
Cobalt (Co)	2.8		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	22.9		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	21900		50	ug/g	12-APR-21				
Lead (Pb)	51.2		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	4840		20	ug/g	12-APR-21				
Mercury (Hg)	0.246		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	1.3		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	10.1		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	17.7		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	69.4		5.0	ug/g	03-NOV-17	340	340	340	340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	0.329		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	<0.050		0.050	ug/g	06-NOV-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
Anthracene	0.071		0.050	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.661		0.050	ug/g	06-NOV-17	0.96	0.96	*0.5	*0.63
Benzo(a)pyrene	0.748		0.050	ug/g	06-NOV-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	0.902		0.050	ug/g	06-NOV-17	0.96	0.96	*0.78	*0.78
Benzo(ghi)perylene	0.526		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.623		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
Chrysene	0.797		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	0.150		0.050	ug/g	06-NOV-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	06-NOV-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
Fluoranthene	0.646		0.050	ug/g	06-NOV-17	9.6	9.6	0.69	0.69

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-9 MW17-103S/D-1-1.5 Sampled By: M. SHIRY on 25-OCT-17 @ 15:23 Matrix: SOIL									
Semi-Volatile Organics									
Fluorene	<0.050		0.050	ug/g	06-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.673		0.050	ug/g	06-NOV-17	0.76	0.95	*0.38	*0.48
1-Methylnaphthalene	0.162		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
2-Methylnaphthalene	0.167		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
Naphthalene	0.121		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
Phenanthrene	0.565		0.050	ug/g	06-NOV-17	12	16	6.2	7.8
Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
Pyrene	0.594		0.050	ug/g	06-NOV-17	96	96	78	78
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
Surrogate: 2-Fluorobiphenyl	118.8		50-140	%	06-NOV-17				
Surrogate: Nitrobenzene d5	116.1		50-140	%	06-NOV-17				
Surrogate: Phenol d5	112.5		30-130	%	06-NOV-17				
Surrogate: p-Terphenyl d14	116.7		50-140	%	06-NOV-17				
Surrogate: 2,4,6-Tribromophenol	124.8		50-140	%	06-NOV-17				
L2015398-10 MW17-103S/D-1-3 Sampled By: M. SHIRY on 25-OCT-17 @ 15:23 Matrix: SOIL						#1	#2	#3	#4
Organic / Inorganic Carbon									
Fraction Organic Carbon	0.0420		0.0010	No Unit	02-NOV-17				
Fraction Organic Carbon	0.0515		0.0010	No Unit	02-NOV-17				
Fraction Organic Carbon	0.0516		0.0010	No Unit	02-NOV-17				
Average Fraction Organic Carbon	0.0484		0.0010	No Unit	02-NOV-17				
Total Organic Carbon	4.20		0.10	%	02-NOV-17				
Total Organic Carbon	5.15		0.10	%	02-NOV-17				
Total Organic Carbon	5.16		0.10	%	02-NOV-17				
L2015398-11 MW17-103S/D-2-3 Sampled By: M. SHIRY on 25-OCT-17 @ 15:27 Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	6.50		0.10	%	02-NOV-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	03-NOV-17	16	28	16	28

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-11 MW17-103S/D-2-3									
Sampled By: M. SHIRY on 25-OCT-17 @ 15:27									
Matrix: SOIL									
Volatile Organic Compounds									
Benzene	0.0070		0.0068	ug/g	03-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	03-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	03-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	03-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	03-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	03-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	03-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	03-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	03-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	03-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	03-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	0.083		0.050	ug/g	03-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	03-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	03-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	03-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	03-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	03-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	03-NOV-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	03-NOV-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	03-NOV-17	0.032	0.25	0.02	0.022
o-Xylene	0.059		0.020	ug/g	03-NOV-17				
m+p-Xylenes	0.055		0.030	ug/g	03-NOV-17				
Xylenes (Total)	0.115		0.050	ug/g	04-NOV-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	100.7		50-140	%	03-NOV-17				
Surrogate: 1,4-Difluorobenzene	98.7		50-140	%	03-NOV-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	03-NOV-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-11 MW17-103S/D-2-3									
Sampled By: M. SHIRY on 25-OCT-17 @ 15:27									
Matrix: SOIL									
Hydrocarbons									
F2 (C10-C16)	11		10	ug/g	07-NOV-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	07-NOV-17				
F3 (C16-C34)	295		50	ug/g	07-NOV-17	1700	2500	300	1300
F3b (C22-C34)	273		25	ug/g	07-NOV-17				
F4 (C34-C50)	459		50	ug/g	07-NOV-17	3300	6600	2800	5600
F4G-SG (GHH-Silica)	2430		250	ug/g	06-NOV-17	3300	6600	2800	5600
						3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	766		72	ug/g	07-NOV-17				
Chrom. to baseline at nC50	NO			No Unit	07-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	101.8		60-140	%	07-NOV-17				
Surrogate: 3,4-Dichlorotoluene	105.0		60-140	%	03-NOV-17				
L2015398-12 MW17-103S/D-4-6									
Sampled By: M. SHIRY on 25-OCT-17 @ 15:37									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.166		0.0040	mS/cm	06-NOV-17	1.4	1.4	0.7	0.7
% Moisture	3.62		0.10	%	02-NOV-17				
pH	8.14		0.10	pH units	02-NOV-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Organic / Inorganic Carbon									
Fraction Organic Carbon	0.0055		0.0010	No Unit	02-NOV-17				
Fraction Organic Carbon	0.0055		0.0010	No Unit	02-NOV-17				
Fraction Organic Carbon	0.0056		0.0010	No Unit	02-NOV-17				
Average Fraction Organic Carbon	0.0055		0.0010	No Unit	02-NOV-17				
Total Organic Carbon	0.55		0.10	%	02-NOV-17				
Total Organic Carbon	0.55		0.10	%	02-NOV-17				
Total Organic Carbon	0.56		0.10	%	02-NOV-17				
Saturated Paste Extractables									
SAR	0.45	SAR:M	0.10	SAR	06-NOV-17	12	12	5	5
Calcium (Ca)	3.0		1.0	mg/L	06-NOV-17				
Magnesium (Mg)	<1.0		1.0	mg/L	06-NOV-17				
Sodium (Na)	2.9		1.0	mg/L	06-NOV-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	2.2		1.0	ug/g	03-NOV-17	18	18	18	18

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-12 MW17-103S/D-4-6									
Sampled By: M. SHIRY on 25-OCT-17 @ 15:37									
Matrix: SOIL									
Metals									
Barium (Ba)	16.1		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	9.9		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.12		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	0.69		0.50	ug/g	03-NOV-17	1.9	1.9	1.2	1.2
Calcium (Ca)	172000		50	ug/g	12-APR-21				
Chromium (Cr)	8.0		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	2.4		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	8.7		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	8690		50	ug/g	12-APR-21				
Lead (Pb)	66.8		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	85300		20	ug/g	12-APR-21				
Mercury (Hg)	0.0289		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	7.9		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	17.3		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	456		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	03-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	03-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	03-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	03-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	03-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	03-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	03-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	03-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	03-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	03-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	03-NOV-17	0.16	0.68	0.05	0.085

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#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
							#1	#2	#3	#4
L2015398-12	MW17-103S/D-4-6									
Sampled By:	M. SHIRY on 25-OCT-17 @ 15:37									
Matrix:	SOIL									
Volatile Organic Compounds										
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	03-NOV-17	1.1	1.6	1.1	1.6
	n-Hexane	<0.050		0.050	ug/g	03-NOV-17	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	03-NOV-17	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	03-NOV-17	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	03-NOV-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	03-NOV-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	03-NOV-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	03-NOV-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	03-NOV-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	03-NOV-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	03-NOV-17				
	m+p-Xylenes	<0.030		0.030	ug/g	03-NOV-17				
	Xylenes (Total)	<0.050		0.050	ug/g	04-NOV-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	93.3		50-140	%	03-NOV-17				
	Surrogate: 1,4-Difluorobenzene	92.3		50-140	%	03-NOV-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	03-NOV-17	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65
	F2 (C10-C16)	<10		10	ug/g	07-NOV-17	230	250	98	150
	F2-Naphth	<10		10	ug/g	07-NOV-17				
	F3a (C16-C22)	<25		25	ug/g	07-NOV-17				
	F3 (C16-C34)	98		50	ug/g	07-NOV-17	1700	2500	300	1300
	F3b (C22-C34)	80		25	ug/g	07-NOV-17				
	F3-PAH	97		50	ug/g	07-NOV-17				
	F4 (C34-C50)	94		50	ug/g	07-NOV-17	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	193		72	ug/g	07-NOV-17				
	Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
	Surrogate: 2-Bromobenzotrifluoride	97.0		60-140	%	07-NOV-17				
	Surrogate: 3,4-Dichlorotoluene	92.0		60-140	%	03-NOV-17				
Polycyclic Aromatic Hydrocarbons										
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics										
	Acenaphthene	<0.050		0.050	ug/g	06-NOV-17	21	29	7.9	29
	Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
	Anthracene	<0.050		0.050	ug/g	06-NOV-17	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	0.111		0.050	ug/g	06-NOV-17	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	0.307		0.050	ug/g	06-NOV-17	*0.3	*0.3	*0.3	*0.3
	Benzo(b)fluoranthene	0.289		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2015398-12	MW17-103S/D-4-6									
Sampled By:	M. SHIRY on 25-OCT-17 @ 15:37									
Matrix:	SOIL						#1	#2	#3	#4
Semi-Volatile Organics										
	Benzo(ghi)perylene	0.253		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	0.224		0.050	ug/g	06-NOV-17	0.96	0.96	0.78	0.78
	Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
	4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
	Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
	2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
	Chrysene	0.139		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
	Dibenzo(a,h)anthracene	0.074		0.050	ug/g	06-NOV-17	0.1	0.1	0.1	0.1
	3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	06-NOV-17	1	1	1	1
	2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
	Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
	2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
	2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
	2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
	2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
	Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
	Fluoranthene	0.069		0.050	ug/g	06-NOV-17	9.6	9.6	0.69	0.69
	Fluorene	<0.050		0.050	ug/g	06-NOV-17	62	69	62	69
	Indeno(1,2,3-cd)pyrene	0.344		0.050	ug/g	06-NOV-17	0.76	0.95	0.38	0.48
	1-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
	2-Methylnaphthalene	<0.030		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
	Naphthalene	<0.050		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
	Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
	Phenanthrene	<0.050		0.050	ug/g	06-NOV-17	12	16	6.2	7.8
	Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
	Pyrene	0.064		0.050	ug/g	06-NOV-17	96	96	78	78
	1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
	2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
	2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	121.3		50-140	%	06-NOV-17				
	Surrogate: Nitrobenzene d5	113.4		50-140	%	06-NOV-17				
	Surrogate: Phenol d5	112.2		30-130	%	06-NOV-17				
	Surrogate: p-Terphenyl d14	115.3		50-140	%	06-NOV-17				
	Surrogate: 2,4,6-Tribromophenol	112.5		50-140	%	06-NOV-17				
L2015398-13	MW17-102D-0.5-1									
Sampled By:	M. SHIRY on 26-OCT-17 @ 17:42									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	7.89		0.10	%	02-NOV-17				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	03-NOV-17	16	28	16	28
	Benzene	<0.0068		0.0068	ug/g	03-NOV-17	0.32	0.4	0.21	0.17

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-13 MW17-102D-0.5-1									
Sampled By: M. SHIRY on 26-OCT-17 @ 17:42									
Matrix: SOIL									
Volatile Organic Compounds									
Bromodichloromethane	<0.050		0.050	ug/g	03-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	03-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	03-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	03-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	03-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	03-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	03-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	03-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	03-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	03-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	03-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	03-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	03-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	03-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	03-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	03-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	03-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	03-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	03-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	03-NOV-17	0.05	0.11	0.05	0.05
Trichloroethylene	0.082		0.010	ug/g	03-NOV-17	0.55	0.61	*0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	03-NOV-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	03-NOV-17	0.032	0.25	0.02	0.022
o-Xylene	0.036		0.020	ug/g	03-NOV-17				
m+p-Xylenes	0.040		0.030	ug/g	03-NOV-17				
Xylenes (Total)	0.076		0.050	ug/g	04-NOV-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	99.7		50-140	%	03-NOV-17				
Surrogate: 1,4-Difluorobenzene	98.4		50-140	%	03-NOV-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	03-NOV-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	07-NOV-17	230	250	98	150

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-13 MW17-102D-0.5-1									
Sampled By: M. SHIRY on 26-OCT-17 @ 17:42									
Matrix: SOIL									
Hydrocarbons									
F3a (C16-C22)	29		25	ug/g	07-NOV-17				
F3 (C16-C34)	91		50	ug/g	07-NOV-17	1700	2500	300	1300
F3b (C22-C34)	62		25	ug/g	07-NOV-17				
F4 (C34-C50)	<50		50	ug/g	07-NOV-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	91		72	ug/g	07-NOV-17				
Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	94.4		60-140	%	07-NOV-17				
Surrogate: 3,4-Dichlorotoluene	98.4		60-140	%	03-NOV-17				
L2015398-14 MW17-102D-0.5-4									
Sampled By: M. SHIRY on 26-OCT-17 @ 17:42									
Matrix: SOIL									
Physical Tests									
% Moisture	8.65		0.10	%	02-NOV-17				
Polycyclic Aromatic Hydrocarbons									
1+2-Methylnaphthalenes	0.278		0.042	ug/g	06-NOV-17	30	42	0.99	3.4
Semi-Volatile Organics									
Acenaphthene	0.379		0.050	ug/g	06-NOV-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	06-NOV-17	0.15	0.17	0.15	0.17
Anthracene	0.690		0.050	ug/g	06-NOV-17	*0.67	0.74	*0.67	0.74
Benzo(a)anthracene	1.90		0.050	ug/g	06-NOV-17	*0.96	*0.96	*0.5	*0.63
Benzo(a)pyrene	1.65		0.050	ug/g	06-NOV-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	1.74		0.050	ug/g	06-NOV-17	*0.96	*0.96	*0.78	*0.78
Benzo(ghi)perylene	0.992		0.050	ug/g	06-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	1.39		0.050	ug/g	06-NOV-17	*0.96	*0.96	*0.78	*0.78
Biphenyl	<0.050		0.050	ug/g	06-NOV-17	52	210	0.31	1.1
4-Chloroaniline	<0.10		0.10	ug/g	06-NOV-17	0.5	0.53	0.5	0.53
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	06-NOV-17	11	13	0.67	1.8
2-Chlorophenol	<0.10		0.10	ug/g	06-NOV-17	3.1	3.9	1.6	2
Chrysene	1.93		0.050	ug/g	06-NOV-17	9.6	9.6	7	7.8
Dibenzo(a,h)anthracene	0.250		0.050	ug/g	06-NOV-17	*0.1	*0.1	*0.1	*0.1
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	06-NOV-17	1	1	1	1
2,4-Dichlorophenol	<0.10		0.10	ug/g	06-NOV-17	0.19	0.27	0.19	0.27
Diethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Dimethylphthalate	<0.10		0.10	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
2,4-Dimethylphenol	<0.10		0.10	ug/g	06-NOV-17	38	53	38	53
2,4-Dinitrophenol	<1.0		1.0	ug/g	06-NOV-17	2	2.9	2	2.9
2,4-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,6-Dinitrotoluene	<0.10		0.10	ug/g	06-NOV-17				
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g	06-NOV-17	0.5	0.5	0.5	0.5
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	06-NOV-17	28	35	5	5
Fluoranthene	4.27	DLHC	0.10	ug/g	06-NOV-17	9.6	9.6	*0.69	*0.69
Fluorene	0.357		0.050	ug/g	06-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	1.36		0.050	ug/g	06-NOV-17	*0.76	*0.95	*0.38	*0.48
1-Methylnaphthalene	0.132		0.030	ug/g	06-NOV-17	30	42	0.99	3.4

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#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2015398-14	MW17-102D-0.5-4									
Sampled By:	M. SHIRY on 26-OCT-17 @ 17:42									
Matrix:	SOIL						#1	#2	#3	#4
Semi-Volatile Organics										
	2-Methylnaphthalene	0.146		0.030	ug/g	06-NOV-17	30	42	0.99	3.4
	Naphthalene	0.180		0.050	ug/g	06-NOV-17	9.6	28	0.6	0.75
	Pentachlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.9	3.3	0.1	0.1
	Phenanthrene	3.92	DLHC	0.10	ug/g	06-NOV-17	12	16	6.2	7.8
	Phenol	<0.10		0.10	ug/g	06-NOV-17	9.4	9.4	9.4	9.4
	Pyrene	3.68		0.050	ug/g	06-NOV-17	96	96	78	78
	1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	06-NOV-17	3.2	16	0.36	1.4
	2,4,5-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	9.1	10	4.4	5.5
	2,4,6-Trichlorophenol	<0.10		0.10	ug/g	06-NOV-17	2.1	2.9	2.1	2.9
	Surrogate: 2-Fluorobiphenyl	120.3		50-140	%	06-NOV-17				
	Surrogate: Nitrobenzene d5	118.8		50-140	%	06-NOV-17				
	Surrogate: Phenol d5	113.1		30-130	%	06-NOV-17				
	Surrogate: p-Terphenyl d14	125.6		50-140	%	06-NOV-17				
	Surrogate: 2,4,6-Tribromophenol	108.9		50-140	%	06-NOV-17				
L2015398-15	MW17-102D-4-5.5									
Sampled By:	M. SHIRY on 26-OCT-17 @ 18:02									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	Conductivity	0.136		0.0040	mS/cm	06-NOV-17	1.4	1.4	0.7	0.7
	% Moisture	13.6		0.10	%	02-NOV-17				
	pH	7.57		0.10	pH units	02-NOV-17				
Cyanides										
	Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables										
	SAR	0.24	SAR:M	0.10	SAR	06-NOV-17	12	12	5	5
	Calcium (Ca)	2.6		1.0	mg/L	06-NOV-17				
	Magnesium (Mg)	<1.0		1.0	mg/L	06-NOV-17				
	Sodium (Na)	1.4		1.0	mg/L	06-NOV-17				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
	Arsenic (As)	9.3		1.0	ug/g	03-NOV-17	18	18	18	18
	Barium (Ba)	115		1.0	ug/g	03-NOV-17	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
	Boron (B)	5.8		5.0	ug/g	03-NOV-17	120	120	120	120
	Boron (B), Hot Water Ext.	0.33		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
	Cadmium (Cd)	1.54		0.50	ug/g	03-NOV-17	1.9	1.9	*1.2	*1.2
	Calcium (Ca)	44200		50	ug/g	12-APR-21				
	Chromium (Cr)	16.6		1.0	ug/g	03-NOV-17	160	160	160	160
	Cobalt (Co)	9.8		1.0	ug/g	03-NOV-17	80	100	22	22
	Copper (Cu)	59.9		1.0	ug/g	03-NOV-17	230	300	140	180
	Iron (Fe)	23500		50	ug/g	12-APR-21				
	Lead (Pb)	424		1.0	ug/g	03-NOV-17	*120	*120	*120	*120
	Magnesium (Mg)	19200		20	ug/g	12-APR-21				
	Mercury (Hg)	0.0432		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8

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#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-15 MW17-102D-4-5.5									
Sampled By: M. SHIRY on 26-OCT-17 @ 18:02									
Matrix: SOIL									
Metals									
Molybdenum (Mo)	1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	22.6		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	35.6		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	784		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	0.31		0.20	ug/g	02-NOV-17	8	10	8	10
L2015398-16 MW17-102D-6-7									
Sampled By: M. SHIRY on 26-OCT-17 @ 18:12									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.178		0.0040	mS/cm	06-NOV-17	1.4	1.4	0.7	0.7
% Moisture	5.65		0.10	%	02-NOV-17				
pH	8.60		0.10	pH units	02-NOV-17				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	02-NOV-17	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.65	SAR:M	0.10	SAR	06-NOV-17	12	12	5	5
Calcium (Ca)	3.5		1.0	mg/L	06-NOV-17				
Magnesium (Mg)	<1.0		1.0	mg/L	06-NOV-17				
Sodium (Na)	4.5		1.0	mg/L	06-NOV-17				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	03-NOV-17	40	50	7.5	7.5
Arsenic (As)	3.0		1.0	ug/g	03-NOV-17	18	18	18	18
Barium (Ba)	60.5		1.0	ug/g	03-NOV-17	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	03-NOV-17	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	<5.0		5.0	ug/g	03-NOV-17	120	120	120	120
Boron (B), Hot Water Ext.	0.21		0.10	ug/g	03-NOV-17	2	2	1.5	1.5
Cadmium (Cd)	<0.50		0.50	ug/g	03-NOV-17	1.9	1.9	1.2	1.2
Calcium (Ca)	106000		50	ug/g	12-APR-21				
Chromium (Cr)	21.5		1.0	ug/g	03-NOV-17	160	160	160	160
Cobalt (Co)	5.1		1.0	ug/g	03-NOV-17	80	100	22	22
Copper (Cu)	25.1		1.0	ug/g	03-NOV-17	230	300	140	180
Iron (Fe)	17300		50	ug/g	12-APR-21				
Lead (Pb)	45.0		1.0	ug/g	03-NOV-17	120	120	120	120
Magnesium (Mg)	29700		20	ug/g	12-APR-21				
Mercury (Hg)	0.0095		0.0050	ug/g	03-NOV-17	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	03-NOV-17	40	40	6.9	6.9
Nickel (Ni)	10.4		1.0	ug/g	03-NOV-17	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	03-NOV-17	5.5	5.5	2.4	2.4

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-16 MW17-102D-6-7									
Sampled By: M. SHIRY on 26-OCT-17 @ 18:12									
Matrix: SOIL									
Metals									
Silver (Ag)	<0.20		0.20	ug/g	03-NOV-17	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	03-NOV-17	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	03-NOV-17	33	33	23	23
Vanadium (V)	31.0		1.0	ug/g	03-NOV-17	86	86	86	86
Zinc (Zn)	393		5.0	ug/g	03-NOV-17	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	02-NOV-17	8	10	8	10
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	04-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	04-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	04-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	04-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	04-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	04-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	04-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	04-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	04-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	04-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	04-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	04-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	04-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	04-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	04-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	04-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	04-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	04-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	04-NOV-17	0.55	0.61	0.061	0.52

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-16 MW17-102D-6-7									
Sampled By: M. SHIRY on 26-OCT-17 @ 18:12									
Matrix: SOIL									
Volatile Organic Compounds									
Trichlorofluoromethane	<0.050		0.050	ug/g	04-NOV-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	04-NOV-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	04-NOV-17				
m+p-Xylenes	<0.030		0.030	ug/g	04-NOV-17				
Xylenes (Total)	<0.050		0.050	ug/g	04-NOV-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	106.7		50-140	%	04-NOV-17				
Surrogate: 1,4-Difluorobenzene	104.5		50-140	%	04-NOV-17				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	04-NOV-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	07-NOV-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	07-NOV-17	230	250	98	150
F2-Naphth	<10		10	ug/g	07-NOV-17				
F3a (C16-C22)	<25		25	ug/g	07-NOV-17				
F3 (C16-C34)	<50		50	ug/g	07-NOV-17	1700	2500	300	1300
F3b (C22-C34)	27		25	ug/g	07-NOV-17				
F3-PAH	<50		50	ug/g	07-NOV-17				
F4 (C34-C50)	<50		50	ug/g	07-NOV-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	07-NOV-17				
Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	96.6		60-140	%	07-NOV-17				
Surrogate: 3,4-Dichlorotoluene	129.5		60-140	%	04-NOV-17				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	0.119		0.050	ug/g	03-NOV-17	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	03-NOV-17	0.15	0.17	0.15	0.17
Anthracene	0.210		0.050	ug/g	03-NOV-17	0.67	0.74	0.67	0.74
Benzo(a)anthracene	0.441		0.050	ug/g	03-NOV-17	0.96	0.96	0.5	0.63
Benzo(a)pyrene	0.356		0.050	ug/g	03-NOV-17	*0.3	*0.3	*0.3	*0.3
Benzo(b)fluoranthene	0.495		0.050	ug/g	03-NOV-17	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	0.221		0.050	ug/g	03-NOV-17	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	0.165		0.050	ug/g	03-NOV-17	0.96	0.96	0.78	0.78
Chrysene	0.490		0.050	ug/g	03-NOV-17	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	0.061		0.050	ug/g	03-NOV-17	0.1	0.1	0.1	0.1
Fluoranthene	1.06		0.050	ug/g	03-NOV-17	9.6	9.6	*0.69	*0.69
Fluorene	0.128		0.050	ug/g	03-NOV-17	62	69	62	69
Indeno(1,2,3-cd)pyrene	0.225		0.050	ug/g	03-NOV-17	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	0.072		0.042	ug/g	03-NOV-17	30	42	0.99	3.4
1-Methylnaphthalene	0.031		0.030	ug/g	03-NOV-17	30	42	0.99	3.4
2-Methylnaphthalene	0.040		0.030	ug/g	03-NOV-17	30	42	0.99	3.4
Naphthalene	0.056		0.050	ug/g	03-NOV-17	9.6	28	0.6	0.75
Phenanthrene	1.10		0.050	ug/g	03-NOV-17	12	16	6.2	7.8
Pyrene	0.806		0.050	ug/g	03-NOV-17	96	96	78	78
Surrogate: 2-Fluorobiphenyl	92.2		50-140	%	03-NOV-17				
Surrogate: p-Terphenyl d14	92.4		50-140	%	03-NOV-17				

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#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-17 DUP 10									
Sampled By: M. SHIRY on 20-OCT-17									
Matrix: SOIL									
Physical Tests									
% Moisture	5.44		0.10	%	01-NOV-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	04-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	04-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	04-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	04-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	04-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	04-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	04-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	04-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	04-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	04-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	04-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	04-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	04-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	04-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	04-NOV-17	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	04-NOV-17	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	04-NOV-17	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	04-NOV-17	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.11	0.05	0.05
Trichloroethylene	<0.010		0.010	ug/g	04-NOV-17	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	04-NOV-17	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	04-NOV-17	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	04-NOV-17				
m+p-Xylenes	<0.030		0.030	ug/g	04-NOV-17				
Xylenes (Total)	<0.050		0.050	ug/g	04-NOV-17	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	105.3		50-140	%	04-NOV-17				
Surrogate: 1,4-Difluorobenzene	102.5		50-140	%	04-NOV-17				

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#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-17 DUP 10									
Sampled By: M. SHIRY on 20-OCT-17									
Matrix: SOIL									
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	04-NOV-17	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	06-NOV-17	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	06-NOV-17	230	250	98	150
F3a (C16-C22)	<25		25	ug/g	06-NOV-17				
F3 (C16-C34)	90		50	ug/g	06-NOV-17	1700	2500	300	1300
F3b (C22-C34)	72		25	ug/g	06-NOV-17				
F4 (C34-C50)	<50		50	ug/g	06-NOV-17	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	90		72	ug/g	06-NOV-17				
Chrom. to baseline at nC50	YES			No Unit	06-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	92.5		60-140	%	06-NOV-17				
Surrogate: 3,4-Dichlorotoluene	116.9		60-140	%	04-NOV-17				
L2015398-18 TRIP BLANK D3									
Sampled By: M. SHIRY on 27-OCT-17									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	<0.10		0.10	%	02-NOV-17				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	04-NOV-17	16	28	16	28
Benzene	<0.0068		0.0068	ug/g	04-NOV-17	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	04-NOV-17	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	04-NOV-17	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	04-NOV-17	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	04-NOV-17	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	04-NOV-17	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	04-NOV-17	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	04-NOV-17	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	04-NOV-17	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	04-NOV-17	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	04-NOV-17	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	04-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	04-NOV-17	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	04-NOV-17	1.1	1.6	1.1	1.6
n-Hexane	<0.050		0.050	ug/g	04-NOV-17	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	04-NOV-17	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	04-NOV-17	31	210	1.7	4.3

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#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2015398-18	TRIP BLANK D3									
Sampled By:	M. SHIRY on 27-OCT-17									
Matrix:	SOIL									
Volatile Organic Compounds										
	MTBE	<0.050		0.050	ug/g	04-NOV-17	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	04-NOV-17	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	04-NOV-17	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	04-NOV-17	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	04-NOV-17	0.05	0.11	0.05	0.05
	Trichloroethylene	<0.010		0.010	ug/g	04-NOV-17	0.55	0.61	0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	04-NOV-17	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	04-NOV-17	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	04-NOV-17				
	m+p-Xylenes	<0.030		0.030	ug/g	04-NOV-17				
	Xylenes (Total)	<0.050		0.050	ug/g	04-NOV-17	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	97.9		50-140	%	04-NOV-17				
	Surrogate: 1,4-Difluorobenzene	94.4		50-140	%	04-NOV-17				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	04-NOV-17	55	65	55	65
	Surrogate: 3,4-Dichlorotoluene	121.6		60-140	%	04-NOV-17				

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
SAR:M	Reported SAR represents a maximum value. Actual SAR may be lower if both Ca and Mg were detectable.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
1,4-DIOXANE-WT	Soil	1,4-Dioxane by GCMS Headspace	EPA 8260

An aliquot of soil/sediment is extract with methanol, and this extract is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution. Results are reported on a dry weight basis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-UW-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F4G-ADD-WT	Soil	F4G-SG (O.Reg.153/04)	MOE DECPH-E3398/CCME TIER 1

Reference Information

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

TOC-R511-WT	Soil	TOC & FOC-O.Reg 153/04 (July 2011)	CARTER 21.3.2

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

Reference Information

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

15-613140 15-613141

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2015398 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Soil**							
Batch R3872530								
WG2653820-4 DUP		**WG2653820-3**						
1,4-Dioxane		<0.20	<0.20	RPD-NA	mg/kg	N/A	40	02-NOV-17
WG2653820-2 LCS								
1,4-Dioxane			87.9		%		60-140	02-NOV-17
WG2653820-1 MB								
1,4-Dioxane			<0.20		mg/kg		0.2	02-NOV-17
WG2653820-5 MS		**WG2653820-3**						
1,4-Dioxane			87.4		%		60-140	02-NOV-17
625-511-WT	**Soil**							
Batch R3874790								
WG2654917-3 DUP		**WG2654917-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	06-NOV-17
1,2,4-Trichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
2-Chlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4-Dichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4-Dimethylphenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4-Dinitrophenol		<1.0	<1.0	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4-Dinitrotoluene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4,5-Trichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2,4,6-Trichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
2,6-Dinitrotoluene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
3,3'-Dichlorobenzidine		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
4-Chloroaniline		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Benzo(ghi)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Biphenyl		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Bis(2-chloroethyl)ether		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Bis(2-chloroisopropyl)ether		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3874790								
WG2654917-3 DUP		**WG2654917-5**						
Bis(2-ethylhexyl)phthalate		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Dibenzo(a,h)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Diethylphthalate		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Dimethylphthalate		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Pentachlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
Phenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	06-NOV-17
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-NOV-17
WG2654917-2 LCS								
1-Methylnaphthalene			109.6		%		50-140	06-NOV-17
1,2,4-Trichlorobenzene			97.1		%		50-140	06-NOV-17
2-Chlorophenol			103.7		%		50-140	06-NOV-17
2-Methylnaphthalene			99.2		%		50-140	06-NOV-17
2,4-Dichlorophenol			105.2		%		50-140	06-NOV-17
2,4-Dimethylphenol			101.0		%		30-130	06-NOV-17
2,4-Dinitrophenol			164.5	LCS-H	%		30-130	06-NOV-17
2,4-Dinitrotoluene			103.0		%		50-140	06-NOV-17
2,4,5-Trichlorophenol			112.6		%		50-140	06-NOV-17
2,4,6-Trichlorophenol			107.2		%		50-140	06-NOV-17
2,6-Dinitrotoluene			101.0		%		50-140	06-NOV-17
3,3'-Dichlorobenzidine			100.8		%		30-130	06-NOV-17
4-Chloroaniline			104.2		%		30-130	06-NOV-17
Acenaphthene			89.4		%		50-140	06-NOV-17
Acenaphthylene			98.5		%		50-140	06-NOV-17
Anthracene			101.2		%		50-140	06-NOV-17
Benzo(a)anthracene			109.8		%		50-140	06-NOV-17
Benzo(a)pyrene			110.3		%		50-140	06-NOV-17
Benzo(b)fluoranthene			113.7		%		50-140	06-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3874790								
WG2654917-2 LCS								
Benzo(ghi)perylene			96.3		%		50-140	06-NOV-17
Benzo(k)fluoranthene			107.5		%		50-140	06-NOV-17
Biphenyl			101.9		%		50-140	06-NOV-17
Bis(2-chloroethyl)ether			101.5		%		50-140	06-NOV-17
Bis(2-chloroisopropyl)ether			99.5		%		50-140	06-NOV-17
Bis(2-ethylhexyl)phthalate			94.7		%		50-140	06-NOV-17
Chrysene			109.6		%		50-140	06-NOV-17
Dibenzo(a,h)anthracene			105.5		%		50-140	06-NOV-17
Diethylphthalate			88.4		%		50-140	06-NOV-17
Dimethylphthalate			89.2		%		50-140	06-NOV-17
Fluoranthene			90.3		%		50-140	06-NOV-17
Fluorene			94.8		%		50-140	06-NOV-17
Indeno(1,2,3-cd)pyrene			113.8		%		50-140	06-NOV-17
Naphthalene			99.1		%		50-140	06-NOV-17
Pentachlorophenol			139.7		%		50-140	06-NOV-17
Phenanthrene			100.5		%		50-140	06-NOV-17
Phenol			106.8		%		30-130	06-NOV-17
Pyrene			95.1		%		50-140	06-NOV-17
WG2654917-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	06-NOV-17
1,2,4-Trichlorobenzene			<0.050		ug/g		0.05	06-NOV-17
2-Chlorophenol			<0.10		ug/g		0.1	06-NOV-17
2-Methylnaphthalene			<0.030		ug/g		0.03	06-NOV-17
2,4-Dichlorophenol			<0.10		ug/g		0.1	06-NOV-17
2,4-Dimethylphenol			<0.10		ug/g		0.1	06-NOV-17
2,4-Dinitrophenol			<1.0		ug/g		1	06-NOV-17
2,4-Dinitrotoluene			<0.10		ug/g		0.1	06-NOV-17
2,4,5-Trichlorophenol			<0.10		ug/g		0.1	06-NOV-17
2,4,6-Trichlorophenol			<0.10		ug/g		0.1	06-NOV-17
2,6-Dinitrotoluene			<0.10		ug/g		0.1	06-NOV-17
3,3'-Dichlorobenzidine			<0.10		ug/g		0.1	06-NOV-17
4-Chloroaniline			<0.10		ug/g		0.1	06-NOV-17
Acenaphthene			<0.050		ug/g		0.05	06-NOV-17
Acenaphthylene			<0.050		ug/g		0.05	06-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3874790								
WG2654917-1 MB								
Anthracene			<0.050		ug/g		0.05	06-NOV-17
Benzo(a)anthracene			<0.050		ug/g		0.05	06-NOV-17
Benzo(a)pyrene			<0.050		ug/g		0.05	06-NOV-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	06-NOV-17
Benzo(ghi)perylene			<0.050		ug/g		0.05	06-NOV-17
Benzo(k)fluoranthene			<0.050		ug/g		0.05	06-NOV-17
Biphenyl			<0.050		ug/g		0.05	06-NOV-17
Bis(2-chloroethyl)ether			<0.10		ug/g		0.1	06-NOV-17
Bis(2-chloroisopropyl)ether			<0.10		ug/g		0.1	06-NOV-17
Bis(2-ethylhexyl)phthalate			<0.10		ug/g		0.1	06-NOV-17
Chrysene			<0.050		ug/g		0.05	06-NOV-17
Dibenzo(a,h)anthracene			<0.050		ug/g		0.05	06-NOV-17
Diethylphthalate			<0.10		ug/g		0.1	06-NOV-17
Dimethylphthalate			<0.10		ug/g		0.1	06-NOV-17
Fluoranthene			<0.050		ug/g		0.05	06-NOV-17
Fluorene			<0.050		ug/g		0.05	06-NOV-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	06-NOV-17
Naphthalene			<0.050		ug/g		0.05	06-NOV-17
Pentachlorophenol			<0.10		ug/g		0.1	06-NOV-17
Phenanthrene			<0.050		ug/g		0.05	06-NOV-17
Phenol			<0.10		ug/g		0.1	06-NOV-17
Pyrene			<0.050		ug/g		0.05	06-NOV-17
Surrogate: 2-Fluorobiphenyl			117.8		%		50-140	06-NOV-17
Surrogate: 2,4,6-Tribromophenol			121.8		%		50-140	06-NOV-17
Surrogate: Nitrobenzene d5			115.7		%		50-140	06-NOV-17
Surrogate: p-Terphenyl d14			114.9		%		50-140	06-NOV-17
Surrogate: Phenol d5			115.3		%		30-130	06-NOV-17
WG2654917-4 MS		**WG2654917-5**						
1-Methylnaphthalene			109.8		%		50-140	06-NOV-17
1,2,4-Trichlorobenzene			95.1		%		50-140	06-NOV-17
2-Chlorophenol			97.0		%		50-140	06-NOV-17
2-Methylnaphthalene			97.4		%		50-140	06-NOV-17
2,4-Dichlorophenol			101.0		%		50-140	06-NOV-17
2,4-Dimethylphenol			100.5		%		30-150	06-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R3874790								
WG2654917-4 MS		**WG2654917-5**						
2,4-Dinitrophenol			108.9		%		30-150	06-NOV-17
2,4-Dinitrotoluene			98.3		%		50-140	06-NOV-17
2,4,5-Trichlorophenol			107.4		%		50-140	06-NOV-17
2,4,6-Trichlorophenol			103.1		%		50-140	06-NOV-17
2,6-Dinitrotoluene			96.1		%		50-140	06-NOV-17
3,3'-Dichlorobenzidine			95.8		%		30-130	06-NOV-17
4-Chloroaniline			101.8		%		30-130	06-NOV-17
Acenaphthene			89.0		%		50-140	06-NOV-17
Acenaphthylene			95.9		%		50-140	06-NOV-17
Anthracene			98.2		%		50-140	06-NOV-17
Benzo(a)anthracene			106.0		%		50-140	06-NOV-17
Benzo(a)pyrene			108.7		%		50-140	06-NOV-17
Benzo(b)fluoranthene			109.1		%		50-140	06-NOV-17
Benzo(ghi)perylene			101.3		%		50-140	06-NOV-17
Benzo(k)fluoranthene			104.4		%		50-140	06-NOV-17
Biphenyl			98.8		%		50-140	06-NOV-17
Bis(2-chloroethyl)ether			97.8		%		50-140	06-NOV-17
Bis(2-chloroisopropyl)ether			95.0		%		50-140	06-NOV-17
Bis(2-ethylhexyl)phthalate			91.7		%		50-140	06-NOV-17
Chrysene			106.6		%		50-140	06-NOV-17
Dibenzo(a,h)anthracene			105.0		%		50-140	06-NOV-17
Diethylphthalate			85.1		%		50-140	06-NOV-17
Dimethylphthalate			87.8		%		50-140	06-NOV-17
Fluoranthene			91.1		%		50-140	06-NOV-17
Fluorene			91.5		%		50-140	06-NOV-17
Indeno(1,2,3-cd)pyrene			114.5		%		50-140	06-NOV-17
Naphthalene			95.8		%		50-140	06-NOV-17
Pentachlorophenol			114.5		%		50-140	06-NOV-17
Phenanthrene			97.0		%		50-140	06-NOV-17
Phenol			98.5		%		30-130	06-NOV-17
Pyrene			94.2		%		50-140	06-NOV-17
B-HWS-R511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R3873850								
WG2655807-4 DUP		**L2016517-2**						
Boron (B), Hot Water Ext.		0.22	0.24		ug/g	5.5	30	03-NOV-17
WG2655807-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			105.9		%		70-130	03-NOV-17
WG2655807-3 LCS								
Boron (B), Hot Water Ext.			99.4		%		70-130	03-NOV-17
WG2655807-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	03-NOV-17
CN-WAD-R511-WT	**Soil**							
Batch R3873726								
WG2654127-3 DUP		**L2014791-14**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	02-NOV-17
WG2654127-2 LCS								
Cyanide, Weak Acid Diss			96.5		%		80-120	02-NOV-17
WG2654127-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	02-NOV-17
WG2654127-4 MS		**L2014791-14**						
Cyanide, Weak Acid Diss			106.0		%		70-130	02-NOV-17
Batch R3875363								
WG2653719-3 DUP		**L2014701-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	06-NOV-17
WG2653719-2 LCS								
Cyanide, Weak Acid Diss			96.7		%		80-120	06-NOV-17
WG2653719-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	06-NOV-17
WG2653719-4 MS		**L2014701-1**						
Cyanide, Weak Acid Diss			107.1		%		70-130	06-NOV-17
CR-CR6-IC-WT	**Soil**							
Batch R3873343								
WG2654129-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			90.5		%		70-130	02-NOV-17
WG2654129-3 DUP		**L2015419-26**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	02-NOV-17
WG2654129-2 LCS								
Chromium, Hexavalent			97.6		%		80-120	02-NOV-17
WG2654129-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Soil**							
Batch R3873919								
WG2655811-4 DUP		**WG2655811-3**						
Conductivity		0.286	0.290		mS/cm	1.4	20	03-NOV-17
WG2656086-1 LCS								
Conductivity			100.3		%		90-110	03-NOV-17
WG2655811-1 MB								
Conductivity			<0.0040		mS/cm		0.004	03-NOV-17
Batch R3875573								
WG2657253-4 DUP		**WG2657253-3**						
Conductivity		0.970	0.895		mS/cm	8.0	20	06-NOV-17
WG2657435-1 LCS								
Conductivity			99.7		%		90-110	06-NOV-17
WG2657253-1 MB								
Conductivity			<0.0040		mS/cm		0.004	06-NOV-17
F1-HS-511-WT	**Soil**							
Batch R3872737								
WG2652752-4 DUP		**WG2652752-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	02-NOV-17
WG2652752-2 LCS								
F1 (C6-C10)			97.0		%		80-120	02-NOV-17
WG2652752-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	02-NOV-17
Surrogate: 3,4-Dichlorotoluene			93.4		%		60-140	02-NOV-17
WG2652752-7 MS		**WG2652752-6**						
F1 (C6-C10)			92.1		%		60-140	02-NOV-17
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	03-NOV-17
WG2653746-2 LCS								
F1 (C6-C10)			105.0		%		80-120	03-NOV-17
WG2653746-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	03-NOV-17
Surrogate: 3,4-Dichlorotoluene			126.5		%		60-140	03-NOV-17
WG2653746-7 MS		**WG2653746-6**						
F1 (C6-C10)			91.5		%		60-140	03-NOV-17
F2-F4-UW-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3875473								
WG2653153-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			110.2		%		70-130	06-NOV-17
F3 (C16-C34)			110.3		%		70-130	06-NOV-17
F4 (C34-C50)			113.3		%		70-130	06-NOV-17
WG2653153-3 DUP		**WG2653153-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	06-NOV-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	06-NOV-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	06-NOV-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	06-NOV-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	06-NOV-17
WG2653153-2 LCS								
F2 (C10-C16)			113.1		%		70-130	06-NOV-17
F3a (C16-C22)			109.8		%		70-130	06-NOV-17
F3b (C22-C34)			110.8		%		70-130	06-NOV-17
F3 (C16-C34)			110.3		%		70-130	06-NOV-17
F4 (C34-C50)			113.0		%		70-130	06-NOV-17
WG2653153-1 MB								
F2 (C10-C16)			<10		ug/g		10	06-NOV-17
F3a (C16-C22)			<25		ug/g		25	06-NOV-17
F3b (C22-C34)			<25		ug/g		25	06-NOV-17
F3 (C16-C34)			<50		ug/g		50	06-NOV-17
F4 (C34-C50)			<50		ug/g		50	06-NOV-17
Surrogate: 2-Bromobenzotrifluoride			94.5		%		60-140	06-NOV-17
Batch R3878157								
WG2654899-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			98.7		%		70-130	07-NOV-17
F3 (C16-C34)			96.4		%		70-130	07-NOV-17
F4 (C34-C50)			95.0		%		70-130	07-NOV-17
WG2654899-3 DUP		**WG2654899-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	40	07-NOV-17
F3a (C16-C22)		<25	<25	RPD-NA	ug/g	N/A	40	07-NOV-17
F3b (C22-C34)		<25	<25	RPD-NA	ug/g	N/A	40	07-NOV-17
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	40	07-NOV-17
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	40	07-NOV-17
WG2654899-2 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-UW-WT	**Soil**							
Batch R3878157								
WG2654899-2 LCS								
F2 (C10-C16)			100.6		%		70-130	07-NOV-17
F3a (C16-C22)			99.1		%		70-130	07-NOV-17
F3b (C22-C34)			96.0		%		70-130	07-NOV-17
F3 (C16-C34)			97.5		%		70-130	07-NOV-17
F4 (C34-C50)			97.7		%		70-130	07-NOV-17
WG2654899-1 MB								
F2 (C10-C16)			<10		ug/g		10	07-NOV-17
F3a (C16-C22)			<25		ug/g		25	07-NOV-17
F3b (C22-C34)			<25		ug/g		25	07-NOV-17
F3 (C16-C34)			<50		ug/g		50	07-NOV-17
F4 (C34-C50)			<50		ug/g		50	07-NOV-17
Surrogate: 2-Bromobenzotrifluoride			73.3		%		60-140	07-NOV-17
F4G-ADD-511-WT	**Soil**							
Batch R3875673								
WG2657801-2 LCS								
F4G-SG (GHH-Silica)			91.3		%		60-140	03-NOV-17
WG2657801-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	03-NOV-17
Batch R3878205								
WG2658797-2 LCS								
F4G-SG (GHH-Silica)			81.6		%		60-140	06-NOV-17
WG2658797-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	06-NOV-17
F4G-ADD-WT	**Soil**							
Batch R3875673								
WG2657801-2 LCS								
F4G-SG (GHH-Silica)			91.3		%		60-120	03-NOV-17
WG2657801-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	03-NOV-17
Batch R3878205								
WG2658797-2 LCS								
F4G-SG (GHH-Silica)			81.6		%		60-120	06-NOV-17
WG2658797-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	06-NOV-17
HG-200.2-CVAA-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R3873648								
WG2655793-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			100.8		%		70-130	03-NOV-17
WG2655793-6 DUP		**WG2655793-5**						
Mercury (Hg)		<0.0050	<0.0050	RPD-NA	ug/g	N/A	40	03-NOV-17
WG2655793-3 LCS								
Mercury (Hg)			110.5		%		80-120	03-NOV-17
WG2655793-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	03-NOV-17
MET-200.2-CCMS-WT	**Soil**							
Batch R3875169								
WG2655793-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			94.5		%		70-130	03-NOV-17
Arsenic (As)			98.5		%		70-130	03-NOV-17
Barium (Ba)			106.9		%		70-130	03-NOV-17
Beryllium (Be)			101.6		%		70-130	03-NOV-17
Bismuth (Bi)			97.9		%		70-130	03-NOV-17
Boron (B)			4.4		mg/kg		0-8.2	03-NOV-17
Cadmium (Cd)			88.6		%		70-130	03-NOV-17
Calcium (Ca)			99.9		%		70-130	03-NOV-17
Chromium (Cr)			97.4		%		70-130	03-NOV-17
Cobalt (Co)			96.0		%		70-130	03-NOV-17
Copper (Cu)			97.9		%		70-130	03-NOV-17
Iron (Fe)			93.2		%		70-130	03-NOV-17
Lead (Pb)			97.4		%		70-130	03-NOV-17
Magnesium (Mg)			101.1		%		70-130	03-NOV-17
Molybdenum (Mo)			102.2		%		70-130	03-NOV-17
Nickel (Ni)			96.0		%		70-130	03-NOV-17
Selenium (Se)			0.32		mg/kg		0.11-0.51	03-NOV-17
Silver (Ag)			0.22		mg/kg		0.13-0.33	03-NOV-17
Thallium (Tl)			0.123		mg/kg		0.077-0.18	03-NOV-17
Uranium (U)			96.8		%		70-130	03-NOV-17
Vanadium (V)			98.9		%		70-130	03-NOV-17
Zinc (Zn)			97.4		%		70-130	03-NOV-17
WG2655793-6 DUP		**WG2655793-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3875169								
WG2655793-6 DUP		**WG2655793-5**						
Arsenic (As)		1.47	1.36		ug/g	7.7	30	03-NOV-17
Barium (Ba)		22.2	22.3		ug/g	0.4	40	03-NOV-17
Beryllium (Be)		0.16	0.16		ug/g	1.2	30	03-NOV-17
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	03-NOV-17
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	03-NOV-17
Cadmium (Cd)		0.041	0.051		ug/g	20	30	03-NOV-17
Calcium (Ca)		116000	114000		ug/g	1.5	30	03-NOV-17
Chromium (Cr)		7.44	7.67		ug/g	3.0	30	03-NOV-17
Cobalt (Co)		2.59	2.59		ug/g	0.1	30	03-NOV-17
Copper (Cu)		5.21	5.60		ug/g	7.1	30	03-NOV-17
Iron (Fe)		9360	9480		ug/g	1.3	30	03-NOV-17
Lead (Pb)		3.27	3.16		ug/g	3.3	40	03-NOV-17
Magnesium (Mg)		5980	5980		ug/g	0.1	30	03-NOV-17
Molybdenum (Mo)		0.22	0.22		ug/g	0.1	40	03-NOV-17
Nickel (Ni)		4.49	4.49		ug/g	0.0	30	03-NOV-17
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	03-NOV-17
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	03-NOV-17
Thallium (Tl)		0.059	0.054		ug/g	8.3	30	03-NOV-17
Uranium (U)		0.473	0.465		ug/g	1.6	30	03-NOV-17
Vanadium (V)		17.6	17.8		ug/g	1.2	30	03-NOV-17
Zinc (Zn)		15.4	16.1		ug/g	4.2	30	03-NOV-17
WG2655793-4 LCS								
Antimony (Sb)			95.4		%		80-120	03-NOV-17
Arsenic (As)			96.0		%		80-120	03-NOV-17
Barium (Ba)			97.8		%		80-120	03-NOV-17
Beryllium (Be)			89.1		%		80-120	03-NOV-17
Bismuth (Bi)			88.0		%		80-120	03-NOV-17
Boron (B)			83.8		%		80-120	03-NOV-17
Cadmium (Cd)			88.8		%		80-120	03-NOV-17
Calcium (Ca)			96.4		%		80-120	03-NOV-17
Chromium (Cr)			93.6		%		80-120	03-NOV-17
Cobalt (Co)			92.5		%		80-120	03-NOV-17
Copper (Cu)			90.6		%		80-120	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R3875169								
WG2655793-4 LCS								
Iron (Fe)			99.1		%		80-120	03-NOV-17
Lead (Pb)			90.3		%		80-120	03-NOV-17
Magnesium (Mg)			104.2		%		80-120	03-NOV-17
Molybdenum (Mo)			94.3		%		80-120	03-NOV-17
Nickel (Ni)			94.4		%		80-120	03-NOV-17
Selenium (Se)			96.8		%		80-120	03-NOV-17
Silver (Ag)			88.2		%		80-120	03-NOV-17
Thallium (Tl)			90.9		%		80-120	03-NOV-17
Uranium (U)			93.7		%		80-120	03-NOV-17
Vanadium (V)			98.4		%		80-120	03-NOV-17
Zinc (Zn)			88.3		%		80-120	03-NOV-17
WG2655793-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	03-NOV-17
Arsenic (As)			<0.10		mg/kg		0.1	03-NOV-17
Barium (Ba)			<0.50		mg/kg		0.5	03-NOV-17
Beryllium (Be)			<0.10		mg/kg		0.1	03-NOV-17
Bismuth (Bi)			<0.20		mg/kg		0.2	03-NOV-17
Boron (B)			<5.0		mg/kg		5	03-NOV-17
Cadmium (Cd)			<0.020		mg/kg		0.02	03-NOV-17
Calcium (Ca)			<50		mg/kg		50	03-NOV-17
Chromium (Cr)			<0.50		mg/kg		0.5	03-NOV-17
Cobalt (Co)			<0.10		mg/kg		0.1	03-NOV-17
Copper (Cu)			<0.50		mg/kg		0.5	03-NOV-17
Iron (Fe)			<50		mg/kg		50	03-NOV-17
Lead (Pb)			<0.50		mg/kg		0.5	03-NOV-17
Magnesium (Mg)			<20		mg/kg		20	03-NOV-17
Molybdenum (Mo)			<0.10		mg/kg		0.1	03-NOV-17
Nickel (Ni)			<0.50		mg/kg		0.5	03-NOV-17
Selenium (Se)			<0.20		mg/kg		0.2	03-NOV-17
Silver (Ag)			<0.10		mg/kg		0.1	03-NOV-17
Thallium (Tl)			<0.050		mg/kg		0.05	03-NOV-17
Uranium (U)			<0.050		mg/kg		0.05	03-NOV-17
Vanadium (V)			<0.20		mg/kg		0.2	03-NOV-17
Zinc (Zn)			<2.0		mg/kg		2	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R3871421								
WG2653428-6 DUP		**L2015360-1**						
% Moisture		8.99	9.11		%	1.4	20	01-NOV-17
WG2653428-5 LCS								
% Moisture			99.6		%		90-110	01-NOV-17
WG2653428-4 MB								
% Moisture			<0.10		%		0.1	01-NOV-17
Batch R3873337								
WG2654903-3 DUP		**L2015398-6**						
% Moisture		8.04	8.53		%	5.9	20	02-NOV-17
WG2654903-2 LCS								
% Moisture			98.4		%		90-110	02-NOV-17
WG2654903-1 MB								
% Moisture			<0.10		%		0.1	02-NOV-17
Batch R3873338								
WG2654793-3 DUP		**L2016410-1**						
% Moisture		9.82	10.3		%	4.7	20	02-NOV-17
WG2654793-2 LCS								
% Moisture			100.9		%		90-110	02-NOV-17
WG2654793-1 MB								
% Moisture			<0.10		%		0.1	02-NOV-17
PAH-511-WT	**Soil**							
Batch R3872866								
WG2653730-4 DUP		**WG2653730-3**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzo(a)anthracene		<0.050	0.053	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzo(b)fluoranthene		<0.050	0.057	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Chrysene		<0.050	0.063	RPD-NA	ug/g	N/A	40	02-NOV-17
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Fluoranthene		<0.050	0.089	RPD-NA	ug/g	N/A	40	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3872866								
WG2653730-4 DUP		**WG2653730-3**						
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Pyrene		<0.050	0.077	RPD-NA	ug/g	N/A	40	02-NOV-17
WG2653730-2 LCS								
1-Methylnaphthalene			86.6		%		50-140	02-NOV-17
2-Methylnaphthalene			84.9		%		50-140	02-NOV-17
Acenaphthene			86.6		%		50-140	02-NOV-17
Acenaphthylene			87.7		%		50-140	02-NOV-17
Anthracene			86.5		%		50-140	02-NOV-17
Benzo(a)anthracene			85.5		%		50-140	02-NOV-17
Benzo(a)pyrene			80.6		%		50-140	02-NOV-17
Benzo(b)fluoranthene			71.8		%		50-140	02-NOV-17
Benzo(g,h,i)perylene			64.6		%		50-140	02-NOV-17
Benzo(k)fluoranthene			92.9		%		50-140	02-NOV-17
Chrysene			93.4		%		50-140	02-NOV-17
Dibenzo(ah)anthracene			70.5		%		50-140	02-NOV-17
Fluoranthene			82.7		%		50-140	02-NOV-17
Fluorene			82.6		%		50-140	02-NOV-17
Indeno(1,2,3-cd)pyrene			63.7		%		50-140	02-NOV-17
Naphthalene			90.0		%		50-140	02-NOV-17
Phenanthrene			86.2		%		50-140	02-NOV-17
Pyrene			84.4		%		50-140	02-NOV-17
WG2653730-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	02-NOV-17
2-Methylnaphthalene			<0.030		ug/g		0.03	02-NOV-17
Acenaphthene			<0.050		ug/g		0.05	02-NOV-17
Acenaphthylene			<0.050		ug/g		0.05	02-NOV-17
Anthracene			<0.050		ug/g		0.05	02-NOV-17
Benzo(a)anthracene			<0.050		ug/g		0.05	02-NOV-17
Benzo(a)pyrene			<0.050		ug/g		0.05	02-NOV-17
Benzo(b)fluoranthene			<0.050		ug/g		0.05	02-NOV-17
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R3872866								
WG2653730-1 MB								
Benzo(k)fluoranthene			<0.050		ug/g		0.05	02-NOV-17
Chrysene			<0.050		ug/g		0.05	02-NOV-17
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	02-NOV-17
Fluoranthene			<0.050		ug/g		0.05	02-NOV-17
Fluorene			<0.050		ug/g		0.05	02-NOV-17
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	02-NOV-17
Naphthalene			<0.050		ug/g		0.05	02-NOV-17
Phenanthrene			<0.050		ug/g		0.05	02-NOV-17
Pyrene			<0.050		ug/g		0.05	02-NOV-17
Surrogate: 2-Fluorobiphenyl			100.2		%		50-140	02-NOV-17
Surrogate: p-Terphenyl d14			98.8		%		50-140	02-NOV-17
WG2653730-5 MS		**WG2653730-3**						
1-Methylnaphthalene			85.6		%		50-140	02-NOV-17
2-Methylnaphthalene			84.2		%		50-140	02-NOV-17
Acenaphthene			85.6		%		50-140	02-NOV-17
Acenaphthylene			87.1		%		50-140	02-NOV-17
Anthracene			87.8		%		50-140	02-NOV-17
Benzo(a)anthracene			92.3		%		50-140	02-NOV-17
Benzo(a)pyrene			81.3		%		50-140	02-NOV-17
Benzo(b)fluoranthene			75.0		%		50-140	02-NOV-17
Benzo(g,h,i)perylene			64.2		%		50-140	02-NOV-17
Benzo(k)fluoranthene			88.6		%		50-140	02-NOV-17
Chrysene			97.4		%		50-140	02-NOV-17
Dibenzo(ah)anthracene			70.3		%		50-140	02-NOV-17
Fluoranthene			90.4		%		50-140	02-NOV-17
Fluorene			82.8		%		50-140	02-NOV-17
Indeno(1,2,3-cd)pyrene			69.4		%		50-140	02-NOV-17
Naphthalene			86.6		%		50-140	02-NOV-17
Phenanthrene			87.1		%		50-140	02-NOV-17
Pyrene			90.2		%		50-140	02-NOV-17
PCB-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R3880007								
WG2656437-4 DUP		**WG2656437-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-NOV-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-NOV-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-NOV-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-NOV-17
WG2656437-2 LCS								
Aroclor 1242			90.3		%		60-140	09-NOV-17
Aroclor 1248			80.8		%		60-140	09-NOV-17
Aroclor 1254			89.1		%		60-140	09-NOV-17
Aroclor 1260			105.6		%		60-140	09-NOV-17
WG2656437-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	09-NOV-17
Aroclor 1248			<0.010		ug/g		0.01	09-NOV-17
Aroclor 1254			<0.010		ug/g		0.01	09-NOV-17
Aroclor 1260			<0.010		ug/g		0.01	09-NOV-17
Surrogate: d14-Terphenyl			78.3		%		60-140	09-NOV-17
WG2656437-5 MS		**WG2656437-3**						
Aroclor 1242			97.2		%		60-140	09-NOV-17
Aroclor 1254			100.7		%		60-140	09-NOV-17
Aroclor 1260			102.4		%		60-140	09-NOV-17
PH-WT	**Soil**							
Batch R3873118								
WG2653742-1 DUP		**L2014791-20**						
pH		6.41	6.37	J	pH units	0.04	0.3	02-NOV-17
WG2655038-1 LCS								
pH			7.00		pH units		6.9-7.1	02-NOV-17
SAR-R511-WT	**Soil**							
Batch R3873881								
WG2655811-4 DUP		**WG2655811-3**						
Calcium (Ca)		1.3	1.3		mg/L	6.1	30	03-NOV-17
Sodium (Na)		35.9	34.6		mg/L	3.8	30	03-NOV-17
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	03-NOV-17
WG2655811-2 IRM		**WT SAR1**						
Calcium (Ca)			100.0		%		70-130	03-NOV-17
Sodium (Na)			98.0		%		70-130	03-NOV-17
Magnesium (Mg)			102.1		%		70-130	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R3873881								
WG2655811-1 MB								
Calcium (Ca)			<1.0		mg/L		1	03-NOV-17
Sodium (Na)			<1.0		mg/L		1	03-NOV-17
Magnesium (Mg)			<1.0		mg/L		1	03-NOV-17
Batch R3875356								
WG2657253-4 DUP		**WG2657253-3**						
Calcium (Ca)		44.7	54.1		mg/L	19	30	06-NOV-17
Sodium (Na)		119	126		mg/L	5.7	30	06-NOV-17
Magnesium (Mg)		2.0	2.4		mg/L	21	30	06-NOV-17
WG2657253-2 IRM		**WT SAR1**						
Calcium (Ca)			97.1		%		70-130	06-NOV-17
Sodium (Na)			97.6		%		70-130	06-NOV-17
Magnesium (Mg)			99.9		%		70-130	06-NOV-17
WG2657253-1 MB								
Calcium (Ca)			<1.0		mg/L		1	06-NOV-17
Sodium (Na)			<1.0		mg/L		1	06-NOV-17
Magnesium (Mg)			<1.0		mg/L		1	06-NOV-17
TOC-R511-WT	**Soil**							
Batch R3872949								
WG2654819-3 CRM		**WT-TOC-CRM**						
Total Organic Carbon			102.4		%		70-130	02-NOV-17
WG2654819-4 DUP		**L2013616-1**						
Total Organic Carbon		0.52	0.52		%	0.1	35	02-NOV-17
WG2654819-2 LCS								
Total Organic Carbon			101.5		%		80-120	02-NOV-17
Total Organic Carbon			101.5		%		80-120	02-NOV-17
Total Organic Carbon			101.5		%		80-120	02-NOV-17
WG2654819-1 MB								
Total Organic Carbon			<0.10		%		0.1	02-NOV-17
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-4 DUP		**WG2652752-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-4 DUP		**WG2652752-3**						
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	02-NOV-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	02-NOV-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	02-NOV-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
trans-1,3-Dichloropropene		<0.030	<0.030		ug/g			02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-4 DUP		**WG2652752-3**						
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	02-NOV-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	02-NOV-17
WG2652752-2 LCS								
1,1,1,2-Tetrachloroethane			100.4		%		60-130	02-NOV-17
1,1,2,2-Tetrachloroethane			98.4		%		60-130	02-NOV-17
1,1,1-Trichloroethane			101.1		%		60-130	02-NOV-17
1,1,2-Trichloroethane			99.1		%		60-130	02-NOV-17
1,1-Dichloroethane			99.2		%		60-130	02-NOV-17
1,1-Dichloroethylene			87.2		%		60-130	02-NOV-17
1,2-Dibromoethane			99.9		%		70-130	02-NOV-17
1,2-Dichlorobenzene			104.0		%		70-130	02-NOV-17
1,2-Dichloroethane			97.8		%		60-130	02-NOV-17
1,2-Dichloropropane			101.3		%		70-130	02-NOV-17
1,3-Dichlorobenzene			108.8		%		70-130	02-NOV-17
1,4-Dichlorobenzene			109.8		%		70-130	02-NOV-17
Acetone			110.7		%		60-140	02-NOV-17
Benzene			102.8		%		70-130	02-NOV-17
Bromodichloromethane			98.0		%		50-140	02-NOV-17
Bromoform			111.9		%		70-130	02-NOV-17
Bromomethane			94.6		%		50-140	02-NOV-17
Carbon tetrachloride			102.2		%		70-130	02-NOV-17
Chlorobenzene			101.1		%		70-130	02-NOV-17
Chloroform			102.6		%		70-130	02-NOV-17
cis-1,2-Dichloroethylene			103.0		%		70-130	02-NOV-17
cis-1,3-Dichloropropene			109.9		%		70-130	02-NOV-17
Dibromochloromethane			103.6		%		60-130	02-NOV-17
Dichlorodifluoromethane			49.8	MES	%		50-140	02-NOV-17
Ethylbenzene			92.1		%		70-130	02-NOV-17
n-Hexane			94.8		%		70-130	02-NOV-17
Methylene Chloride			106.2		%		70-130	02-NOV-17
MTBE			99.95		%		70-130	02-NOV-17
m+p-Xylenes			94.8				70-130	

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-2 LCS								
m+p-Xylenes			94.8		%		70-130	02-NOV-17
Methyl Ethyl Ketone			114.8		%		60-140	02-NOV-17
Methyl Isobutyl Ketone			98.9		%		60-140	02-NOV-17
o-Xylene			93.1		%		70-130	02-NOV-17
Styrene			92.4		%		70-130	02-NOV-17
Tetrachloroethylene			98.9		%		60-130	02-NOV-17
Toluene			93.3		%		70-130	02-NOV-17
trans-1,2-Dichloroethylene			99.8		%		60-130	02-NOV-17
trans-1,3-Dichloropropene			104.7		%		70-130	02-NOV-17
Trichloroethylene			105.1		%		60-130	02-NOV-17
Trichlorofluoromethane			95.2		%		50-140	02-NOV-17
Vinyl chloride			84.7		%		60-140	02-NOV-17
WG2652752-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1-Dichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17
1,2-Dibromoethane			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichloropropane			<0.050		ug/g		0.05	02-NOV-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
Acetone			<0.50		ug/g		0.5	02-NOV-17
Benzene			<0.0068		ug/g		0.0068	02-NOV-17
Bromodichloromethane			<0.050		ug/g		0.05	02-NOV-17
Bromoform			<0.050		ug/g		0.05	02-NOV-17
Bromomethane			<0.050		ug/g		0.05	02-NOV-17
Carbon tetrachloride			<0.050		ug/g		0.05	02-NOV-17
Chlorobenzene			<0.050		ug/g		0.05	02-NOV-17
Chloroform			<0.050		ug/g		0.05	02-NOV-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-1 MB								
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	02-NOV-17
Dibromochloromethane			<0.050		ug/g		0.05	02-NOV-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	02-NOV-17
Ethylbenzene			<0.018		ug/g		0.018	02-NOV-17
n-Hexane			<0.050		ug/g		0.05	02-NOV-17
Methylene Chloride			<0.050		ug/g		0.05	02-NOV-17
MTBE			<0.050		ug/g		0.05	02-NOV-17
m+p-Xylenes			<0.030		ug/g		0.03	02-NOV-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	02-NOV-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	02-NOV-17
o-Xylene			<0.020		ug/g		0.02	02-NOV-17
Styrene			<0.050		ug/g		0.05	02-NOV-17
Tetrachloroethylene			<0.050		ug/g		0.05	02-NOV-17
Toluene			<0.080		ug/g		0.08	02-NOV-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	02-NOV-17
Trichloroethylene			<0.010		ug/g		0.01	02-NOV-17
Trichlorofluoromethane			<0.050		ug/g		0.05	02-NOV-17
Vinyl chloride			<0.020		ug/g		0.02	02-NOV-17
Surrogate: 1,4-Difluorobenzene			101.3		%		50-140	02-NOV-17
Surrogate: 4-Bromofluorobenzene			103.8		%		50-140	02-NOV-17
WG2652752-5 MS		**WG2652752-3**						
1,1,1,2-Tetrachloroethane			103.4		%		50-140	02-NOV-17
1,1,2,2-Tetrachloroethane			101.1		%		50-140	02-NOV-17
1,1,1-Trichloroethane			104.4		%		50-140	02-NOV-17
1,1,2-Trichloroethane			100.4		%		50-140	02-NOV-17
1,1-Dichloroethane			101.9		%		50-140	02-NOV-17
1,1-Dichloroethylene			90.7		%		50-140	02-NOV-17
1,2-Dibromoethane			100.1		%		50-140	02-NOV-17
1,2-Dichlorobenzene			105.6		%		50-140	02-NOV-17
1,2-Dichloroethane			97.4		%		50-140	02-NOV-17
1,2-Dichloropropane			102.5		%		50-140	02-NOV-17
1,3-Dichlorobenzene			102.0		%		50-140	02-NOV-17
1,4-Dichlorobenzene			104.9		%		50-140	02-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872737								
WG2652752-5 MS		**WG2652752-3**						
Acetone			111.8		%		50-140	02-NOV-17
Benzene			104.7		%		50-140	02-NOV-17
Bromodichloromethane			98.7		%		50-140	02-NOV-17
Bromoform			113.6		%		50-140	02-NOV-17
Bromomethane			95.4		%		50-140	02-NOV-17
Carbon tetrachloride			105.9		%		50-140	02-NOV-17
Chlorobenzene			103.1		%		50-140	02-NOV-17
Chloroform			104.3		%		50-140	02-NOV-17
cis-1,2-Dichloroethylene			104.3		%		50-140	02-NOV-17
cis-1,3-Dichloropropene			104.7		%		50-140	02-NOV-17
Dibromochloromethane			105.2		%		50-140	02-NOV-17
Dichlorodifluoromethane			55.1		%		50-140	02-NOV-17
Ethylbenzene			95.3		%		50-140	02-NOV-17
n-Hexane			100.9		%		50-140	02-NOV-17
Methylene Chloride			106.8		%		50-140	02-NOV-17
MTBE			100.7		%		50-140	02-NOV-17
m+p-Xylenes			97.1		%		50-140	02-NOV-17
Methyl Ethyl Ketone			109.5		%		50-140	02-NOV-17
Methyl Isobutyl Ketone			95.8		%		50-140	02-NOV-17
o-Xylene			95.7		%		50-140	02-NOV-17
Styrene			93.9		%		50-140	02-NOV-17
Tetrachloroethylene			102.5		%		50-140	02-NOV-17
Toluene			96.3		%		50-140	02-NOV-17
trans-1,2-Dichloroethylene			101.0		%		50-140	02-NOV-17
trans-1,3-Dichloropropene			100.6		%		50-140	02-NOV-17
Trichloroethylene			106.9		%		50-140	02-NOV-17
Trichlorofluoromethane			100.9		%		50-140	02-NOV-17
Vinyl chloride			88.5		%		50-140	02-NOV-17
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,2-Trichloroethane		<0.050	<0.050					

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
Benzene		0.0070	0.0070		ug/g	0.0	40	03-NOV-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-NOV-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	03-NOV-17
n-Hexane		0.083	0.084		ug/g	1.2	40	03-NOV-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
m+p-Xylenes		0.055	0.056		ug/g	2.2	40	03-NOV-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
o-Xylene		0.059	0.061		ug/g	2.5	40	03-NOV-17
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	03-NOV-17
trans-1,2-Dichloroethylene		<0.050	<0.050		ug/g			03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-NOV-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	03-NOV-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	03-NOV-17
WG2653746-2 LCS								
1,1,1,2-Tetrachloroethane			99.6		%		60-130	03-NOV-17
1,1,2,2-Tetrachloroethane			107.9		%		60-130	03-NOV-17
1,1,1-Trichloroethane			94.2		%		60-130	03-NOV-17
1,1,2-Trichloroethane			107.1		%		60-130	03-NOV-17
1,1-Dichloroethane			96.8		%		60-130	03-NOV-17
1,1-Dichloroethylene			83.2		%		60-130	03-NOV-17
1,2-Dibromoethane			108.9		%		70-130	03-NOV-17
1,2-Dichlorobenzene			100.9		%		70-130	03-NOV-17
1,2-Dichloroethane			109.0		%		60-130	03-NOV-17
1,2-Dichloropropane			105.0		%		70-130	03-NOV-17
1,3-Dichlorobenzene			96.0		%		70-130	03-NOV-17
1,4-Dichlorobenzene			99.4		%		70-130	03-NOV-17
Acetone			117.2		%		60-140	03-NOV-17
Benzene			99.2		%		70-130	03-NOV-17
Bromodichloromethane			101.4		%		50-140	03-NOV-17
Bromoform			105.7		%		70-130	03-NOV-17
Bromomethane			90.3		%		50-140	03-NOV-17
Carbon tetrachloride			92.2		%		70-130	03-NOV-17
Chlorobenzene			99.2		%		70-130	03-NOV-17
Chloroform			100.8		%		70-130	03-NOV-17
cis-1,2-Dichloroethylene			100.4		%		70-130	03-NOV-17
cis-1,3-Dichloropropene			104.1		%		70-130	03-NOV-17
Dibromochloromethane			108.4		%		60-130	03-NOV-17
Dichlorodifluoromethane			51.4		%		50-140	03-NOV-17
Ethylbenzene			91.7		%		70-130	03-NOV-17
n-Hexane			89.2		%		70-130	03-NOV-17
Methylene Chloride			103.5		%		70-130	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-2 LCS								
MTBE			96.1		%		70-130	03-NOV-17
m+p-Xylenes			94.0		%		70-130	03-NOV-17
Methyl Ethyl Ketone			118.7		%		60-140	03-NOV-17
Methyl Isobutyl Ketone			114.7		%		60-140	03-NOV-17
o-Xylene			94.2		%		70-130	03-NOV-17
Styrene			96.7		%		70-130	03-NOV-17
Tetrachloroethylene			91.2		%		60-130	03-NOV-17
Toluene			93.6		%		70-130	03-NOV-17
trans-1,2-Dichloroethylene			96.1		%		60-130	03-NOV-17
trans-1,3-Dichloropropene			103.1		%		70-130	03-NOV-17
Trichloroethylene			98.5		%		60-130	03-NOV-17
Trichlorofluoromethane			88.1		%		50-140	03-NOV-17
Vinyl chloride			80.6		%		60-140	03-NOV-17
WG2653746-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1-Dichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
1,2-Dibromoethane			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichloropropane			<0.050		ug/g		0.05	03-NOV-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
Acetone			<0.50		ug/g		0.5	03-NOV-17
Benzene			<0.0068		ug/g		0.0068	03-NOV-17
Bromodichloromethane			<0.050		ug/g		0.05	03-NOV-17
Bromoform			<0.050		ug/g		0.05	03-NOV-17
Bromomethane			<0.050		ug/g		0.05	03-NOV-17
Carbon tetrachloride			<0.050		ug/g		0.05	03-NOV-17
Chlorobenzene			<0.050		ug/g		0.05	03-NOV-17
Chloroform			<0.050		ug/g		0.05	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-1 MB								
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	03-NOV-17
Dibromochloromethane			<0.050		ug/g		0.05	03-NOV-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	03-NOV-17
Ethylbenzene			<0.018		ug/g		0.018	03-NOV-17
n-Hexane			<0.050		ug/g		0.05	03-NOV-17
Methylene Chloride			<0.050		ug/g		0.05	03-NOV-17
MTBE			<0.050		ug/g		0.05	03-NOV-17
m+p-Xylenes			<0.030		ug/g		0.03	03-NOV-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	03-NOV-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	03-NOV-17
o-Xylene			<0.020		ug/g		0.02	03-NOV-17
Styrene			<0.050		ug/g		0.05	03-NOV-17
Tetrachloroethylene			<0.050		ug/g		0.05	03-NOV-17
Toluene			<0.080		ug/g		0.08	03-NOV-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	03-NOV-17
Trichloroethylene			<0.010		ug/g		0.01	03-NOV-17
Trichlorofluoromethane			<0.050		ug/g		0.05	03-NOV-17
Vinyl chloride			<0.020		ug/g		0.02	03-NOV-17
Surrogate: 1,4-Difluorobenzene			101.1		%		50-140	03-NOV-17
Surrogate: 4-Bromofluorobenzene			104.9		%		50-140	03-NOV-17
WG2653746-5 MS		**WG2653746-3**						
1,1,1,2-Tetrachloroethane			100.3		%		50-140	03-NOV-17
1,1,2,2-Tetrachloroethane			109.1		%		50-140	03-NOV-17
1,1,1-Trichloroethane			94.8		%		50-140	03-NOV-17
1,1,2-Trichloroethane			113.0		%		50-140	03-NOV-17
1,1-Dichloroethane			98.6		%		50-140	03-NOV-17
1,1-Dichloroethylene			83.9		%		50-140	03-NOV-17
1,2-Dibromoethane			113.9		%		50-140	03-NOV-17
1,2-Dichlorobenzene			98.5		%		50-140	03-NOV-17
1,2-Dichloroethane			113.8		%		50-140	03-NOV-17
1,2-Dichloropropane			107.1		%		50-140	03-NOV-17
1,3-Dichlorobenzene			92.6		%		50-140	03-NOV-17

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-5 MS		**WG2653746-3**						
1,4-Dichlorobenzene			95.4		%		50-140	03-NOV-17
Acetone			115.7		%		50-140	03-NOV-17
Benzene			100.2		%		50-140	03-NOV-17
Bromodichloromethane			104.5		%		50-140	03-NOV-17
Bromoform			107.7		%		50-140	03-NOV-17
Bromomethane			92.5		%		50-140	03-NOV-17
Carbon tetrachloride			91.7		%		50-140	03-NOV-17
Chlorobenzene			98.1		%		50-140	03-NOV-17
Chloroform			102.1		%		50-140	03-NOV-17
cis-1,2-Dichloroethylene			101.8		%		50-140	03-NOV-17
cis-1,3-Dichloropropene			103.5		%		50-140	03-NOV-17
Dibromochloromethane			112.0		%		50-140	03-NOV-17
Dichlorodifluoromethane			58.2		%		50-140	03-NOV-17
Ethylbenzene			91.1		%		50-140	03-NOV-17
n-Hexane			95.5		%		50-140	03-NOV-17
Methylene Chloride			110.0		%		50-140	03-NOV-17
MTBE			97.0		%		50-140	03-NOV-17
m+p-Xylenes			92.2		%		50-140	03-NOV-17
Methyl Ethyl Ketone			130.3		%		50-140	03-NOV-17
Methyl Isobutyl Ketone			120.2		%		50-140	03-NOV-17
o-Xylene			93.7		%		50-140	03-NOV-17
Styrene			94.3		%		50-140	03-NOV-17
Tetrachloroethylene			88.3		%		50-140	03-NOV-17
Toluene			95.3		%		50-140	03-NOV-17
trans-1,2-Dichloroethylene			95.4		%		50-140	03-NOV-17
trans-1,3-Dichloropropene			103.9		%		50-140	03-NOV-17
Trichloroethylene			97.3		%		50-140	03-NOV-17
Trichlorofluoromethane			90.2		%		50-140	03-NOV-17
Vinyl chloride			83.4		%		50-140	03-NOV-17

Quality Control Report

Workorder: L2015398 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2015398 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Hydrocarbons							
F2-F4 (O.Reg.153/04)							
	4	20-OCT-17 10:01	06-NOV-17 00:00	14	17	days	EHT
	17	20-OCT-17	06-NOV-17 00:00	14	17	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2015398 were received on 30-OCT-17 09:00.

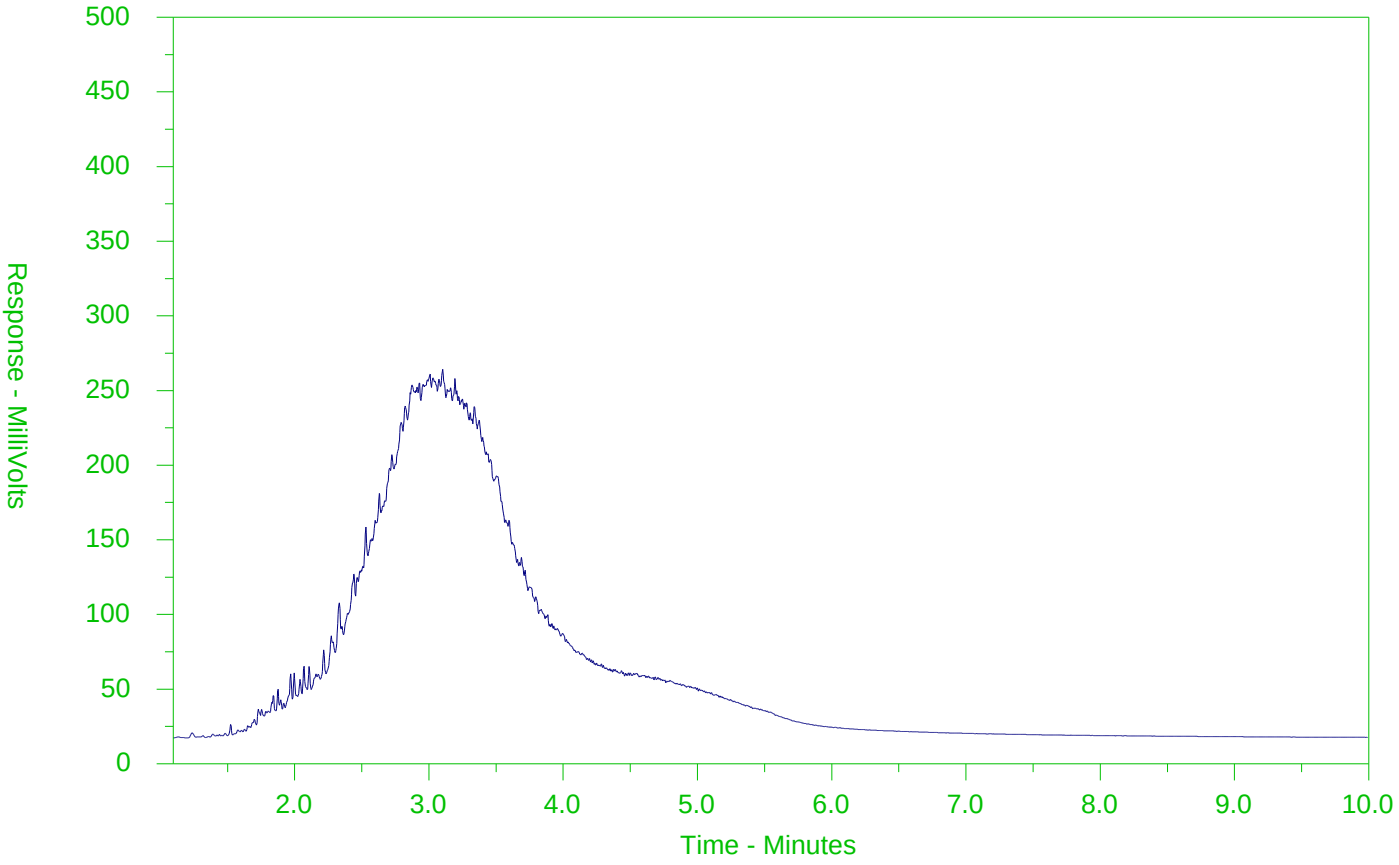
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-4
Client Sample ID: MW17-101S/D-4-5.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

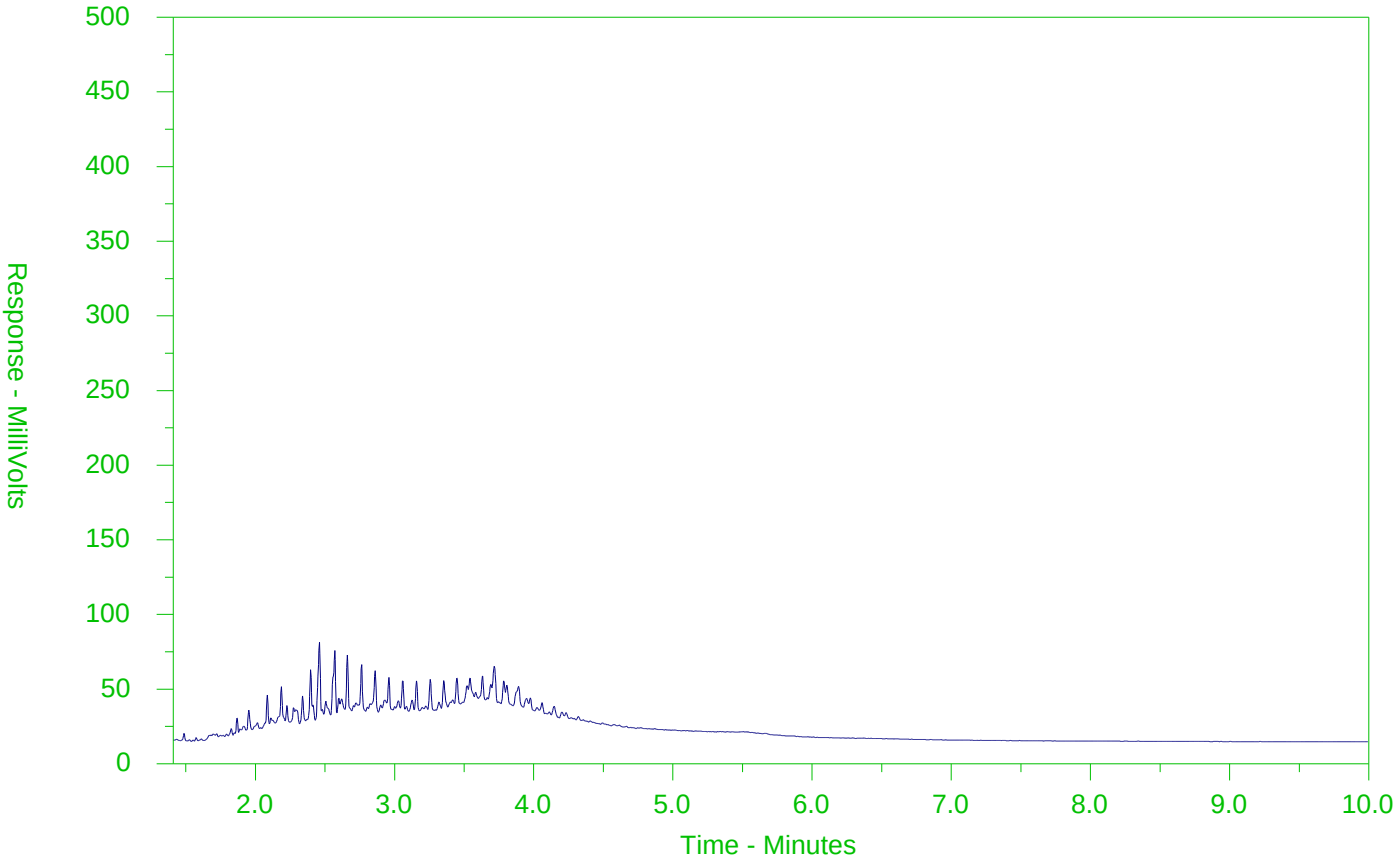
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-7
Client Sample ID: MW17-105S/D-4-6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

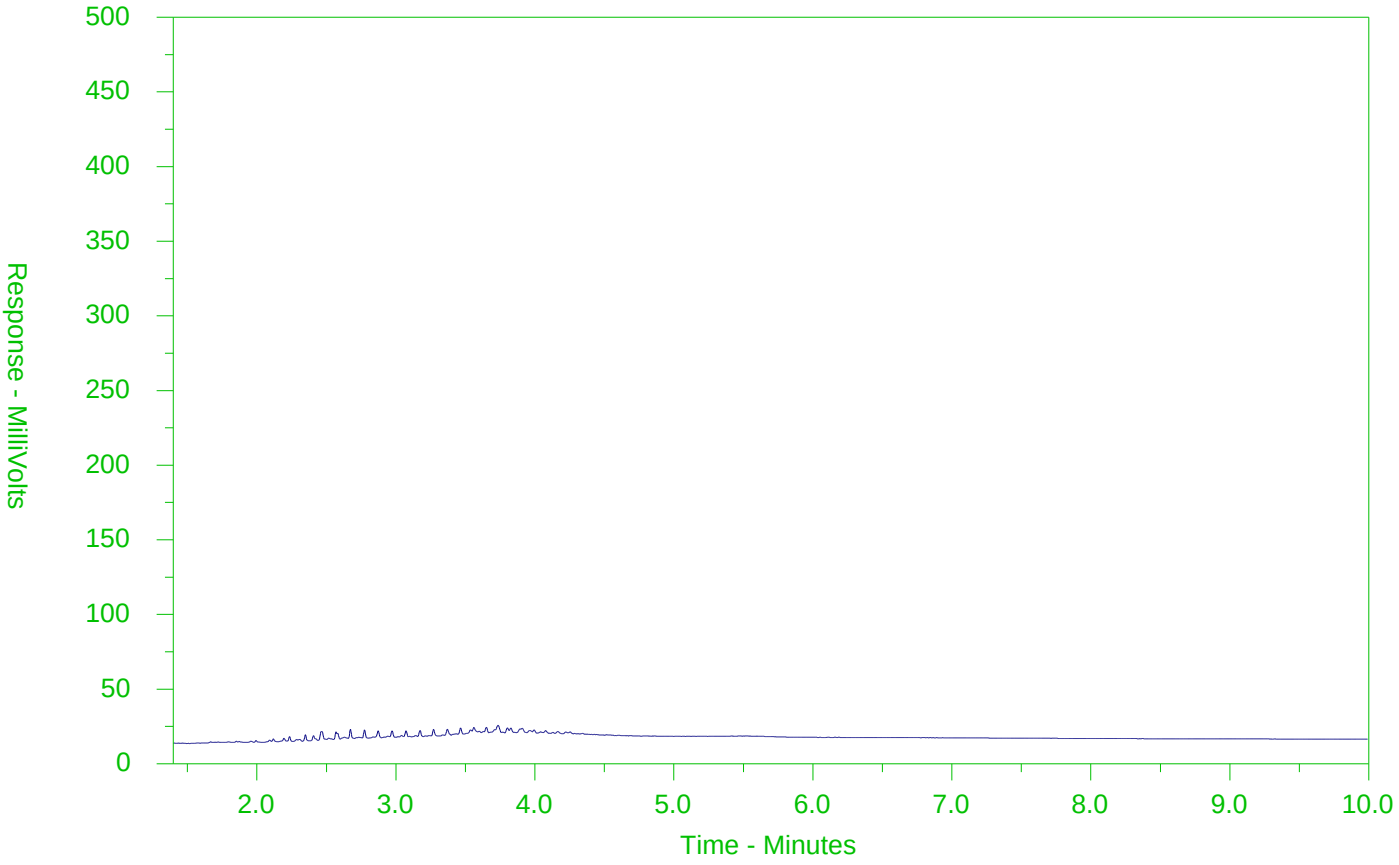
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-8
Client Sample ID: MW17-105S/D-6-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

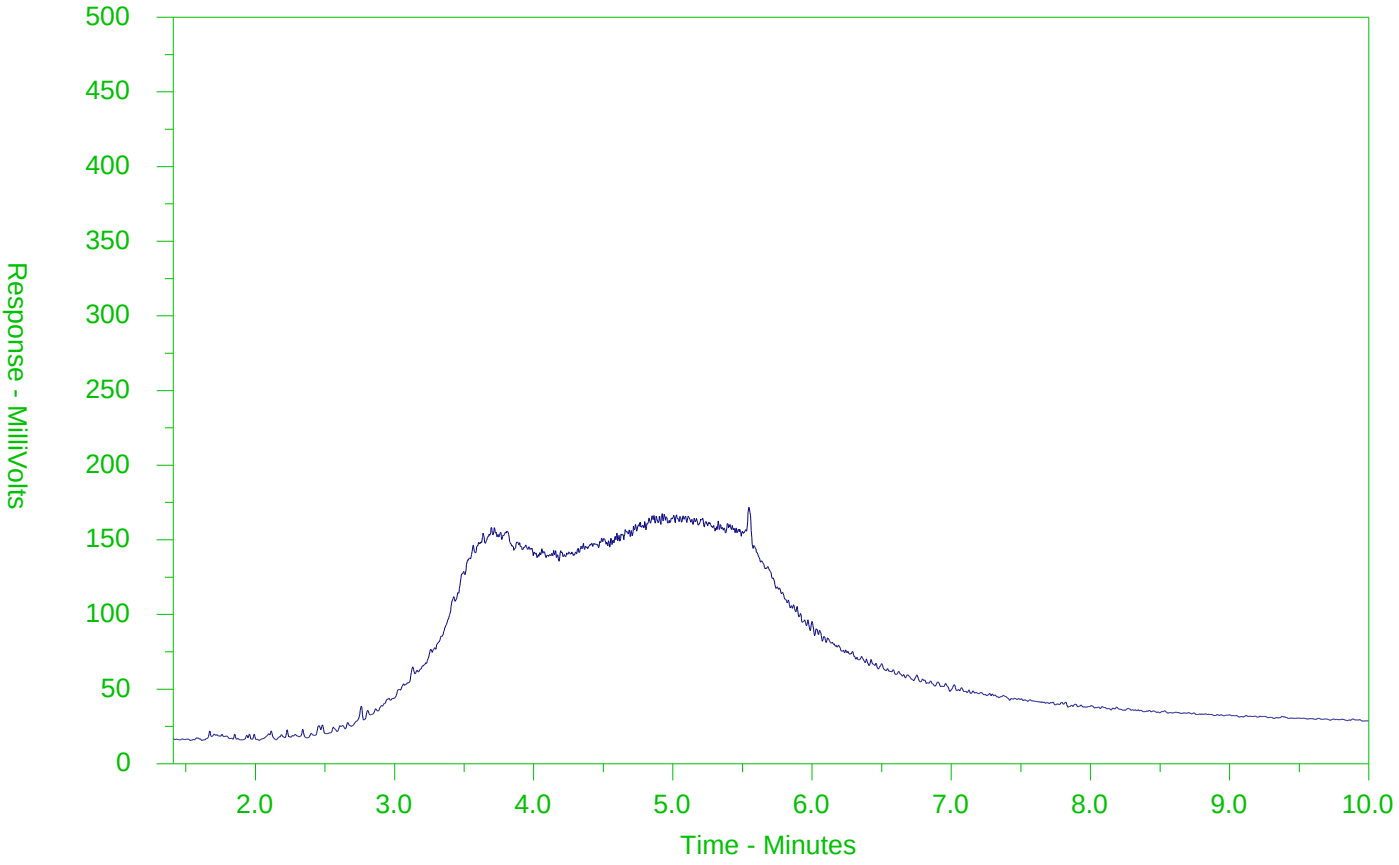
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-11
Client Sample ID: MW17-103S/D-2-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

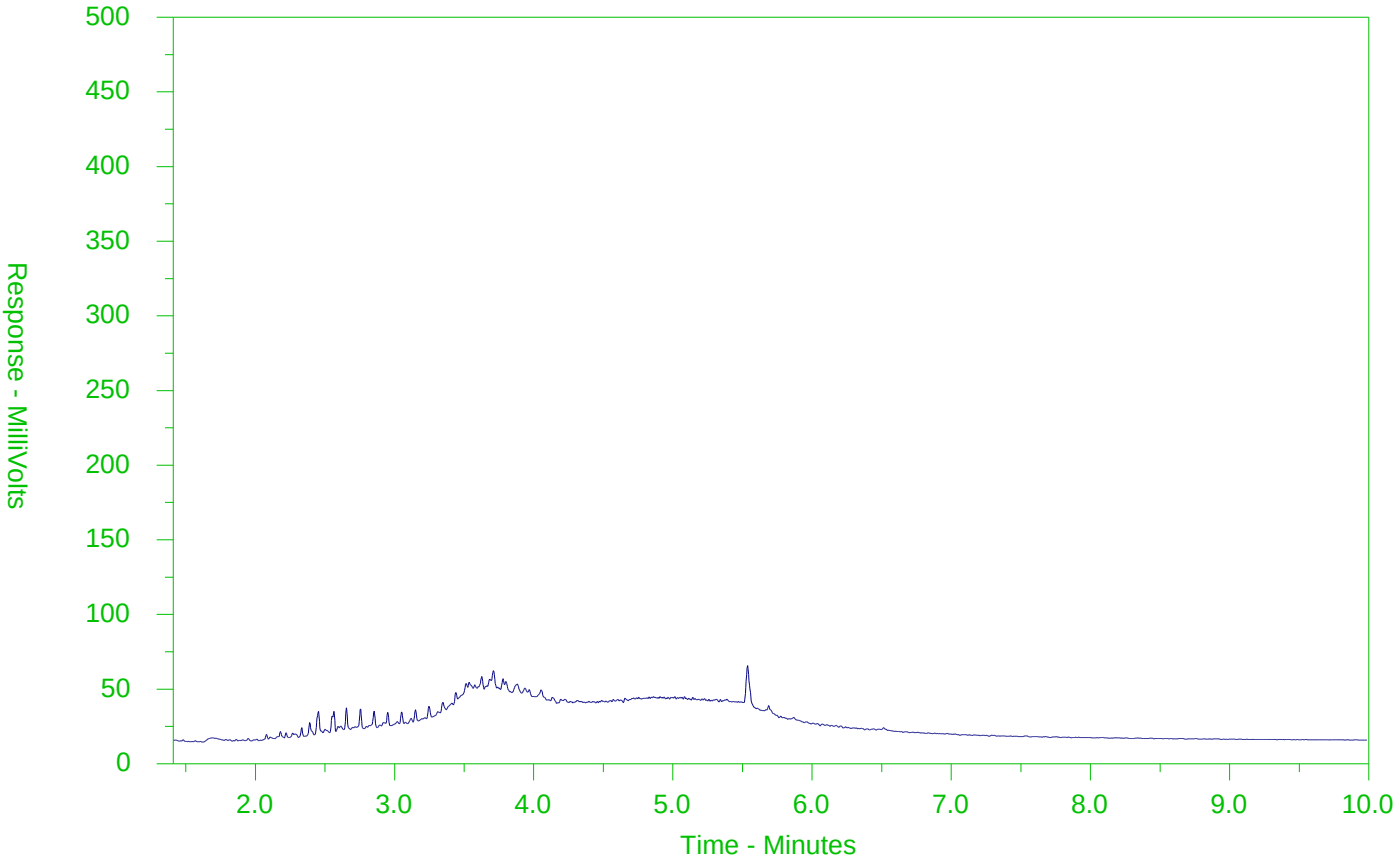
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-12
Client Sample ID: MW17-103S/D-4-6



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

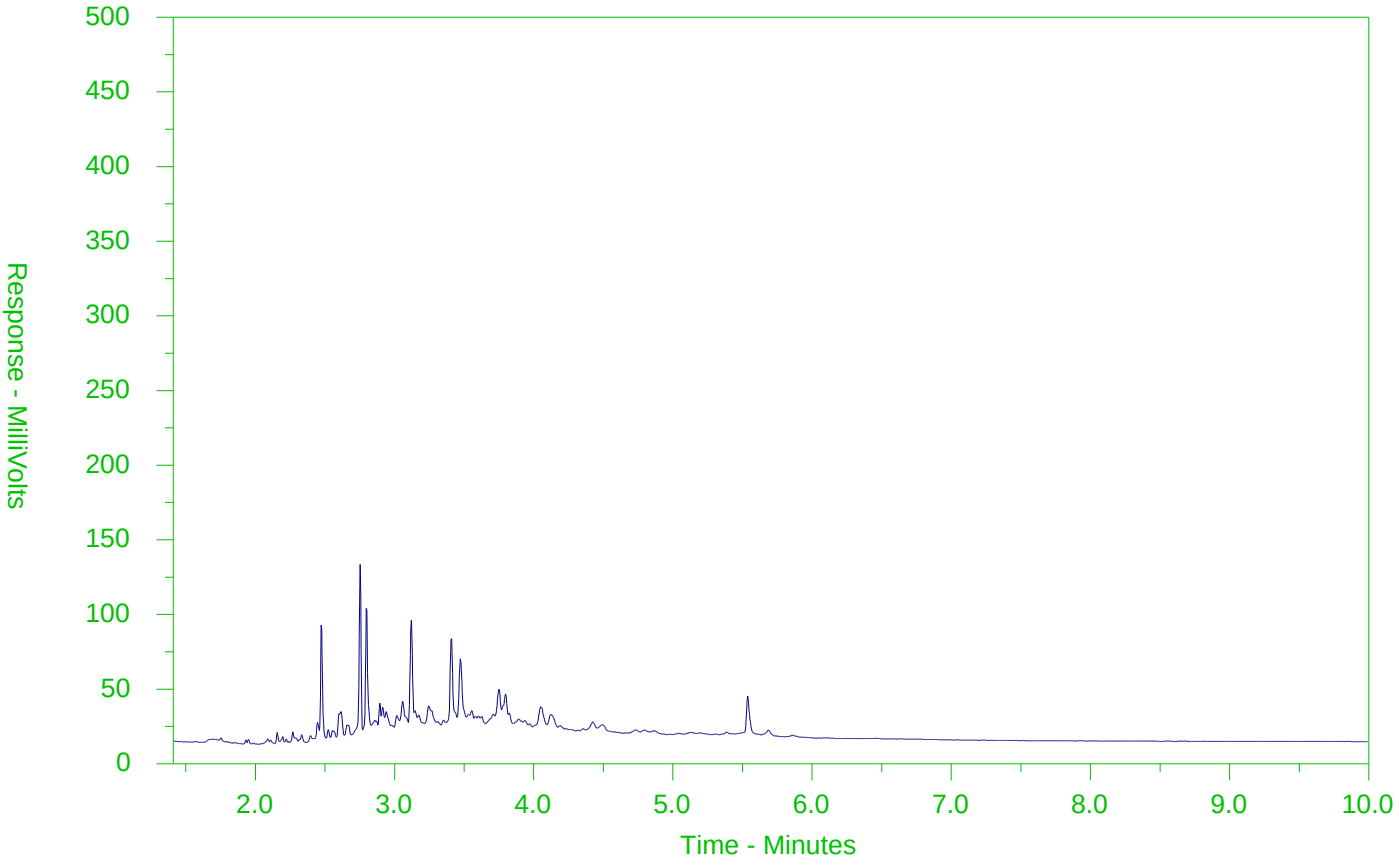
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-13
Client Sample ID: MW17-102D-0.5-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

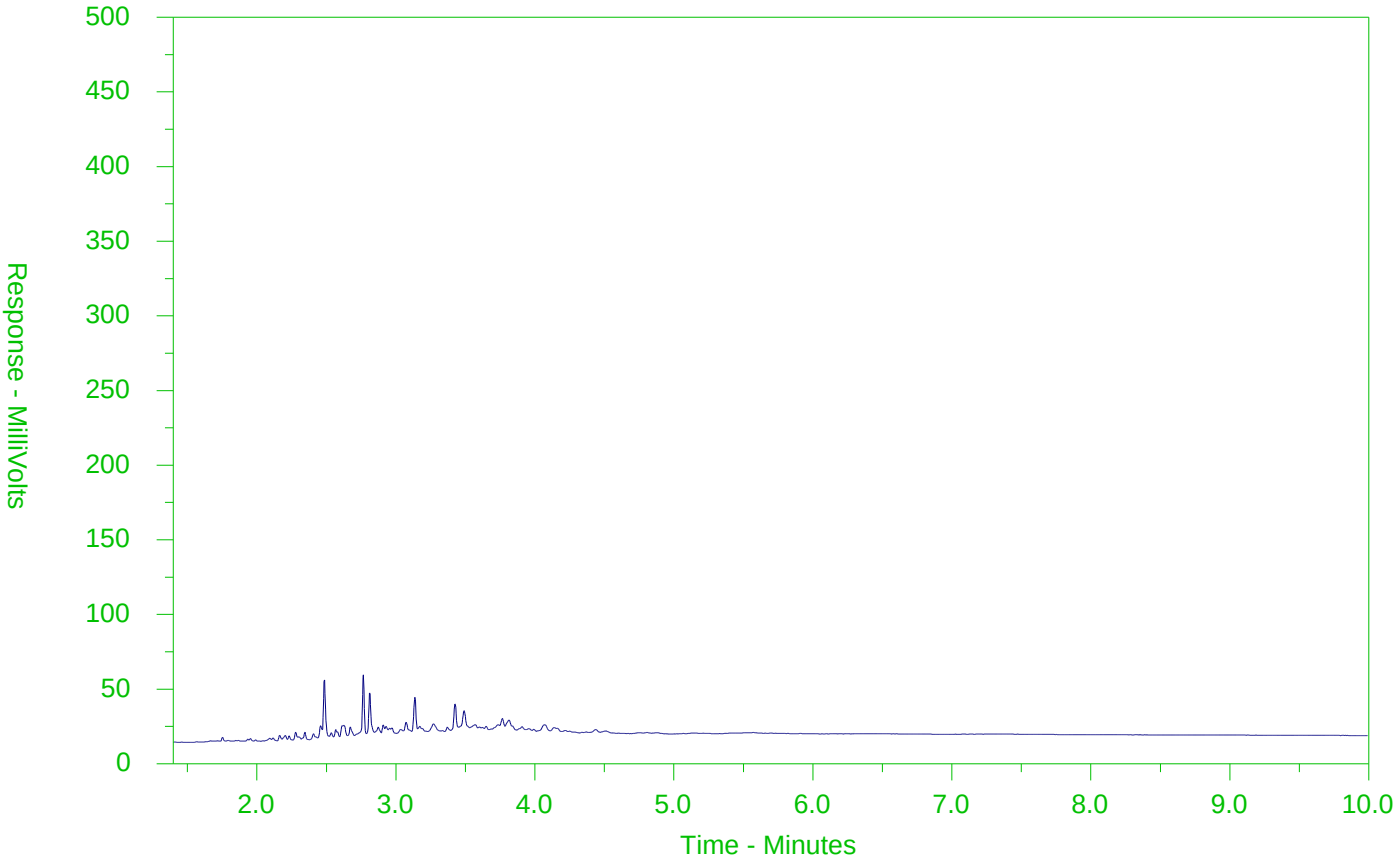
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-16
Client Sample ID: MW17-102D-6-7



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

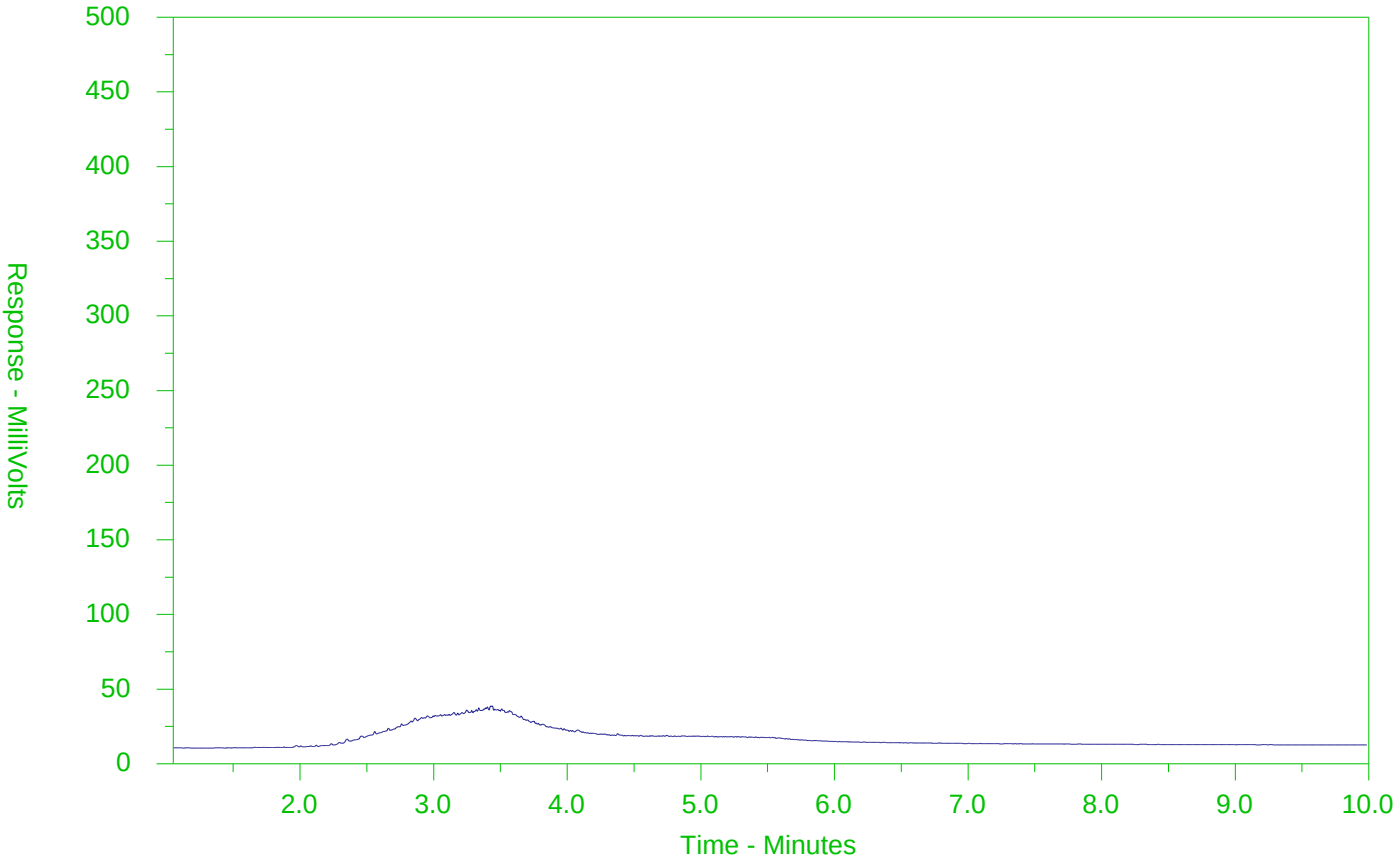
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015398-17
Client Sample ID: DUP 10



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2015398-COFC

COC Number 15 - 613141

Page 2 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CHPM	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shay	Quality Control (QC) Report with Report: ☑ YES ☐ NO	4 day [P4] ☐ / 1 Business day [E1] ☐
Phone:		☒ Compare Results to Criteria on Report - provide details below if box checked	3 day [P3] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	2 day [P2] ☐
Street:		Email 1 or Fax: Michael, Dirk	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:		Email 2: Kyrie, Tanya	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:		Email 3:	
Invoice To	Same as Report To ☐ YES ☒ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☒ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax:	
Contact:	Acct Payable	Email 2:	

Project Information

ALS Account # / Quote #:	Q62156
Job #:	694757
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only):	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Nathy	Sampler: M Shay

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	0. Reg Metals + Hg	0. Reg SVOC	0. Reg PAH	0. Reg PHC+BTEX	0. Reg VOC	1,4-Dioxane	0. Reg VOC, F1	Number of Containers
13	MW17-102D-0.5-1	26-Oct-17	1742	Soil				X	X			3
14	MW17-102D-0.5-4		1742			X						1
15	MW17-102D-4-5.5		1802		X							1
16	MW17-102D-6-7		1812		X		X	X	X			5
17	DUP 10	20-Oct-17	—					X			X	3
18	Trip Blank D3	27-Oct-17	—	Other							X	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

0. Reg Table 6 RPI

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☒ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
-0.4			0.1		

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
M. Shay	2017/10/30	1585

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
KK	OCT 30/17	900

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
SM	30-OCT-17	1500

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

AK

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2015398-COFC

COC Number 15 - 613140

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Company	CMZM	Quality Control (QC) Report with Report	YES NO	4 day [P4] / 1 Business day [E1]
Contact	M. Shirey	Compare Results to Criteria on Report - provide details below if box checked		3 day [P3] / Same Day, Weekend or Statutory holiday [E0]
Phone		Select Distribution: EMAIL MAIL FAX		2 day [P2]
	Company address below will appear on the final report			Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street		Email 1 or Fax		For tests that can not be performed according to the service level selected, you will be contacted.
City/Province		Email 2		
Postal Code		Email 3		

Invoice To	Same as Report To YES NO	Invoice Distribution	Select Invoice Distribution: EMAIL MAIL FAX
	Copy of Invoice with Report YES NO	Email 1 or Fax	
Company		Email 2	
Contact	Acct Payable		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q62156	AFE/Cost Center	PO#
Job #	694757	Major/Minor Code	Routing Code
PO / AFE		Requisitioner	
LSD		Location	

ALS Lab Work Order # (lab use only): L2015398 | ALS Contact: Matty | Sampler: M. Shirey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O. Reg Metals + Energy	O. Reg PAH	O. Reg Silver	O. Reg PHC	O. Reg PCB	O. Reg VOC	Dioxin/Furans	1,4 Dioxane	TOC					Number of Containers
1	MW17-101 S/D - 0.5 - 1.5	20-Oct-17	847	Soil					H		H							2
2	MW17-101 S/D - 1.5 - 2.5		847						H		H							2
3	MW17-101 S/D - 2-3		908		X		X											2
4	MW17-101 S/D - 4-5.5		1001		X		X	X		X		X						5
5	MW17-105 S/D - 0 - 0.3	24-Oct-17	1148		X													1
6	MW17-105 S/D - 0.5 - 1.5		1148				X											1
7	MW17-105 S/D - 4 - 6		1212		X		X	X		X		X	X					6
8	MW17-105 S/D - 6 - 7		1232					X		X								3
9	MW17-103 S/D - 1 - 1.5	25-Oct-17	1523		X		X											2
10	MW17-103 S/D - 1 - 3		1523										X					1
11	MW17-103 S/D - 2-3		1527					X		X								3
12	MW17-103 S/D - 4-6		1537		X		X	X		X			X					6

Drinking Water (DW) Samples* (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	O. Reg Table 6 RPI
Are samples for human drinking water use? YES NO	H = Hold sample

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen | SIF Observations: Yes | No
Ice Packs | Ice Cubes | Custody seal intact: Yes | No
Cooling Initiated

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
-0.4			0.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M. Shirey	Date: 2017/10/30	Time: 1545	Received by:	Date: OCT 30/17	Time: 900	Received by:	Date: 30-OCT-17	Time: 1500

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

* Drinking water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

AK

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 30-OCT-17
Report Date: 09-NOV-17 08:13 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2015412

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 15-613138
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-1 MW17-109S-13.25 Sampled By: M. SHIRY on 27-OCT-17 @ 12:35 Matrix: ROCK							
Physical Tests							
% Moisture	1.56		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Benzene	0.0091		0.0068	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromodichloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromoform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromomethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Carbon tetrachloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dibromochloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chloroform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dibromoethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dichlorodifluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methylene Chloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloropropane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		03-NOV-17	
Ethylbenzene	0.131		0.018	ug/g	31-OCT-17	02-NOV-17	R3872812
n-Hexane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
MTBE	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Styrene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Tetrachloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Toluene	<0.080		0.080	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichloroethylene	<0.010		0.010	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichlorofluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Vinyl chloride	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-1 MW17-109S-13.25 Sampled By: M. SHIRY on 27-OCT-17 @ 12:35 Matrix: ROCK							
Volatile Organic Compounds							
o-Xylene	0.086		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
m+p-Xylenes	0.103		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
Xylenes (Total)	0.189		0.050	ug/g		03-NOV-17	
Surrogate: 4-Bromofluorobenzene	99.2		50-140	%	31-OCT-17	02-NOV-17	R3872812
Surrogate: 1,4-Difluorobenzene	102.7		50-140	%	31-OCT-17	02-NOV-17	R3872812
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	31-OCT-17	02-NOV-17	R3872812
F1-BTEX	<5.0		5.0	ug/g		08-NOV-17	
F2 (C10-C16)	16		10	ug/g	02-NOV-17	07-NOV-17	R3879004
F3 (C16-C34)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
F4 (C34-C50)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	<72		72	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	07-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	90.3		60-140	%	02-NOV-17	07-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	83.3		60-140	%	31-OCT-17	02-NOV-17	R3872812
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	06-NOV-17	06-NOV-17	R3874775
Aroclor 1248	<0.010		0.010	ug/g	06-NOV-17	06-NOV-17	R3874775
Aroclor 1254	<0.010		0.010	ug/g	06-NOV-17	06-NOV-17	R3874775
Aroclor 1260	<0.010		0.010	ug/g	06-NOV-17	06-NOV-17	R3874775
Total PCBs	<0.020		0.020	ug/g	06-NOV-17	06-NOV-17	R3874775
Surrogate: d14-Terphenyl	90.5		60-140	%	06-NOV-17	06-NOV-17	R3874775
L2015412-2 MW17-105S/D-13.25 Sampled By: M. SHIRY on 27-OCT-17 @ 12:45 Matrix: ROCK							
Physical Tests							
% Moisture	5.41		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Benzene	0.115		0.0068	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromodichloromethane	<0.50	DLVH	0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromoform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromomethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Carbon tetrachloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dibromochloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chloroform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dibromoethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dichlorodifluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-2 MW17-105S/D-13.25 Sampled By: M. SHIRY on 27-OCT-17 @ 12:45 Matrix: ROCK							
Volatile Organic Compounds							
1,1-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methylene Chloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloropropane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		03-NOV-17	
Ethylbenzene	1.68		0.018	ug/g	31-OCT-17	02-NOV-17	R3872812
n-Hexane	1.02		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
MTBE	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Styrene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2,2-Tetrachloroethane	<0.075	DLVH	0.075	ug/g	31-OCT-17	02-NOV-17	R3872812
Tetrachloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Toluene	<0.080		0.080	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2-Trichloroethane	<0.18	DLVH	0.18	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichloroethylene	<0.010		0.010	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichlorofluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Vinyl chloride	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
o-Xylene	0.053		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
m+p-Xylenes	13.2		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
Xylenes (Total)	13.3		0.050	ug/g		03-NOV-17	
Surrogate: 4-Bromofluorobenzene	103.4		50-140	%	31-OCT-17	02-NOV-17	R3872812
Surrogate: 1,4-Difluorobenzene	93.4		50-140	%	31-OCT-17	02-NOV-17	R3872812
Hydrocarbons							
F1 (C6-C10)	289	DLHC	40	ug/g	31-OCT-17	03-NOV-17	R3872812
F1-BTEX	274		40	ug/g		08-NOV-17	
F2 (C10-C16)	76		10	ug/g	02-NOV-17	07-NOV-17	R3879004
F3 (C16-C34)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
F4 (C34-C50)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	364		82	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	07-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	97.4		60-140	%	02-NOV-17	07-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	131.1		60-140	%	31-OCT-17	03-NOV-17	R3872812
L2015412-3 MW17-101S/D-8.5							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-3 MW17-101S/D-8.5 Sampled By: M. SHIRY on 27-OCT-17 @ 12:55 Matrix: ROCK							
Physical Tests							
% Moisture	0.48		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Benzene	<0.0068		0.0068	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromodichloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromoform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromomethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Carbon tetrachloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dibromochloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chloroform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dibromoethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dichlorodifluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methylene Chloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloropropane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		03-NOV-17	
Ethylbenzene	<0.018		0.018	ug/g	31-OCT-17	02-NOV-17	R3872812
n-Hexane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
MTBE	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Styrene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Tetrachloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Toluene	<0.080		0.080	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichloroethylene	<0.010		0.010	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichlorofluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Vinyl chloride	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-3 MW17-101S/D-8.5 Sampled By: M. SHIRY on 27-OCT-17 @ 12:55 Matrix: ROCK							
Volatile Organic Compounds							
o-Xylene	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
m+p-Xylenes	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
Xylenes (Total)	<0.050		0.050	ug/g		03-NOV-17	
Surrogate: 4-Bromofluorobenzene	107.1		50-140	%	31-OCT-17	02-NOV-17	R3872812
Surrogate: 1,4-Difluorobenzene	101.8		50-140	%	31-OCT-17	02-NOV-17	R3872812
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	31-OCT-17	02-NOV-17	R3872812
F1-BTEX	<5.0		5.0	ug/g		08-NOV-17	
F2 (C10-C16)	159		10	ug/g	02-NOV-17	08-NOV-17	R3879004
F3 (C16-C34)	1360		50	ug/g	02-NOV-17	08-NOV-17	R3879004
F4 (C34-C50)	106		50	ug/g	02-NOV-17	08-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	1630		72	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	08-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	87.6		60-140	%	02-NOV-17	08-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	68.2		60-140	%	31-OCT-17	02-NOV-17	R3872812
L2015412-4 MW17-104S/D-9 Sampled By: M. SHIRY on 27-OCT-17 @ 13:05 Matrix: ROCK							
Physical Tests							
% Moisture	0.39		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Benzene	<0.0068		0.0068	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromodichloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromoform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Bromomethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Carbon tetrachloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dibromochloromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Chloroform	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dibromoethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Dichlorodifluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methylene Chloride	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,2-Dichloropropane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-4 MW17-104S/D-9 Sampled By: M. SHIRY on 27-OCT-17 @ 13:05 Matrix: ROCK							
Volatile Organic Compounds							
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		03-NOV-17	
Ethylbenzene	<0.018		0.018	ug/g	31-OCT-17	02-NOV-17	R3872812
n-Hexane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-OCT-17	02-NOV-17	R3872812
MTBE	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Styrene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Tetrachloroethylene	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Toluene	<0.080		0.080	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
1,1,2-Trichloroethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichloroethylene	<0.010		0.010	ug/g	31-OCT-17	02-NOV-17	R3872812
Trichlorofluoromethane	<0.050		0.050	ug/g	31-OCT-17	02-NOV-17	R3872812
Vinyl chloride	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
o-Xylene	<0.020		0.020	ug/g	31-OCT-17	02-NOV-17	R3872812
m+p-Xylenes	<0.030		0.030	ug/g	31-OCT-17	02-NOV-17	R3872812
Xylenes (Total)	<0.050		0.050	ug/g		03-NOV-17	
Surrogate: 4-Bromofluorobenzene	131.3		50-140	%	31-OCT-17	02-NOV-17	R3872812
Surrogate: 1,4-Difluorobenzene	128.5		50-140	%	31-OCT-17	02-NOV-17	R3872812
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	31-OCT-17	02-NOV-17	R3872812
F1-BTEX	<5.0		5.0	ug/g		08-NOV-17	
F2 (C10-C16)	23		10	ug/g	02-NOV-17	07-NOV-17	R3879004
F3 (C16-C34)	69		50	ug/g	02-NOV-17	07-NOV-17	R3879004
F4 (C34-C50)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	92		72	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	07-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	97.3		60-140	%	02-NOV-17	07-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	91.0		60-140	%	31-OCT-17	02-NOV-17	R3872812
L2015412-5 MW17-104S/D-16.8 Sampled By: M. SHIRY on 27-OCT-17 @ 13:15 Matrix: ROCK							
Physical Tests							
% Moisture	3.29		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
Benzene	<0.0068		0.0068	ug/g	01-NOV-17	04-NOV-17	R3874287
Bromodichloromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-5 MW17-104S/D-16.8 Sampled By: M. SHIRY on 27-OCT-17 @ 13:15 Matrix: ROCK							
Volatile Organic Compounds							
Bromoform	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Bromomethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Carbon tetrachloride	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Chlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Dibromochloromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Chloroform	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dibromoethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,3-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,4-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Dichlorodifluoromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1-Dichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Methylene Chloride	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichloropropane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		04-NOV-17	
Ethylbenzene	<0.018		0.018	ug/g	01-NOV-17	04-NOV-17	R3874287
n-Hexane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Methyl Ethyl Ketone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
MTBE	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Styrene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Tetrachloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Toluene	<0.080		0.080	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,1-Trichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,2-Trichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Trichloroethylene	<0.010		0.010	ug/g	01-NOV-17	04-NOV-17	R3874287
Trichlorofluoromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Vinyl chloride	<0.020		0.020	ug/g	01-NOV-17	04-NOV-17	R3874287
o-Xylene	<0.020		0.020	ug/g	01-NOV-17	04-NOV-17	R3874287
m+p-Xylenes	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
Xylenes (Total)	<0.050		0.050	ug/g		04-NOV-17	
Surrogate: 4-Bromofluorobenzene	102.8		50-140	%	01-NOV-17	04-NOV-17	R3874287
Surrogate: 1,4-Difluorobenzene	99.8		50-140	%	01-NOV-17	04-NOV-17	R3874287

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-5 MW17-104S/D-16.8 Sampled By: M. SHIRY on 27-OCT-17 @ 13:15 Matrix: ROCK							
Volatile Organic Compounds **Hydrocarbons**							
F1 (C6-C10)	<5.0		5.0	ug/g	01-NOV-17	04-NOV-17	R3874287
F1-BTEX	<5.0		5.0	ug/g		08-NOV-17	
F2 (C10-C16)	14		10	ug/g	02-NOV-17	07-NOV-17	R3879004
F3 (C16-C34)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
F4 (C34-C50)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	<72		72	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	07-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	89.7		60-140	%	02-NOV-17	07-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	126.4		60-140	%	01-NOV-17	04-NOV-17	R3874287
L2015412-6 MW17-104S/D-22 Sampled By: M. SHIRY on 27-OCT-17 @ 13:20 Matrix: ROCK							
Physical Tests							
% Moisture	4.96		0.10	%	02-NOV-17	02-NOV-17	R3873338
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
Benzene	<0.0068		0.0068	ug/g	01-NOV-17	04-NOV-17	R3874287
Bromodichloromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Bromoform	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Bromomethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Carbon tetrachloride	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Chlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Dibromochloromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Chloroform	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dibromoethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,3-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,4-Dichlorobenzene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Dichlorodifluoromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1-Dichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Methylene Chloride	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,2-Dichloropropane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		04-NOV-17	
Ethylbenzene	<0.018		0.018	ug/g	01-NOV-17	04-NOV-17	R3874287
n-Hexane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2015412-6 MW17-104S/D-22 Sampled By: M. SHIRY on 27-OCT-17 @ 13:20 Matrix: ROCK							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	01-NOV-17	04-NOV-17	R3874287
MTBE	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Styrene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Tetrachloroethylene	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Toluene	<0.080		0.080	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,1-Trichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
1,1,2-Trichloroethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Trichloroethylene	<0.010		0.010	ug/g	01-NOV-17	04-NOV-17	R3874287
Trichlorofluoromethane	<0.050		0.050	ug/g	01-NOV-17	04-NOV-17	R3874287
Vinyl chloride	<0.020		0.020	ug/g	01-NOV-17	04-NOV-17	R3874287
o-Xylene	<0.020		0.020	ug/g	01-NOV-17	04-NOV-17	R3874287
m+p-Xylenes	<0.030		0.030	ug/g	01-NOV-17	04-NOV-17	R3874287
Xylenes (Total)	<0.050		0.050	ug/g		04-NOV-17	
Surrogate: 4-Bromofluorobenzene	102.7		50-140	%	01-NOV-17	04-NOV-17	R3874287
Surrogate: 1,4-Difluorobenzene	101.2		50-140	%	01-NOV-17	04-NOV-17	R3874287
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	01-NOV-17	04-NOV-17	R3874287
F1-BTEX	<5.0		5.0	ug/g		08-NOV-17	
F2 (C10-C16)	202		10	ug/g	02-NOV-17	07-NOV-17	R3879004
F3 (C16-C34)	381		50	ug/g	02-NOV-17	07-NOV-17	R3879004
F4 (C34-C50)	<50		50	ug/g	02-NOV-17	07-NOV-17	R3879004
Total Hydrocarbons (C6-C50)	583		72	ug/g		08-NOV-17	
Chrom. to baseline at nC50	YES				02-NOV-17	07-NOV-17	R3879004
Surrogate: 2-Bromobenzotrifluoride	90.9		60-140	%	02-NOV-17	07-NOV-17	R3879004
Surrogate: 3,4-Dichlorotoluene	101.7		60-140	%	01-NOV-17	04-NOV-17	R3874287

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Dichlorodifluoromethane	MES	L2015412-1, -2, -3, -4
Matrix Spike	Dichlorodifluoromethane	MES	L2015412-1, -2, -3, -4

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Soil F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MOISTURE-WT Soil % Moisture Gravimetric: Oven Dried

Reference Information

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

15-613138

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2015412 Report Date: 09-NOV-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R3872812								
WG2653488-4 DUP		**WG2653488-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	02-NOV-17
WG2653488-2 LCS								
F1 (C6-C10)			98.1		%		80-120	02-NOV-17
WG2653488-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	02-NOV-17
Surrogate: 3,4-Dichlorotoluene			91.8		%		60-140	02-NOV-17
WG2653488-7 MS		**WG2653488-6**						
F1 (C6-C10)			82.5		%		60-140	02-NOV-17
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	03-NOV-17
WG2653746-2 LCS								
F1 (C6-C10)			105.0		%		80-120	03-NOV-17
WG2653746-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	03-NOV-17
Surrogate: 3,4-Dichlorotoluene			126.5		%		60-140	03-NOV-17
WG2653746-7 MS		**WG2653746-6**						
F1 (C6-C10)			91.5		%		60-140	03-NOV-17
F2-F4-511-WT	**Soil**							
Batch R3879004								
WG2654910-4 CRM		**ALS PHC2 IRM**						
F2 (C10-C16)			112.7		%		70-130	07-NOV-17
F3 (C16-C34)			108.6		%		70-130	07-NOV-17
F4 (C34-C50)			103.3		%		70-130	07-NOV-17
WG2654910-3 DUP		**WG2654910-5**						
F2 (C10-C16)		133	165		ug/g	22	30	07-NOV-17
F3 (C16-C34)		397	461		ug/g	15	30	07-NOV-17
F4 (C34-C50)		91	82		ug/g	9.7	30	07-NOV-17
WG2654910-2 LCS								
F2 (C10-C16)			108.0		%		80-120	07-NOV-17
F3 (C16-C34)			104.9		%		80-120	07-NOV-17
F4 (C34-C50)			101.8		%		80-120	07-NOV-17
WG2654910-1 MB								
F2 (C10-C16)			<10		ug/g		10	08-NOV-17
F3 (C16-C34)			<50		ug/g		50	08-NOV-17
F4 (C34-C50)			<50		ug/g		50	08-NOV-17

Quality Control Report

Workorder: L2015412 Report Date: 09-NOV-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R3879004								
WG2654910-1 MB								
Surrogate: 2-Bromobenzotrifluoride			83.9		%		60-140	08-NOV-17
MOISTURE-WT	**Soil**							
Batch R3873338								
WG2654793-3 DUP		**L2016410-1**						
% Moisture		9.82	10.3		%	4.7	20	02-NOV-17
WG2654793-2 LCS								
% Moisture			100.9		%		90-110	02-NOV-17
WG2654793-1 MB								
% Moisture			<0.10		%		0.1	02-NOV-17
PCB-511-WT	**Soil**							
Batch R3874775								
WG2653739-3 DUP		**WG2653739-5**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	06-NOV-17
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	06-NOV-17
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	06-NOV-17
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	06-NOV-17
WG2653739-2 LCS								
Aroclor 1242			79.1		%		60-140	06-NOV-17
Aroclor 1248			85.3		%		60-140	06-NOV-17
Aroclor 1254			86.5		%		60-140	06-NOV-17
Aroclor 1260			104.6		%		60-140	06-NOV-17
WG2653739-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	06-NOV-17
Aroclor 1248			<0.010		ug/g		0.01	06-NOV-17
Aroclor 1254			<0.010		ug/g		0.01	06-NOV-17
Aroclor 1260			<0.010		ug/g		0.01	06-NOV-17
Surrogate: d14-Terphenyl			99.8		%		60-140	06-NOV-17
WG2653739-4 MS		**WG2653739-5**						
Aroclor 1242			80.8		%		60-140	06-NOV-17
Aroclor 1254			91.5		%		60-140	06-NOV-17
Aroclor 1260			109.2		%		60-140	06-NOV-17
VOC-511-HS-WT	**Soil**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872812								
WG2653488-4 DUP		**WG2653488-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	02-NOV-17
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	02-NOV-17
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	02-NOV-17
Styrene		<0.050	<0.050		ug/g			02-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872812								
WG2653488-4 DUP		**WG2653488-3**						
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	02-NOV-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-NOV-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	02-NOV-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-NOV-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	02-NOV-17
WG2653488-2 LCS								
1,1,1,2-Tetrachloroethane			101.2		%		60-130	02-NOV-17
1,1,2,2-Tetrachloroethane			103.9		%		60-130	02-NOV-17
1,1,1-Trichloroethane			100.5		%		60-130	02-NOV-17
1,1,2-Trichloroethane			106.0		%		60-130	02-NOV-17
1,1-Dichloroethane			102.5		%		60-130	02-NOV-17
1,1-Dichloroethylene			90.3		%		60-130	02-NOV-17
1,2-Dibromoethane			106.3		%		70-130	02-NOV-17
1,2-Dichlorobenzene			103.9		%		70-130	02-NOV-17
1,2-Dichloroethane			109.8		%		60-130	02-NOV-17
1,2-Dichloropropane			107.1		%		70-130	02-NOV-17
1,3-Dichlorobenzene			101.0		%		70-130	02-NOV-17
1,4-Dichlorobenzene			104.4		%		70-130	02-NOV-17
Acetone			121.1		%		60-140	02-NOV-17
Benzene			103.3		%		70-130	02-NOV-17
Bromodichloromethane			102.8		%		50-140	02-NOV-17
Bromoform			102.6		%		70-130	02-NOV-17
Bromomethane			96.7		%		50-140	02-NOV-17
Carbon tetrachloride			98.6		%		70-130	02-NOV-17
Chlorobenzene			102.3		%		70-130	02-NOV-17
Chloroform			105.1		%		70-130	02-NOV-17
cis-1,2-Dichloroethylene			103.0		%		70-130	02-NOV-17
cis-1,3-Dichloropropene			111.0		%		70-130	02-NOV-17
Dibromochloromethane			108.1		%		60-130	02-NOV-17
Dichlorodifluoromethane			49.1	MES	%		50-140	02-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872812								
WG2653488-2 LCS								
Ethylbenzene			95.0		%		70-130	02-NOV-17
n-Hexane			96.5		%		70-130	02-NOV-17
Methylene Chloride			108.5		%		70-130	02-NOV-17
MTBE			99.5		%		70-130	02-NOV-17
m+p-Xylenes			98.5		%		70-130	02-NOV-17
Methyl Ethyl Ketone			115.0		%		60-140	02-NOV-17
Methyl Isobutyl Ketone			113.9		%		60-140	02-NOV-17
o-Xylene			103.7		%		70-130	02-NOV-17
Styrene			104.8		%		70-130	02-NOV-17
Tetrachloroethylene			96.7		%		60-130	02-NOV-17
Toluene			97.2		%		70-130	02-NOV-17
trans-1,2-Dichloroethylene			101.5		%		60-130	02-NOV-17
trans-1,3-Dichloropropene			108.6		%		70-130	02-NOV-17
Trichloroethylene			102.1		%		60-130	02-NOV-17
Trichlorofluoromethane			94.9		%		50-140	02-NOV-17
Vinyl chloride			86.3		%		60-140	02-NOV-17
WG2653488-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1-Dichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17
1,2-Dibromoethane			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichloroethane			<0.050		ug/g		0.05	02-NOV-17
1,2-Dichloropropane			<0.050		ug/g		0.05	02-NOV-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	02-NOV-17
Acetone			<0.50		ug/g		0.5	02-NOV-17
Benzene			<0.0068		ug/g		0.0068	02-NOV-17
Bromodichloromethane			<0.050		ug/g		0.05	02-NOV-17
Bromoform			<0.050		ug/g		0.05	02-NOV-17
Bromomethane			<0.050		ug/g		0.05	02-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872812								
WG2653488-1 MB								
Carbon tetrachloride			<0.050		ug/g		0.05	02-NOV-17
Chlorobenzene			<0.050		ug/g		0.05	02-NOV-17
Chloroform			<0.050		ug/g		0.05	02-NOV-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	02-NOV-17
Dibromochloromethane			<0.050		ug/g		0.05	02-NOV-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	02-NOV-17
Ethylbenzene			<0.018		ug/g		0.018	02-NOV-17
n-Hexane			<0.050		ug/g		0.05	02-NOV-17
Methylene Chloride			<0.050		ug/g		0.05	02-NOV-17
MTBE			<0.050		ug/g		0.05	02-NOV-17
m+p-Xylenes			<0.030		ug/g		0.03	02-NOV-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	02-NOV-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	02-NOV-17
o-Xylene			<0.020		ug/g		0.02	02-NOV-17
Styrene			<0.050		ug/g		0.05	02-NOV-17
Tetrachloroethylene			<0.050		ug/g		0.05	02-NOV-17
Toluene			<0.080		ug/g		0.08	02-NOV-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	02-NOV-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	02-NOV-17
Trichloroethylene			<0.010		ug/g		0.01	02-NOV-17
Trichlorofluoromethane			<0.050		ug/g		0.05	02-NOV-17
Vinyl chloride			<0.020		ug/g		0.02	02-NOV-17
Surrogate: 1,4-Difluorobenzene			109.8		%		50-140	02-NOV-17
Surrogate: 4-Bromofluorobenzene			105.9		%		50-140	02-NOV-17
WG2653488-5 MS		**WG2653488-3**						
1,1,1,2-Tetrachloroethane			102.8		%		50-140	02-NOV-17
1,1,2,2-Tetrachloroethane			108.4		%		50-140	02-NOV-17
1,1,1-Trichloroethane			100.8		%		50-140	02-NOV-17
1,1,2-Trichloroethane			109.3		%		50-140	02-NOV-17
1,1-Dichloroethane			103.3		%		50-140	02-NOV-17
1,1-Dichloroethylene			89.9		%		50-140	02-NOV-17
1,2-Dibromoethane			110.4		%		50-140	02-NOV-17
1,2-Dichlorobenzene			105.6		%		50-140	02-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3872812								
WG2653488-5 MS		**WG2653488-3**						
1,2-Dichloroethane			112.8		%		50-140	02-NOV-17
1,2-Dichloropropane			108.6		%		50-140	02-NOV-17
1,3-Dichlorobenzene			100.7		%		50-140	02-NOV-17
1,4-Dichlorobenzene			104.1		%		50-140	02-NOV-17
Acetone			122.2		%		50-140	02-NOV-17
Benzene			104.1		%		50-140	02-NOV-17
Bromodichloromethane			104.7		%		50-140	02-NOV-17
Bromoform			105.8		%		50-140	02-NOV-17
Bromomethane			96.0		%		50-140	02-NOV-17
Carbon tetrachloride			98.6		%		50-140	02-NOV-17
Chlorobenzene			103.5		%		50-140	02-NOV-17
Chloroform			106.5		%		50-140	02-NOV-17
cis-1,2-Dichloroethylene			104.1		%		50-140	02-NOV-17
cis-1,3-Dichloropropene			111.4		%		50-140	02-NOV-17
Dibromochloromethane			111.3		%		50-140	02-NOV-17
Dichlorodifluoromethane			49.2	MES	%		50-140	02-NOV-17
Ethylbenzene			95.1		%		50-140	02-NOV-17
n-Hexane			96.5		%		50-140	02-NOV-17
Methylene Chloride			109.7		%		50-140	02-NOV-17
MTBE			98.7		%		50-140	02-NOV-17
m+p-Xylenes			98.4		%		50-140	02-NOV-17
Methyl Ethyl Ketone			120.9		%		50-140	02-NOV-17
Methyl Isobutyl Ketone			118.8		%		50-140	02-NOV-17
o-Xylene			104.3		%		50-140	02-NOV-17
Styrene			105.6		%		50-140	02-NOV-17
Tetrachloroethylene			96.4		%		50-140	02-NOV-17
Toluene			97.8		%		50-140	02-NOV-17
trans-1,2-Dichloroethylene			101.1		%		50-140	02-NOV-17
trans-1,3-Dichloropropene			109.4		%		50-140	02-NOV-17
Trichloroethylene			102.3		%		50-140	02-NOV-17
Trichlorofluoromethane			94.7		%		50-140	02-NOV-17
Vinyl chloride			85.3		%		50-140	02-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
Benzene		0.0070	0.0070		ug/g	0.0	40	03-NOV-17
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-NOV-17
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	03-NOV-17
n-Hexane		0.083	0.084		ug/g	1.2	40	03-NOV-17
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
m+p-Xylenes		0.055	0.056		ug/g	2.2	40	03-NOV-17
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	03-NOV-17
o-Xylene		0.059	0.061		ug/g	2.5	40	03-NOV-17
Styrene		<0.050	<0.050		ug/g			03-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-4 DUP		**WG2653746-3**						
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	03-NOV-17
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-NOV-17
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	03-NOV-17
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-NOV-17
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	03-NOV-17
WG2653746-2 LCS								
1,1,1,2-Tetrachloroethane			99.6		%		60-130	03-NOV-17
1,1,2,2-Tetrachloroethane			107.9		%		60-130	03-NOV-17
1,1,1-Trichloroethane			94.2		%		60-130	03-NOV-17
1,1,2-Trichloroethane			107.1		%		60-130	03-NOV-17
1,1-Dichloroethane			96.8		%		60-130	03-NOV-17
1,1-Dichloroethylene			83.2		%		60-130	03-NOV-17
1,2-Dibromoethane			108.9		%		70-130	03-NOV-17
1,2-Dichlorobenzene			100.9		%		70-130	03-NOV-17
1,2-Dichloroethane			109.0		%		60-130	03-NOV-17
1,2-Dichloropropane			105.0		%		70-130	03-NOV-17
1,3-Dichlorobenzene			96.0		%		70-130	03-NOV-17
1,4-Dichlorobenzene			99.4		%		70-130	03-NOV-17
Acetone			117.2		%		60-140	03-NOV-17
Benzene			99.2		%		70-130	03-NOV-17
Bromodichloromethane			101.4		%		50-140	03-NOV-17
Bromoform			105.7		%		70-130	03-NOV-17
Bromomethane			90.3		%		50-140	03-NOV-17
Carbon tetrachloride			92.2		%		70-130	03-NOV-17
Chlorobenzene			99.2		%		70-130	03-NOV-17
Chloroform			100.8		%		70-130	03-NOV-17
cis-1,2-Dichloroethylene			100.4		%		70-130	03-NOV-17
cis-1,3-Dichloropropene			104.1		%		70-130	03-NOV-17
Dibromochloromethane			108.4		%		60-130	03-NOV-17
Dichlorodifluoromethane			51.4		%		50-140	03-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-2 LCS								
Ethylbenzene			91.7		%		70-130	03-NOV-17
n-Hexane			89.2		%		70-130	03-NOV-17
Methylene Chloride			103.5		%		70-130	03-NOV-17
MTBE			96.1		%		70-130	03-NOV-17
m+p-Xylenes			94.0		%		70-130	03-NOV-17
Methyl Ethyl Ketone			118.7		%		60-140	03-NOV-17
Methyl Isobutyl Ketone			114.7		%		60-140	03-NOV-17
o-Xylene			94.2		%		70-130	03-NOV-17
Styrene			96.7		%		70-130	03-NOV-17
Tetrachloroethylene			91.2		%		60-130	03-NOV-17
Toluene			93.6		%		70-130	03-NOV-17
trans-1,2-Dichloroethylene			96.1		%		60-130	03-NOV-17
trans-1,3-Dichloropropene			103.1		%		70-130	03-NOV-17
Trichloroethylene			98.5		%		60-130	03-NOV-17
Trichlorofluoromethane			88.1		%		50-140	03-NOV-17
Vinyl chloride			80.6		%		60-140	03-NOV-17
WG2653746-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,1-Trichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1,2-Trichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1-Dichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,1-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
1,2-Dibromoethane			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichloroethane			<0.050		ug/g		0.05	03-NOV-17
1,2-Dichloropropane			<0.050		ug/g		0.05	03-NOV-17
1,3-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
1,4-Dichlorobenzene			<0.050		ug/g		0.05	03-NOV-17
Acetone			<0.50		ug/g		0.5	03-NOV-17
Benzene			<0.0068		ug/g		0.0068	03-NOV-17
Bromodichloromethane			<0.050		ug/g		0.05	03-NOV-17
Bromoform			<0.050		ug/g		0.05	03-NOV-17
Bromomethane			<0.050		ug/g		0.05	03-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-1 MB								
Carbon tetrachloride			<0.050		ug/g		0.05	03-NOV-17
Chlorobenzene			<0.050		ug/g		0.05	03-NOV-17
Chloroform			<0.050		ug/g		0.05	03-NOV-17
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	03-NOV-17
Dibromochloromethane			<0.050		ug/g		0.05	03-NOV-17
Dichlorodifluoromethane			<0.050		ug/g		0.05	03-NOV-17
Ethylbenzene			<0.018		ug/g		0.018	03-NOV-17
n-Hexane			<0.050		ug/g		0.05	03-NOV-17
Methylene Chloride			<0.050		ug/g		0.05	03-NOV-17
MTBE			<0.050		ug/g		0.05	03-NOV-17
m+p-Xylenes			<0.030		ug/g		0.03	03-NOV-17
Methyl Ethyl Ketone			<0.50		ug/g		0.5	03-NOV-17
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	03-NOV-17
o-Xylene			<0.020		ug/g		0.02	03-NOV-17
Styrene			<0.050		ug/g		0.05	03-NOV-17
Tetrachloroethylene			<0.050		ug/g		0.05	03-NOV-17
Toluene			<0.080		ug/g		0.08	03-NOV-17
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	03-NOV-17
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	03-NOV-17
Trichloroethylene			<0.010		ug/g		0.01	03-NOV-17
Trichlorofluoromethane			<0.050		ug/g		0.05	03-NOV-17
Vinyl chloride			<0.020		ug/g		0.02	03-NOV-17
Surrogate: 1,4-Difluorobenzene			101.1		%		50-140	03-NOV-17
Surrogate: 4-Bromofluorobenzene			104.9		%		50-140	03-NOV-17
WG2653746-5 MS		**WG2653746-3**						
1,1,1,2-Tetrachloroethane			100.3		%		50-140	03-NOV-17
1,1,2,2-Tetrachloroethane			109.1		%		50-140	03-NOV-17
1,1,1-Trichloroethane			94.8		%		50-140	03-NOV-17
1,1,2-Trichloroethane			113.0		%		50-140	03-NOV-17
1,1-Dichloroethane			98.6		%		50-140	03-NOV-17
1,1-Dichloroethylene			83.9		%		50-140	03-NOV-17
1,2-Dibromoethane			113.9		%		50-140	03-NOV-17
1,2-Dichlorobenzene			98.5		%		50-140	03-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R3874287								
WG2653746-5 MS		**WG2653746-3**						
1,2-Dichloroethane			113.8		%		50-140	03-NOV-17
1,2-Dichloropropane			107.1		%		50-140	03-NOV-17
1,3-Dichlorobenzene			92.6		%		50-140	03-NOV-17
1,4-Dichlorobenzene			95.4		%		50-140	03-NOV-17
Acetone			115.7		%		50-140	03-NOV-17
Benzene			100.2		%		50-140	03-NOV-17
Bromodichloromethane			104.5		%		50-140	03-NOV-17
Bromoform			107.7		%		50-140	03-NOV-17
Bromomethane			92.5		%		50-140	03-NOV-17
Carbon tetrachloride			91.7		%		50-140	03-NOV-17
Chlorobenzene			98.1		%		50-140	03-NOV-17
Chloroform			102.1		%		50-140	03-NOV-17
cis-1,2-Dichloroethylene			101.8		%		50-140	03-NOV-17
cis-1,3-Dichloropropene			103.5		%		50-140	03-NOV-17
Dibromochloromethane			112.0		%		50-140	03-NOV-17
Dichlorodifluoromethane			58.2		%		50-140	03-NOV-17
Ethylbenzene			91.1		%		50-140	03-NOV-17
n-Hexane			95.5		%		50-140	03-NOV-17
Methylene Chloride			110.0		%		50-140	03-NOV-17
MTBE			97.0		%		50-140	03-NOV-17
m+p-Xylenes			92.2		%		50-140	03-NOV-17
Methyl Ethyl Ketone			130.3		%		50-140	03-NOV-17
Methyl Isobutyl Ketone			120.2		%		50-140	03-NOV-17
o-Xylene			93.7		%		50-140	03-NOV-17
Styrene			94.3		%		50-140	03-NOV-17
Tetrachloroethylene			88.3		%		50-140	03-NOV-17
Toluene			95.3		%		50-140	03-NOV-17
trans-1,2-Dichloroethylene			95.4		%		50-140	03-NOV-17
trans-1,3-Dichloropropene			103.9		%		50-140	03-NOV-17
Trichloroethylene			97.3		%		50-140	03-NOV-17
Trichlorofluoromethane			90.2		%		50-140	03-NOV-17
Vinyl chloride			83.4		%		50-140	03-NOV-17

Quality Control Report

Workorder: L2015412 Report Date: 09-NOV-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

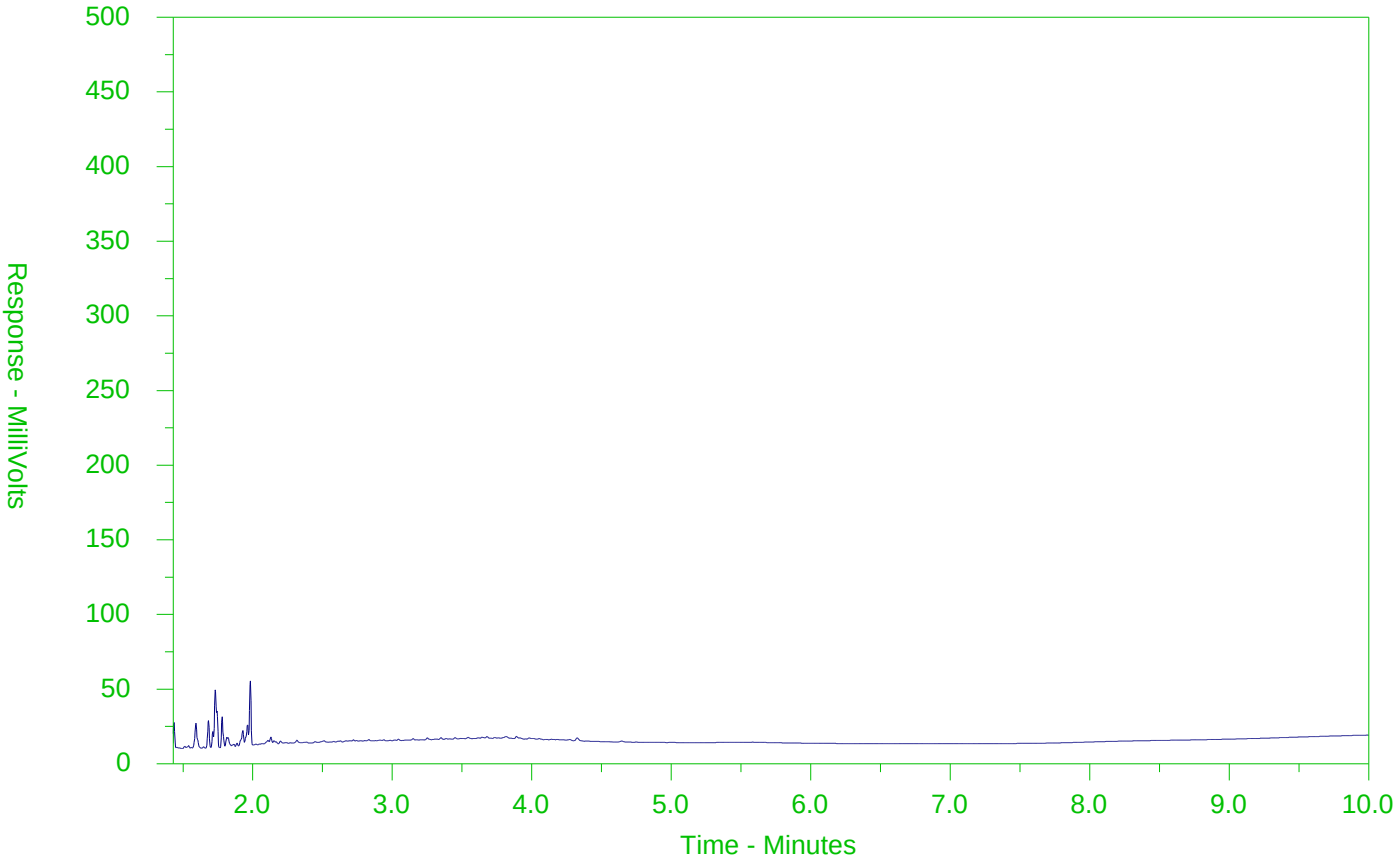
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-1
Client Sample ID: MW17-109S-13.25



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

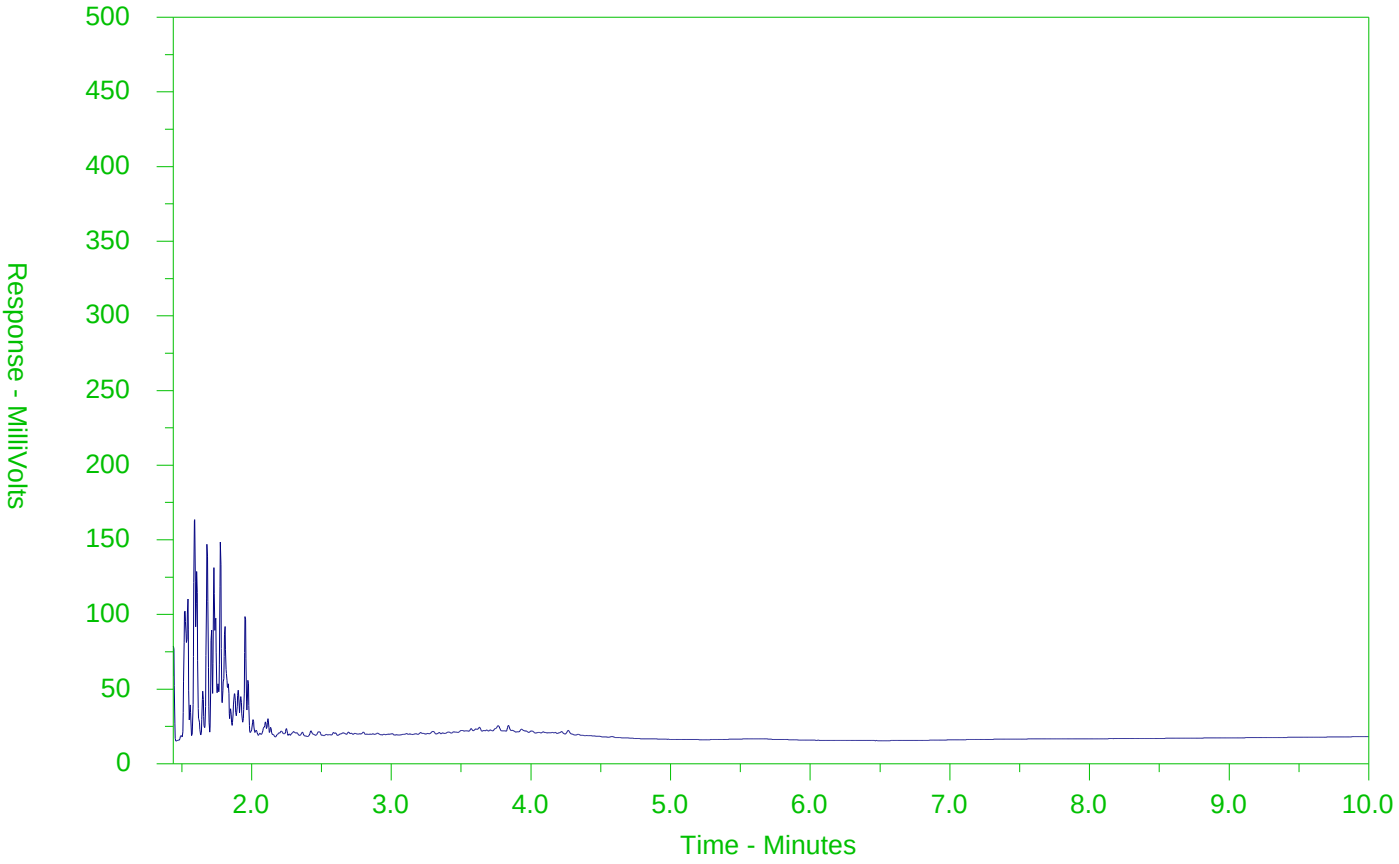
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-2
Client Sample ID: MW17-105S/D-13.25



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

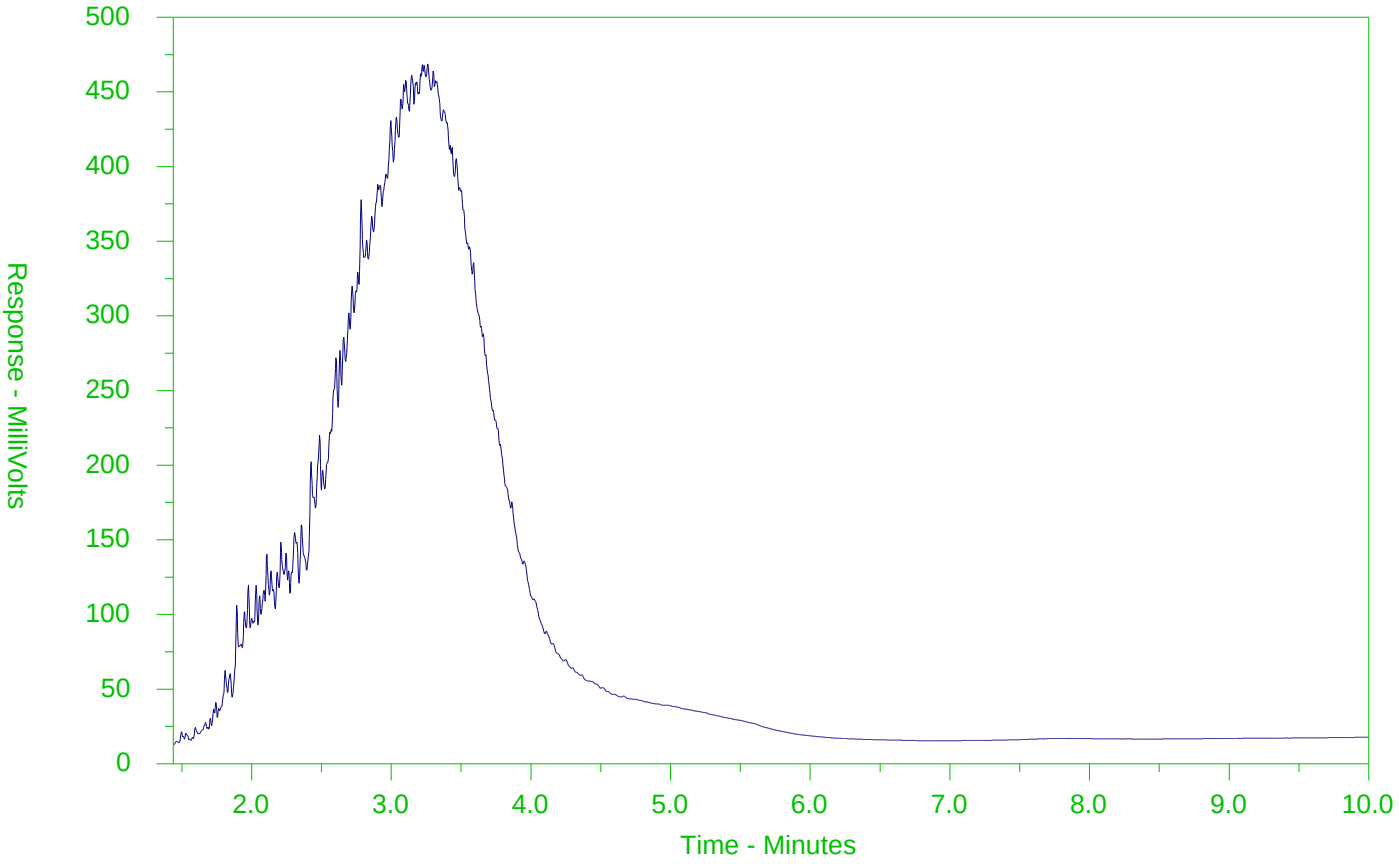
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-3
Client Sample ID: MW17-101S/D-8.5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

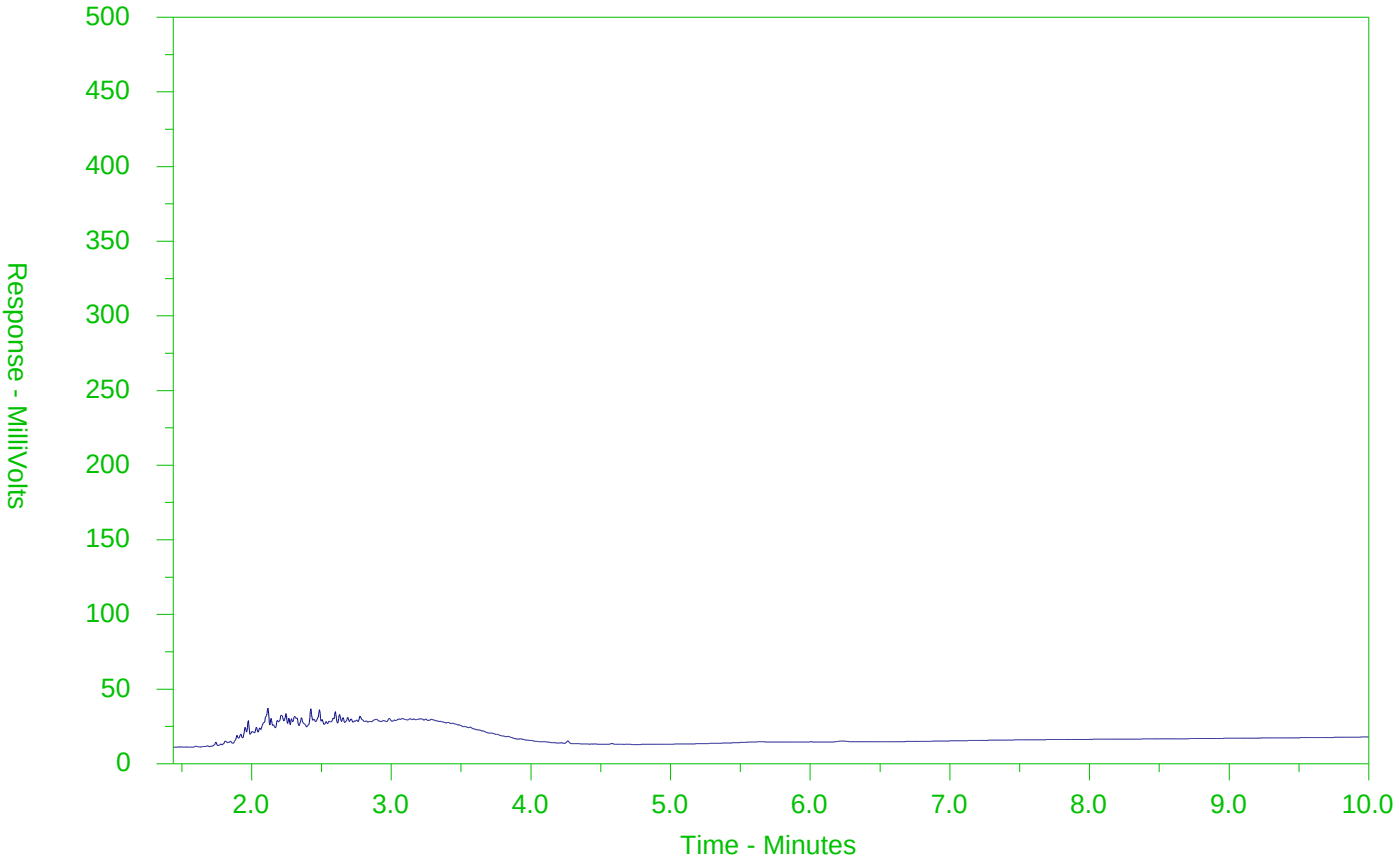
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-4
Client Sample ID: MW17-104S/D-9



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

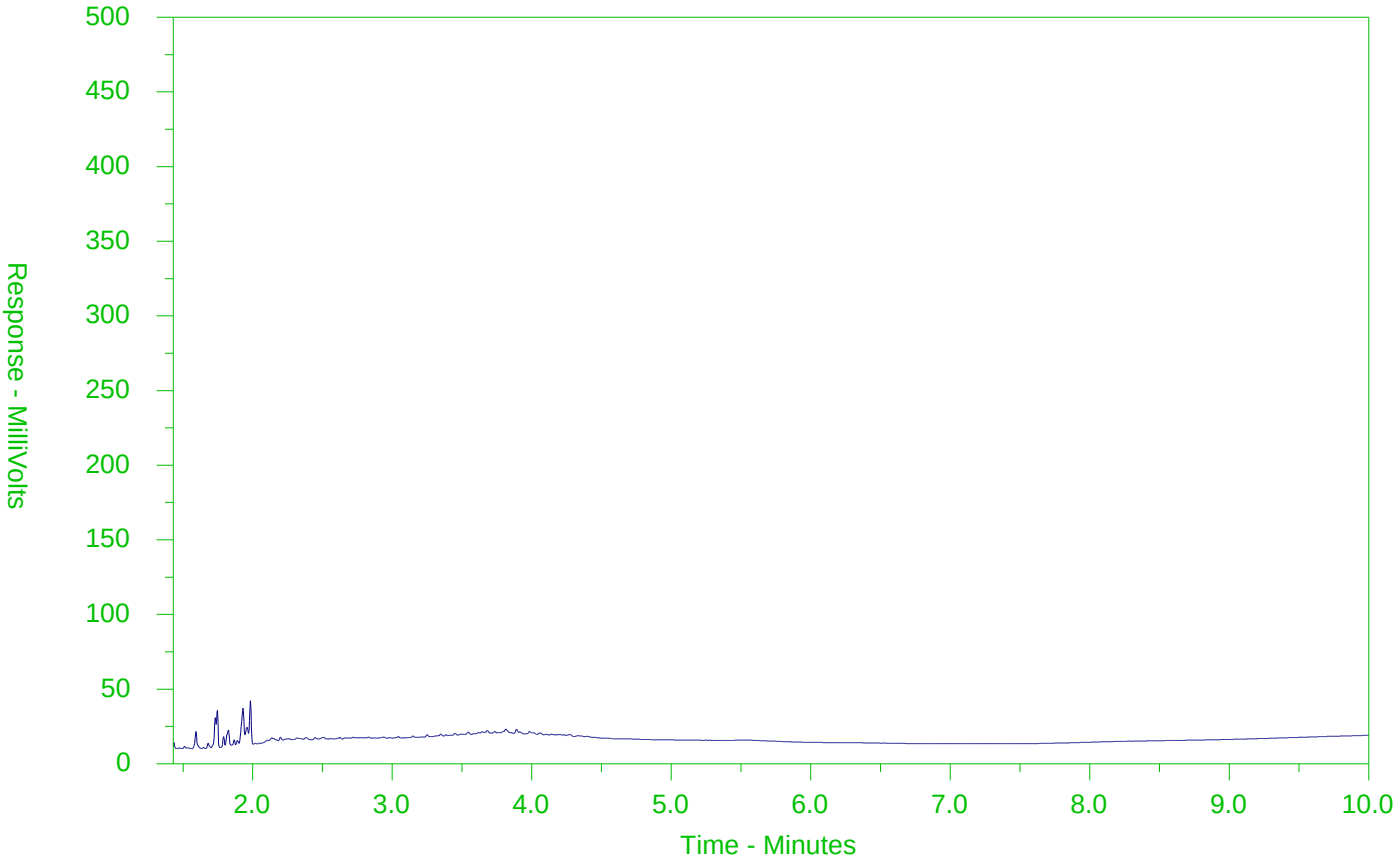
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-5
Client Sample ID: MW17-104S/D-16.8



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

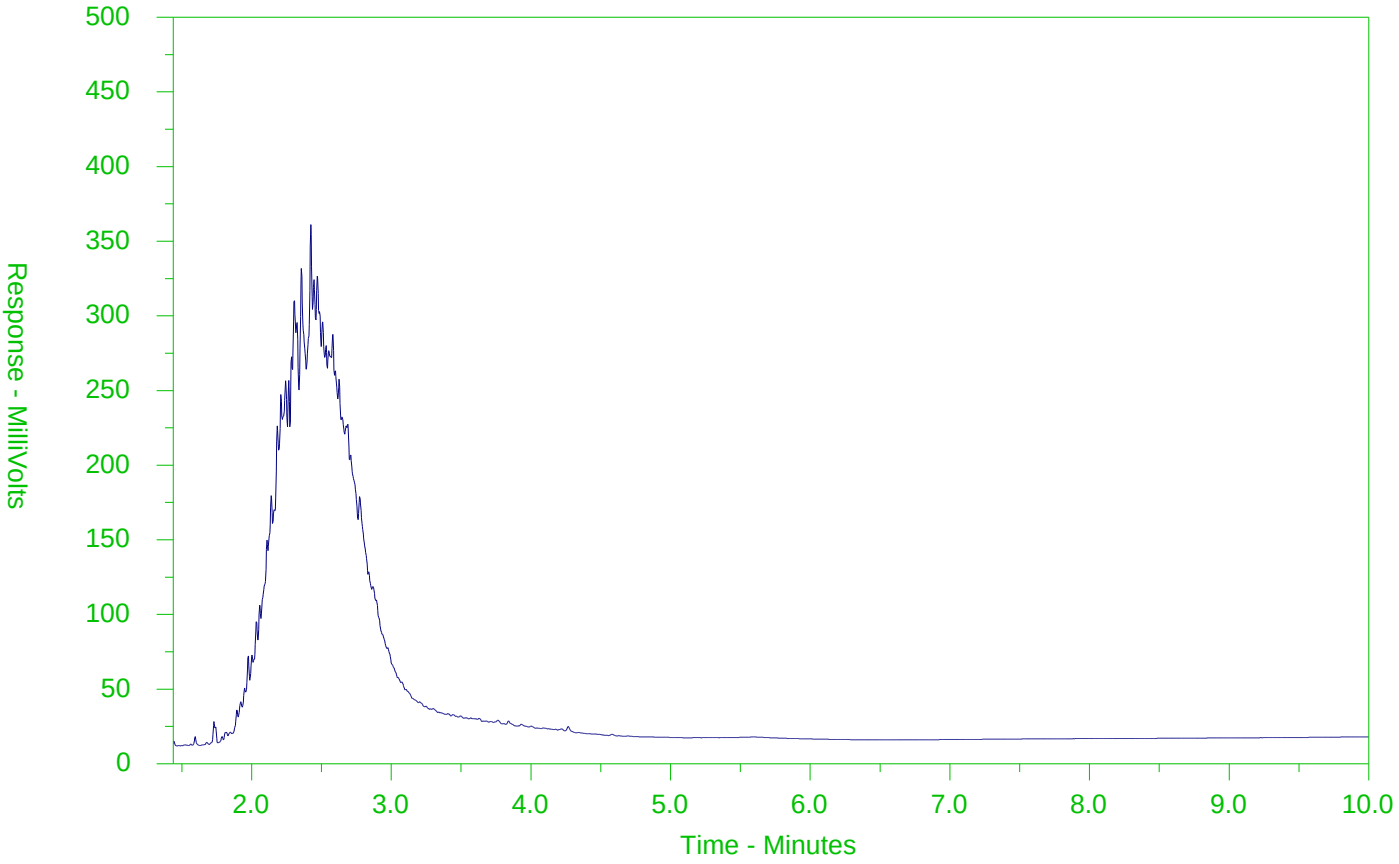
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2015412-6
Client Sample ID: MW17-104S/D-22



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2015412-COFC

COC Number: 15 - 613138

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shaw	Quality Control (QC) Report with Report: YES NO	Priority (Business Days): 4 day [P4]; 3 day [P3]; 2 day [P2]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E1]; Same Day, Weekend or Statutory holiday [E0]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs:
Street:		Email 1 or Fax: Duke, Michael	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2: Kyle, Tanya	
Postal Code:		Email 3:	

Invoice To		Invoice Distribution
	Same as Report To: YES NO	Select Invoice Distribution: EMAIL MAIL FAX
	Copy of Invoice with Report: YES NO	Email 1 or Fax:
Company:		Email 2:
Contact:	Acct Payable	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2015412	ALS Contact: Matthy	Sampler: M. Shaw

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	0.2 deg PHC + VOC	10 deg PCB	Number of Containers
	MW17-1095-13.25	27-Oct-17	1235	Rock	X	X	3
	MW17-1055/D-13.25		1245		X		
	MW17-1015/D-8.5		1255		X		
	MW17-1045/D-9		1305		X		
	MW17-1045/D-16.8		1315		X		
	MW17-1045/D-22		1320		X		

Drinking Water (DW) Samples¹ (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES ND	
Are samples for human drinking water use? YES ND	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No	
Ice Packs		Ice Cubes	Custody seal intact	Yes	X	No
Cooling Initiated						

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
-0.4°			0.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: M. Shaw	Date: 2017/10/30	Time: 5:45	Received by:	Date: OCT 30/17	Time: 9:00	Received by:	Date: 30 OCT 17	Time: 1500

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

¹ If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 03-NOV-17
Report Date: 13-NOV-17 12:19 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2017929

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-617075, 17-617076, 17-617082
Legal Site Desc:

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-1 MW17-108S						
Sampled By: CLIENT on 31-OCT-17 @ 11:05						
Matrix: WATER						
Physical Tests						
Conductivity	1.08		0.0030	mS/cm	07-NOV-17	
pH	7.32		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	9.00		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<20	DLM	20	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.10		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	1.13		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	184		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	113		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	0.610		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.201		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	9670		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	0.569		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	1.3		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	09-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-1 MW17-108S						
Sampled By: CLIENT on 31-OCT-17 @ 11:05						
Matrix: WATER						
Volatile Organic Compounds						
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	0.74		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	07-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	07-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.7		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
F1-BTEX	<25		25	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F2-Naphth	<100		100	ug/L	10-NOV-17	
F3 (C16-C34)	470		250	ug/L	08-NOV-17	500
F3-PAH	470		250	ug/L	10-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	470		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	78.2		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	96.0		60-140	%	07-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.035	DLQ	0.035	ug/L	10-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-1 MW17-108S						
Sampled By: CLIENT on 31-OCT-17 @ 11:05						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	0.022		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
Fluorene	0.136		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	10-NOV-17	3.2
1-Methylnaphthalene	0.022		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
Phenanthrene	0.025		0.020	ug/L	10-NOV-17	1
Pyrene	0.047		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	72.4		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	62.6		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	69.5		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	83.3		60-140	%	10-NOV-17	
L2017929-2 DUP 1						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.09		0.0030	mS/cm	07-NOV-17	
pH	7.35		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	8.92		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.10		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	1.10		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	180		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	113		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-2 DUP 1						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						
Dissolved Metals						
						0.1
Molybdenum (Mo)-Dissolved	0.594		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.165		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	9360		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	0.557		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	1.1		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	09-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	0.72		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-2 DUP 1						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						#1
Volatile Organic Compounds						
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	07-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	07-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	96.8		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	98.1		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
F1-BTEX	<25		25	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F2-Naphth	<100		100	ug/L	10-NOV-17	
F3 (C16-C34)	450		250	ug/L	08-NOV-17	500
F3-PAH	450		250	ug/L	10-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	450		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	83.3		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	99.0		60-140	%	07-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.040	DLQ	0.040	ug/L	10-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
Anthracene	0.023		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	0.023		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	0.022		0.020	ug/L	10-NOV-17	0.41
Fluorene	0.162		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	0.048		0.028	ug/L	10-NOV-17	3.2
1-Methylnaphthalene	0.026		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	0.023		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
Phenanthrene	0.030		0.020	ug/L	10-NOV-17	1
Pyrene	0.050		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	88.9		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	72.4		60-140	%	10-NOV-17	

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-2 DUP 1						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Surrogate: d8-Naphthalene	79.7		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	101.9		60-140	%	10-NOV-17	
L2017929-3 MW17-105D						
Sampled By: CLIENT on 31-OCT-17 @ 13:47						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.08		0.0030	mS/cm	07-NOV-17	
pH	7.50		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	60.3		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.11		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	20.5		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	251		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	87		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.22		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.342		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	3.54		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	2.02		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	34800		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.021		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	3.52		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	28.6		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	09-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	3.05		0.50	ug/L	07-NOV-17	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-3 MW17-105D						
Sampled By: CLIENT on 31-OCT-17 @ 13:47						
Matrix: WATER						
Volatile Organic Compounds						
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	5.57		0.50	ug/L	07-NOV-17	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	3.88		0.50	ug/L	07-NOV-17	*0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	0.72		0.40	ug/L	07-NOV-17	
Xylenes (Total)	0.72		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	96.0		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.8		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
F1-BTEX	<25		25	ug/L	09-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	09-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-3 MW17-105D						
Sampled By: CLIENT on 31-OCT-17 @ 13:47						
Matrix: WATER						#1
Hydrocarbons						
Surrogate: 2-Bromobenzotrifluoride	78.8		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	108.5		60-140	%	07-NOV-17	
L2017929-4 DUP2						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.09		0.0030	mS/cm	07-NOV-17	
pH	7.61		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	60.4		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.11		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	20.6		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	246		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	87		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.22		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.336		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	3.56		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	2.02		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	34800		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.018		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	3.38		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	28.8		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	09-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	3.07		0.50	ug/L	07-NOV-17	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-4 DUP2						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						
Volatile Organic Compounds						
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	5.62		0.50	ug/L	07-NOV-17	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	3.97		0.50	ug/L	07-NOV-17	*0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	0.70		0.40	ug/L	07-NOV-17	
Xylenes (Total)	0.70		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	94.8		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.7		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
F1-BTEX	<25		25	ug/L	09-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	09-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-4 DUP2						
Sampled By: CLIENT on 31-OCT-17						
Matrix: WATER						#1
Hydrocarbons						
Surrogate: 2-Bromobenzotrifluoride	71.5		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	103.4		60-140	%	07-NOV-17	
L2017929-5 MW17-105S						
Sampled By: CLIENT on 31-OCT-17 @ 14:43						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.01		0.0030	mS/cm	07-NOV-17	
pH	7.61		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	52.3		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	12.6		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	142		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	76		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.17		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	0.38		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.094		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	3.17		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	1.98		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	28000		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.029		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	2.51		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	46.7		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	09-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	66.8		0.50	ug/L	07-NOV-17	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-5 MW17-105S						
Sampled By: CLIENT on 31-OCT-17 @ 14:43						
Matrix: WATER						
Volatile Organic Compounds						
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	10.9		0.50	ug/L	07-NOV-17	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	8.42		0.50	ug/L	07-NOV-17	*2.4
n-Hexane	7.46		0.50	ug/L	07-NOV-17	*5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	1.57		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	5.63		0.50	ug/L	07-NOV-17	*0.5
o-Xylene	1.17		0.30	ug/L	07-NOV-17	
m+p-Xylenes	37.4		0.40	ug/L	07-NOV-17	
Xylenes (Total)	38.6		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.4		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.5		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	313		25	ug/L	07-NOV-17	420
F1-BTEX	198		47	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F2-Naphth	<100		100	ug/L	10-NOV-17	
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F3-PAH	<250		250	ug/L	10-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-5 MW17-105S						
Sampled By: CLIENT on 31-OCT-17 @ 14:43						
Matrix: WATER						#1
Hydrocarbons						
Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	79.5		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	98.8		60-140	%	07-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	0.560		0.028	ug/L	10-NOV-17	3.2
1-Methylnaphthalene	0.231		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	0.329		0.020	ug/L	10-NOV-17	3.2
Naphthalene	1.28		0.050	ug/L	10-NOV-17	7
Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	86.8		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	85.9		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	84.3		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	102.3		60-140	%	10-NOV-17	
L2017929-6 MW17-100S						
Sampled By: CLIENT on 31-OCT-17 @ 16:10						
Matrix: WATER						#1
Physical Tests						
Conductivity	0.817		0.0030	mS/cm	07-NOV-17	
pH	7.25		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	2.35		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.26		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	5.88		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	67.7		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-6 MW17-100S						
Sampled By: CLIENT on 31-OCT-17 @ 16:10						
Matrix: WATER						
Dissolved Metals						
Boron (B)-Dissolved	81		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	0.121		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	1.05		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	0.95		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	1.26		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	6.88		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.497		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	7480		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.046		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	1.57		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	458		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-6 MW17-100S						
Sampled By: CLIENT on 31-OCT-17 @ 16:10						
Matrix: WATER						#1
Volatile Organic Compounds						
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	07-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	07-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.2		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.5		70-130	%	07-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
F1-BTEX	<25		25	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	10-NOV-17	150
F3 (C16-C34)	<250		250	ug/L	10-NOV-17	500
F4 (C34-C50)	<250		250	ug/L	10-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	10-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	60.5		60-140	%	10-NOV-17	
Surrogate: 3,4-Dichlorotoluene	103.5		60-140	%	07-NOV-17	
L2017929-7 TRIP BLANK 1						
Sampled By: CLIENT on 31-OCT-17 @ 11:05						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-7 TRIP BLANK 1						
Sampled By: CLIENT on 31-OCT-17 @ 11:05						
Matrix: WATER						#1
Volatile Organic Compounds						
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
MTBE	<2.0		2.0	ug/L	07-NOV-17	15
Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	07-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	07-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	07-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	07-NOV-17	72
Surrogate: 4-Bromofluorobenzene	94.6		70-130	%	07-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.3		70-130	%	07-NOV-17	
L2017929-8 MW17-101S						
Sampled By: CLIENT on 01-NOV-17 @ 09:50						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.04		0.0030	mS/cm	07-NOV-17	
pH	7.44		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	8.98		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-8 MW17-101S						
Sampled By: CLIENT on 01-NOV-17 @ 09:50						
Matrix: WATER						
Dissolved Metals						
Arsenic (As)-Dissolved	0.29		0.10	ug/L	08-NOV-17	25
Barium (Ba)-Dissolved	77.5		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	59		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	0.195		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	6.26		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	7710		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	3.07		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	07-NOV-17	2700
Benzene	0.89		0.50	ug/L	07-NOV-17	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	07-NOV-17	16
Bromoform	<5.0		5.0	ug/L	07-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	07-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	07-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	07-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	07-NOV-17	25
Chloroform	<1.0		1.0	ug/L	07-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	07-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	07-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	07-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
cis-1,2-Dichloroethylene	0.67		0.50	ug/L	07-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	07-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	07-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	07-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	07-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-8	MW17-101S						
Sampled By:	CLIENT on 01-NOV-17 @ 09:50						
Matrix:	WATER						
Volatile Organic Compounds							
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	07-NOV-17	0.5
	1,4-Dioxane	<20		20	ug/L	07-NOV-17	50
	Ethylbenzene	<0.50		0.50	ug/L	07-NOV-17	2.4
	n-Hexane	<0.50		0.50	ug/L	07-NOV-17	5
	Methyl Ethyl Ketone	<20		20	ug/L	07-NOV-17	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	07-NOV-17	640
	MTBE	<2.0		2.0	ug/L	07-NOV-17	15
	Styrene	<0.50		0.50	ug/L	07-NOV-17	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	07-NOV-17	0.5
	Toluene	<0.50		0.50	ug/L	07-NOV-17	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	07-NOV-17	0.5
	Trichloroethylene	0.60		0.50	ug/L	07-NOV-17	*0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	07-NOV-17	150
	Vinyl chloride	<0.50		0.50	ug/L	07-NOV-17	0.5
	o-Xylene	<0.30		0.30	ug/L	07-NOV-17	
	m+p-Xylenes	<0.40		0.40	ug/L	07-NOV-17	
	Xylenes (Total)	<0.50		0.50	ug/L	07-NOV-17	72
	Surrogate: 4-Bromofluorobenzene	95.7		70-130	%	07-NOV-17	
	Surrogate: 1,4-Difluorobenzene	97.5		70-130	%	07-NOV-17	
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	07-NOV-17	420
	F1-BTEX	<25		25	ug/L	10-NOV-17	420
	F2 (C10-C16)	120		100	ug/L	08-NOV-17	150
	F2-Naphth	120		100	ug/L	10-NOV-17	
	F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
	F3-PAH	<250		250	ug/L	10-NOV-17	
	F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
	Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
	Surrogate: 2-Bromobenzotrifluoride	81.7		60-140	%	08-NOV-17	
	Surrogate: 3,4-Dichlorotoluene	100.2		60-140	%	07-NOV-17	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	0.618		0.020	ug/L	10-NOV-17	4.1
	Acenaphthylene	<0.100	DLQ	0.10	ug/L	10-NOV-17	1
	Anthracene	<0.090	DLQ	0.90	ug/L	10-NOV-17	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-8 MW17-101S						
Sampled By: CLIENT on 01-NOV-17 @ 09:50						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Fluorene	0.892		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	0.174		0.028	ug/L	10-NOV-17	3.2
1-Methylnaphthalene	0.142		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	0.032		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.135	DLQ	0.14	ug/L	10-NOV-17	7
Phenanthrene	<0.030	DLQ	0.030	ug/L	10-NOV-17	1
Pyrene	0.044		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	92.0		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	84.2		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	73.9		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	102.4		60-140	%	10-NOV-17	
L2017929-9 DUP3						
Sampled By: CLIENT on 01-NOV-17						
Matrix: WATER						#1
Volatile Organic Compounds						
1,4-Dioxane	<20		20	ug/L	08-NOV-17	50
L2017929-10 MW17-101D						
Sampled By: CLIENT on 01-NOV-17 @ 10:50						
Matrix: WATER						#1
Physical Tests						
Conductivity	1.50		0.0030	mS/cm	07-NOV-17	
pH	7.59		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	142		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.53		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	44.8		0.10	ug/L	07-NOV-17	*25
Barium (Ba)-Dissolved	136		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	71		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.23		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.520		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	9.78		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	6.93		0.50	ug/L	07-NOV-17	100

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-10	MW17-101D						
Sampled By:	CLIENT on 01-NOV-17 @ 10:50						
Matrix:	WATER						
Dissolved Metals							
	Selenium (Se)-Dissolved	0.375		0.050	ug/L	07-NOV-17	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
	Sodium (Na)-Dissolved	75800		500	ug/L	07-NOV-17	490000
	Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2
	Uranium (U)-Dissolved	8.19		0.010	ug/L	07-NOV-17	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
	Zinc (Zn)-Dissolved	46.1		1.0	ug/L	07-NOV-17	890
Speciated Metals							
	Chromium, Hexavalent	<1.0		1.0	ug/L	13-NOV-17	25
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	08-NOV-17	2700
	Benzene	1.17		0.50	ug/L	08-NOV-17	*0.5
	Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
	Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
	Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
	Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
	Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
	Chloroform	1.1		1.0	ug/L	08-NOV-17	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	cis-1,2-Dichloroethylene	1.44		0.50	ug/L	08-NOV-17	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	09-NOV-17	0.5
	1,4-Dioxane	<20		20	ug/L	08-NOV-17	50
	Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
	n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
	Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
	MTBE	<2.0		2.0	ug/L	08-NOV-17	15
	Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Toluene	<0.50		0.50	ug/L	08-NOV-17	24

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-10	MW17-101D						
Sampled By:	CLIENT on 01-NOV-17 @ 10:50						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
	Vinyl chloride	0.91		0.50	ug/L	08-NOV-17	*0.5
	o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
	m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
	Xylenes (Total)	<0.50		0.50	ug/L	09-NOV-17	72
	Surrogate: 4-Bromofluorobenzene	93.3		70-130	%	08-NOV-17	
	Surrogate: 1,4-Difluorobenzene	97.9		70-130	%	08-NOV-17	
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
	F1-BTEX	<25		25	ug/L	10-NOV-17	420
	F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
	F2-Naphth	<100		100	ug/L	10-NOV-17	
	F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
	F3-PAH	<250		250	ug/L	10-NOV-17	
	F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
	Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
	Surrogate: 2-Bromobenzotrifluoride	68.9		60-140	%	08-NOV-17	
	Surrogate: 3,4-Dichlorotoluene	86.0		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
	Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
	Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	10-NOV-17	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
	Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
	Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Surrogate: d10-Acenaphthene	71.0		60-140	%	10-NOV-17	
	Surrogate: d12-Chrysene	70.7		60-140	%	10-NOV-17	
	Surrogate: d8-Naphthalene	69.0		60-140	%	10-NOV-17	
	Surrogate: d10-Phenanthrene	83.3		60-140	%	10-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-11 MW17-104D						
Sampled By: CLIENT on 01-NOV-17 @ 12:05						
Matrix: WATER						
Physical Tests						
Conductivity	0.725		0.0030	mS/cm	07-NOV-17	
pH	7.65		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	7.53		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	2.05		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	10.6		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	60.2		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	40		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.19		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.093		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	23.4		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	4.41		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.274		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	8890		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.022		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	17.0		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	58.2		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-11 MW17-104D						
Sampled By: CLIENT on 01-NOV-17 @ 12:05						
Matrix: WATER						
Volatile Organic Compounds						
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.4		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	99.2		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
F1-BTEX	<25		25	ug/L	13-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	13-NOV-17	150
F2-Naphth	<100		100	ug/L	13-NOV-17	
F3 (C16-C34)	<250		250	ug/L	13-NOV-17	500
F3-PAH	<250		250	ug/L	13-NOV-17	
F4 (C34-C50)	<250		250	ug/L	13-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	13-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	13-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	99.3		60-140	%	13-NOV-17	
Surrogate: 3,4-Dichlorotoluene	94.5		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	0.072		0.020	ug/L	10-NOV-17	4.1
Acenaphthylene	0.020		0.020	ug/L	10-NOV-17	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-11 MW17-104D						
Sampled By: CLIENT on 01-NOV-17 @ 12:05						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Anthracene	<0.045	DLQ	0.045	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	0.015		0.010	ug/L	10-NOV-17	*0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	0.021		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
Fluorene	0.073		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	0.024		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	0.075		0.028	ug/L	10-NOV-17	3.2
1-Methylnaphthalene	0.050		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	0.026		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
Pyrene	0.026		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	88.2		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	97.2		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	78.1		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	108.6		60-140	%	10-NOV-17	
L2017929-12 MW17-104S						
Sampled By: CLIENT on 01-NOV-17 @ 13:00						
Matrix: WATER						#1
Physical Tests						
Conductivity	0.758		0.0030	mS/cm	07-NOV-17	
pH	7.69		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	2.35		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	1.06		0.10	ug/L	08-NOV-17	25
Barium (Ba)-Dissolved	60.7		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	24		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.11		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-12 MW17-104S						
Sampled By: CLIENT on 01-NOV-17 @ 13:00						
Matrix: WATER						
Dissolved Metals						
						0.1
Molybdenum (Mo)-Dissolved	0.234		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.216		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	2220		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	0.361		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	0.65		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-12 MW17-104S						
Sampled By: CLIENT on 01-NOV-17 @ 13:00						
Matrix: WATER						
Volatile Organic Compounds						
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	2.47		0.30	ug/L	08-NOV-17	
m+p-Xylenes	0.63		0.40	ug/L	08-NOV-17	
Xylenes (Total)	3.10		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	98.0		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	98.6		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	61		25	ug/L	08-NOV-17	420
F1-BTEX	58		25	ug/L	10-NOV-17	420
F2 (C10-C16)	760		100	ug/L	08-NOV-17	*150
F2-Naphth	760		100	ug/L	10-NOV-17	
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F3-PAH	<250		250	ug/L	10-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	830		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	76.4		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	91.0		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	3.67		0.020	ug/L	10-NOV-17	4.1
Acenaphthylene	0.440		0.020	ug/L	10-NOV-17	1
Anthracene	0.159		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	0.026		0.020	ug/L	10-NOV-17	0.41
Fluorene	2.15		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	19.8		0.057	ug/L	10-NOV-17	*3.2
1-Methylnaphthalene	13.9	DLHC	0.040	ug/L	10-NOV-17	*3.2
2-Methylnaphthalene	5.92	DLM	0.040	ug/L	10-NOV-17	*3.2
Naphthalene	<15.0	DLQ	15	ug/L	10-NOV-17	**7
Phenanthrene	1.39		0.020	ug/L	10-NOV-17	*1
Pyrene	0.061		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	93.2		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	79.0		60-140	%	10-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-12 MW17-104S						
Sampled By: CLIENT on 01-NOV-17 @ 13:00						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Surrogate: d8-Naphthalene	102.8		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	71.7		60-140	%	10-NOV-17	
L2017929-13 MW17-106S						
Sampled By: CLIENT on 01-NOV-17 @ 14:35						
Matrix: WATER						#1
Physical Tests						
Conductivity	0.746		0.0030	mS/cm	07-NOV-17	
pH	7.48		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	4.92		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.26		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	1.30		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	34.9		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	68		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	0.043		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.17		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	0.48		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	1.19		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	3.19		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.128		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	6370		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.120		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	1.92		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	322		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-13 MW17-106S						
Sampled By: CLIENT on 01-NOV-17 @ 14:35						
Matrix: WATER						
Volatile Organic Compounds						
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
F1-BTEX	<25		25	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F2-Naphth	<100		100	ug/L	10-NOV-17	
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F3-PAH	<250		250	ug/L	10-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-13	MW17-106S						
Sampled By:	CLIENT on 01-NOV-17 @ 14:35						
Matrix:	WATER						#1
Hydrocarbons							
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
	Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
	Surrogate: 2-Bromobenzotrifluoride	79.8		60-140	%	08-NOV-17	
	Surrogate: 3,4-Dichlorotoluene	88.2		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
	Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
	Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	10-NOV-17	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
	Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
	Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Surrogate: d10-Acenaphthene	86.7		60-140	%	10-NOV-17	
	Surrogate: d12-Chrysene	93.0		60-140	%	10-NOV-17	
	Surrogate: d8-Naphthalene	84.8		60-140	%	10-NOV-17	
	Surrogate: d10-Phenanthrene	104.1		60-140	%	10-NOV-17	
L2017929-14	MW17-106D						
Sampled By:	CLIENT on 01-NOV-17 @ 15:35						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	08-NOV-17	2700
	Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
	Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
	Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
	Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
	Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
	Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2017929-14 MW17-106D									
Sampled By: CLIENT on 01-NOV-17 @ 15:35									
Matrix: WATER						#1			
Volatile Organic Compounds									
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5			
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6			
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26			
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5			
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4			
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5			
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800			
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640			
MTBE	<2.0		2.0	ug/L	08-NOV-17	15			
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5			
Toluene	<0.50		0.50	ug/L	08-NOV-17	24			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5			
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150			
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5			
o-Xylene	<0.30		0.30	ug/L	08-NOV-17				
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17				
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72			
Surrogate: 4-Bromofluorobenzene	96.9		70-130	%	08-NOV-17				
Surrogate: 1,4-Difluorobenzene	98.7		70-130	%	08-NOV-17				
Hydrocarbons									
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420			
F1-BTEX	<25		25	ug/L	10-NOV-17	420			
F2 (C10-C16)	<100		100	ug/L	10-NOV-17	150			
F3 (C16-C34)	<250		250	ug/L	10-NOV-17	500			
F4 (C34-C50)	<250		250	ug/L	10-NOV-17	500			
Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17				
Chrom. to baseline at nC50	YES			No Unit	10-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	81.1		60-140	%	10-NOV-17				
Surrogate: 3,4-Dichlorotoluene	97.6		60-140	%	08-NOV-17				
L2017929-15 MW17-107S									
Sampled By: CLIENT on 01-NOV-17 @ 16:25									
Matrix: WATER						#1			
Physical Tests									

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-15 MW17-107S						
Sampled By: CLIENT on 01-NOV-17 @ 16:25						
Matrix: WATER						
Physical Tests						
Conductivity	0.831		0.0030	mS/cm	07-NOV-17	
pH	7.76		0.10	pH units	04-NOV-17	
Anions and Nutrients						
Chloride (Cl)	7.91		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	0.28		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	2.02		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	88.7		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	85		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	0.133		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.47		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	0.85		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.167		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	2.42		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	2.92		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.859		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	7800		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.086		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	1.40		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	200		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-15 MW17-107S						
Sampled By: CLIENT on 01-NOV-17 @ 16:25						
Matrix: WATER						
Volatile Organic Compounds						
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	21.4		0.50	ug/L	08-NOV-17	*5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
1,1-Dichloroethylene	1.01		0.50	ug/L	08-NOV-17	*0.5
cis-1,2-Dichloroethylene	1.47		0.50	ug/L	08-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	0.68		0.50	ug/L	08-NOV-17	*0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	19.5		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	1.26		0.50	ug/L	08-NOV-17	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.4		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
F1-BTEX	<25		25	ug/L	13-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
F2-Naphth	<100		100	ug/L	13-NOV-17	
F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
F3-PAH	<250		250	ug/L	13-NOV-17	
F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	13-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	82.1		60-140	%	08-NOV-17	
Surrogate: 3,4-Dichlorotoluene	78.3		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-15 MW17-107S						
Sampled By: CLIENT on 01-NOV-17 @ 16:25						
Matrix: WATER						
Polycyclic Aromatic Hydrocarbons						
Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	13-NOV-17	3.2
1-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	94.1		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	92.0		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	87.3		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	109.1		60-140	%	10-NOV-17	
Semi-Volatile Organics						
Biphenyl	<0.40		0.40	ug/L	13-NOV-17	0.5
4-Chloroaniline	<0.40		0.40	ug/L	13-NOV-17	10
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-NOV-17	5
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-NOV-17	120
2-Chlorophenol	<0.30		0.30	ug/L	13-NOV-17	8.9
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-NOV-17	0.5
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-NOV-17	20
Diethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
Dimethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-NOV-17	59
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-NOV-17	10
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L	13-NOV-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-NOV-17	10
Pentachlorophenol	<0.50		0.50	ug/L	13-NOV-17	30
Phenanthrene	<0.20		0.20	ug/L	13-NOV-17	1
Phenol	<0.50		0.50	ug/L	13-NOV-17	890
Pyrene	<0.20		0.20	ug/L	13-NOV-17	4.1
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-NOV-17	3
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	8.9
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	2
Surrogate: 2-Fluorobiphenyl	87.9		50-140	%	13-NOV-17	
Surrogate: Nitrobenzene d5	95.5		50-140	%	13-NOV-17	

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-15 MW17-107S						
Sampled By: CLIENT on 01-NOV-17 @ 16:25						
Matrix: WATER						#1
Semi-Volatile Organics						
Surrogate: Phenol d5	46.6		30-130	%	13-NOV-17	
Surrogate: p-Terphenyl d14	91.7		60-140	%	13-NOV-17	
Surrogate: 2,4,6-Tribromophenol	98.3		50-140	%	13-NOV-17	
L2017929-16 DUP4						
Sampled By: CLIENT on 01-NOV-17						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	13-NOV-17	3.2
1-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
Surrogate: d10-Acenaphthene	77.2		60-140	%	10-NOV-17	
Surrogate: d12-Chrysene	63.6		60-140	%	10-NOV-17	
Surrogate: d8-Naphthalene	74.6		60-140	%	10-NOV-17	
Surrogate: d10-Phenanthrene	91.9		60-140	%	10-NOV-17	
Semi-Volatile Organics						
Biphenyl	<0.40		0.40	ug/L	13-NOV-17	0.5
4-Chloroaniline	<0.40		0.40	ug/L	13-NOV-17	10
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-NOV-17	5
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-NOV-17	120
2-Chlorophenol	<0.30		0.30	ug/L	13-NOV-17	8.9
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-NOV-17	0.5
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-NOV-17	20
Diethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
Dimethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-NOV-17	59
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-NOV-17	10
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L	13-NOV-17	

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2017929-16 DUP4									
Sampled By: CLIENT on 01-NOV-17									
Matrix: WATER						#1			
Semi-Volatile Organics									
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-NOV-17	10			
Pentachlorophenol	<0.50		0.50	ug/L	13-NOV-17	30			
Phenanthrene	<0.20		0.20	ug/L	13-NOV-17	1			
Phenol	<0.50		0.50	ug/L	13-NOV-17	890			
Pyrene	<0.20		0.20	ug/L	13-NOV-17	4.1			
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-NOV-17	3			
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	8.9			
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	2			
Surrogate: 2-Fluorobiphenyl	78.5		50-140	%	13-NOV-17				
Surrogate: Nitrobenzene d5	85.6		50-140	%	13-NOV-17				
Surrogate: Phenol d5	41.5		30-130	%	13-NOV-17				
Surrogate: p-Terphenyl d14	86.3		60-140	%	13-NOV-17				
Surrogate: 2,4,6-Tribromophenol	97.9		50-140	%	13-NOV-17				
L2017929-17 MW17-109S									
Sampled By: CLIENT on 02-NOV-17 @ 09:43									
Matrix: WATER						#1			
Physical Tests									
Conductivity	1.67		0.0030	mS/cm	07-NOV-17				
pH	7.44		0.10	pH units	04-NOV-17				
Anions and Nutrients									
Chloride (Cl)	8.31		0.50	mg/L	07-NOV-17	790			
Cyanides									
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52			
Dissolved Metals									
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17				
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17				
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	06-NOV-17	6			
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	06-NOV-17	25			
Barium (Ba)-Dissolved	48.3	DLHC	1.0	ug/L	06-NOV-17	1000			
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	06-NOV-17	4			
Boron (B)-Dissolved	<100	DLHC	100	ug/L	06-NOV-17	5000			
Cadmium (Cd)-Dissolved	<0.10	DLHC	0.10	ug/L	06-NOV-17	2.1			
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	06-NOV-17	50			
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	06-NOV-17	3.8			
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	06-NOV-17	69			
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	06-NOV-17	10			
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1			
Molybdenum (Mo)-Dissolved	<0.50	DLHC	0.50	ug/L	06-NOV-17	70			
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	06-NOV-17	100			
Selenium (Se)-Dissolved	1.03	DLHC	0.50	ug/L	06-NOV-17	10			
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	06-NOV-17	1.2			
Sodium (Na)-Dissolved	<5000	DLHC	5000	ug/L	06-NOV-17	490000			
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	06-NOV-17	2			
Uranium (U)-Dissolved	4.92	DLHC	0.10	ug/L	06-NOV-17	20			
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	06-NOV-17	6.2			

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-17	MW17-109S						
Sampled By:	CLIENT on 02-NOV-17 @ 09:43						
Matrix:	WATER						
Dissolved Metals							
	Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	06-NOV-17	890
Speciated Metals							
	Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	08-NOV-17	2700
	Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
	Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
	Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
	Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
	Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
	Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
	Ethylbenzene	3.19		0.50	ug/L	08-NOV-17	*2.4
	n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
	Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
	MTBE	<2.0		2.0	ug/L	08-NOV-17	15
	Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Toluene	<0.50		0.50	ug/L	08-NOV-17	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
	Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
	o-Xylene	0.50		0.30	ug/L	08-NOV-17	
	m+p-Xylenes	1.10		0.40	ug/L	08-NOV-17	
	Xylenes (Total)	1.60		0.50	ug/L	08-NOV-17	72

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-17	MW17-109S						
Sampled By:	CLIENT on 02-NOV-17 @ 09:43						
Matrix:	WATER						
Volatile Organic Compounds							
	Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	08-NOV-17	
	Surrogate: 1,4-Difluorobenzene	98.8		70-130	%	08-NOV-17	
Hydrocarbons							
	F1 (C6-C10)	38		25	ug/L	08-NOV-17	420
	F1-BTEX	33		25	ug/L	10-NOV-17	420
	F2 (C10-C16)	<100		100	ug/L	08-NOV-17	150
	F2-Naphth	<100		100	ug/L	10-NOV-17	
	F3 (C16-C34)	<250		250	ug/L	08-NOV-17	500
	F3-PAH	<250		250	ug/L	10-NOV-17	
	F4 (C34-C50)	<250		250	ug/L	08-NOV-17	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
	Chrom. to baseline at nC50	YES			No Unit	08-NOV-17	
	Surrogate: 2-Bromobenzotrifluoride	61.4		60-140	%	08-NOV-17	
	Surrogate: 3,4-Dichlorotoluene	89.1		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	3.37		0.020	ug/L	10-NOV-17	4.1
	Acenaphthylene	0.553		0.020	ug/L	10-NOV-17	1
	Anthracene	0.314		0.020	ug/L	10-NOV-17	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Fluoranthene	0.030		0.020	ug/L	10-NOV-17	0.41
	Fluorene	3.06		0.020	ug/L	10-NOV-17	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
	1+2-Methylnaphthalenes	4.47		0.028	ug/L	10-NOV-17	*3.2
	1-Methylnaphthalene	3.98		0.020	ug/L	10-NOV-17	*3.2
	2-Methylnaphthalene	0.493		0.020	ug/L	10-NOV-17	3.2
	Naphthalene	<0.800	DLQ	0.80	ug/L	10-NOV-17	7
	Phenanthrene	0.953		0.020	ug/L	10-NOV-17	1
	Pyrene	0.084		0.020	ug/L	10-NOV-17	4.1
	Surrogate: d10-Acenaphthene	84.4		60-140	%	10-NOV-17	
	Surrogate: d12-Chrysene	79.4		60-140	%	10-NOV-17	
	Surrogate: d8-Naphthalene	118.6		60-140	%	10-NOV-17	
	Surrogate: d10-Phenanthrene	82.9		60-140	%	10-NOV-17	
Polychlorinated Biphenyls							
	Aroclor 1242	<0.10	DLM	0.10	ug/L	10-NOV-17	
	Aroclor 1248	<0.020		0.020	ug/L	10-NOV-17	
	Aroclor 1254	<0.020		0.020	ug/L	10-NOV-17	
	Aroclor 1260	<0.020		0.020	ug/L	10-NOV-17	
	Total PCBs	<0.110	DLM	0.11	ug/L	10-NOV-17	0.2
	Surrogate: 2-fluorobiphenyl	84.8		50-150	%	10-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2017929-18 DUP5									
Sampled By: CLIENT on 02-NOV-17									
Matrix: WATER						#1			
Polychlorinated Biphenyls									
Aroclor 1242	<0.20	DLM	0.20	ug/L	10-NOV-17				
Aroclor 1248	<0.020		0.020	ug/L	10-NOV-17				
Aroclor 1254	<0.020		0.020	ug/L	10-NOV-17				
Aroclor 1260	<0.020		0.020	ug/L	10-NOV-17				
Total PCBs	<0.20	DLM	0.20	ug/L	10-NOV-17	0.2			
Surrogate: 2-fluorobiphenyl	80.6		50-150	%	10-NOV-17				
L2017929-19 MW17-110S									
Sampled By: CLIENT on 02-NOV-17 @ 10:40									
Matrix: WATER						#1			
Physical Tests									
Conductivity	0.890		0.0030	mS/cm	07-NOV-17				
pH	7.53		0.10	pH units	04-NOV-17				
Anions and Nutrients									
Chloride (Cl)	5.88		0.50	mg/L	07-NOV-17	790			
Cyanides									
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52			
Dissolved Metals									
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17				
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17				
Antimony (Sb)-Dissolved	0.22		0.10	ug/L	07-NOV-17	6			
Arsenic (As)-Dissolved	2.61		0.10	ug/L	07-NOV-17	25			
Barium (Ba)-Dissolved	42.8		0.10	ug/L	07-NOV-17	1000			
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4			
Boron (B)-Dissolved	118		10	ug/L	07-NOV-17	5000			
Cadmium (Cd)-Dissolved	0.020		0.010	ug/L	07-NOV-17	2.1			
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50			
Cobalt (Co)-Dissolved	1.54		0.10	ug/L	07-NOV-17	3.8			
Copper (Cu)-Dissolved	1.61		0.20	ug/L	07-NOV-17	69			
Lead (Pb)-Dissolved	0.154		0.050	ug/L	07-NOV-17	10			
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1			
Molybdenum (Mo)-Dissolved	2.58		0.050	ug/L	07-NOV-17	70			
Nickel (Ni)-Dissolved	6.48		0.50	ug/L	07-NOV-17	100			
Selenium (Se)-Dissolved	0.231		0.050	ug/L	07-NOV-17	10			
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2			
Sodium (Na)-Dissolved	8290		500	ug/L	07-NOV-17	490000			
Thallium (Tl)-Dissolved	0.081		0.010	ug/L	07-NOV-17	2			
Uranium (U)-Dissolved	2.76		0.010	ug/L	07-NOV-17	20			
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2			
Zinc (Zn)-Dissolved	459		1.0	ug/L	07-NOV-17	890			
Speciated Metals									
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25			
Volatile Organic Compounds									
Acetone	<30		30	ug/L	08-NOV-17	2700			
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-19	MW17-110S						
Sampled By:	CLIENT on 02-NOV-17 @ 10:40						
Matrix:	WATER						
Volatile Organic Compounds							
	Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
	Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
	Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
	Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
	Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
	Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
	Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
	n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
	Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
	MTBE	<2.0		2.0	ug/L	08-NOV-17	15
	Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Toluene	<0.50		0.50	ug/L	08-NOV-17	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
	Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
	o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
	m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
	Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
	Surrogate: 4-Bromofluorobenzene	97.1		70-130	%	08-NOV-17	
	Surrogate: 1,4-Difluorobenzene	97.6		70-130	%	08-NOV-17	
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
	F1-BTEX	<25		25	ug/L	10-NOV-17	420
	F2 (C10-C16)	<100		100	ug/L	10-NOV-17	150

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-19	MW17-110S						
Sampled By:	CLIENT on 02-NOV-17 @ 10:40						
Matrix:	WATER						#1
Hydrocarbons							
	F2-Naphth	<100		100	ug/L	10-NOV-17	
	F3 (C16-C34)	<250		250	ug/L	10-NOV-17	500
	F3-PAH	<250		250	ug/L	10-NOV-17	
	F4 (C34-C50)	<250		250	ug/L	10-NOV-17	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
	Chrom. to baseline at nC50	YES			No Unit	10-NOV-17	
	Surrogate: 2-Bromobenzotrifluoride	84.5		60-140	%	10-NOV-17	
	Surrogate: 3,4-Dichlorotoluene	92.5		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Acenaphthylene	<0.020		0.020	ug/L	10-NOV-17	1
	Anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	10-NOV-17	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	10-NOV-17	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Chrysene	<0.020		0.020	ug/L	10-NOV-17	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	10-NOV-17	0.2
	Fluoranthene	<0.020		0.020	ug/L	10-NOV-17	0.41
	Fluorene	<0.020		0.020	ug/L	10-NOV-17	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	10-NOV-17	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	10-NOV-17	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	10-NOV-17	3.2
	Naphthalene	<0.050		0.050	ug/L	10-NOV-17	7
	Phenanthrene	<0.020		0.020	ug/L	10-NOV-17	1
	Pyrene	<0.020		0.020	ug/L	10-NOV-17	4.1
	Surrogate: d10-Acenaphthene	89.9		60-140	%	10-NOV-17	
	Surrogate: d12-Chrysene	81.1		60-140	%	10-NOV-17	
	Surrogate: d8-Naphthalene	81.6		60-140	%	10-NOV-17	
	Surrogate: d10-Phenanthrene	99.9		60-140	%	10-NOV-17	
L2017929-20	MW17-111S						
Sampled By:	CLIENT on 02-NOV-17 @ 11:58						
Matrix:	WATER						#1
Physical Tests							
	Conductivity	0.680		0.0030	mS/cm	07-NOV-17	
	pH	7.81		0.10	pH units	04-NOV-17	
Anions and Nutrients							
	Chloride (Cl)	12.9		0.50	mg/L	07-NOV-17	790
Cyanides							
	Cyanide, Weak Acid Diss	<2.0		2.0	ug/L	06-NOV-17	52
Dissolved Metals							
	Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
	Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-20	MW17-111S						
Sampled By:	CLIENT on 02-NOV-17 @ 11:58						
Matrix:	WATER						
Dissolved Metals							
	Antimony (Sb)-Dissolved	0.14		0.10	ug/L	07-NOV-17	6
	Arsenic (As)-Dissolved	3.15		0.10	ug/L	07-NOV-17	25
	Barium (Ba)-Dissolved	82.4		0.10	ug/L	07-NOV-17	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
	Boron (B)-Dissolved	76		10	ug/L	07-NOV-17	5000
	Cadmium (Cd)-Dissolved	0.119		0.010	ug/L	07-NOV-17	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
	Cobalt (Co)-Dissolved	0.37		0.10	ug/L	07-NOV-17	3.8
	Copper (Cu)-Dissolved	0.40		0.20	ug/L	07-NOV-17	69
	Lead (Pb)-Dissolved	0.263		0.050	ug/L	07-NOV-17	10
	Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
	Molybdenum (Mo)-Dissolved	3.25		0.050	ug/L	07-NOV-17	70
	Nickel (Ni)-Dissolved	2.00		0.50	ug/L	07-NOV-17	100
	Selenium (Se)-Dissolved	0.126		0.050	ug/L	07-NOV-17	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
	Sodium (Na)-Dissolved	7430		500	ug/L	07-NOV-17	490000
	Thallium (Tl)-Dissolved	0.115		0.010	ug/L	07-NOV-17	2
	Uranium (U)-Dissolved	2.36		0.010	ug/L	07-NOV-17	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
	Zinc (Zn)-Dissolved	304		1.0	ug/L	07-NOV-17	890
Speciated Metals							
	Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	08-NOV-17	2700
	Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
	Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
	Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
	Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
	Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
	Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
	1,1-Dichloroethane	2.64		0.50	ug/L	08-NOV-17	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
	Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2017929-20 MW17-111S						
Sampled By: CLIENT on 02-NOV-17 @ 11:58						
Matrix: WATER						#1
Volatile Organic Compounds						
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	4.51		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	97.0		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.8		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
F1-BTEX	<25		25	ug/L	10-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	10-NOV-17	150
F3 (C16-C34)	<250		250	ug/L	10-NOV-17	500
F4 (C34-C50)	<250		250	ug/L	10-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	10-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	10-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	82.2		60-140	%	10-NOV-17	
Surrogate: 3,4-Dichlorotoluene	101.3		60-140	%	08-NOV-17	
Polychlorinated Biphenyls						
Aroclor 1242	<0.020		0.020	ug/L	10-NOV-17	
Aroclor 1248	<0.020		0.020	ug/L	10-NOV-17	
Aroclor 1254	<0.020		0.020	ug/L	10-NOV-17	
Aroclor 1260	<0.020		0.020	ug/L	10-NOV-17	
Total PCBs	<0.040		0.040	ug/L	10-NOV-17	0.2
Surrogate: 2-fluorobiphenyl	80.4		50-150	%	10-NOV-17	
L2017929-21 MW17-103S						
Sampled By: CLIENT on 02-NOV-17 @ 13:32						
Matrix: WATER						#1
Physical Tests						
Conductivity	0.864		0.0030	mS/cm	04-NOV-17	
pH	7.63		0.10	pH units	04-NOV-17	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-21 MW17-103S						
Sampled By: CLIENT on 02-NOV-17 @ 13:32						
Matrix: WATER						
Anions and Nutrients						
Chloride (Cl)	6.86		0.50	mg/L	07-NOV-17	790
Cyanides						
Cyanide, Weak Acid Diss	<20	DLM	20	ug/L	07-NOV-17	52
Dissolved Metals						
Dissolved Mercury Filtration Location	FIELD			No Unit	06-NOV-17	
Dissolved Metals Filtration Location	FIELD			No Unit	06-NOV-17	
Antimony (Sb)-Dissolved	1.07		0.10	ug/L	07-NOV-17	6
Arsenic (As)-Dissolved	1.06		0.10	ug/L	07-NOV-17	25
Barium (Ba)-Dissolved	45.2		0.10	ug/L	07-NOV-17	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	07-NOV-17	4
Boron (B)-Dissolved	86		10	ug/L	07-NOV-17	5000
Cadmium (Cd)-Dissolved	0.083		0.010	ug/L	07-NOV-17	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	50
Cobalt (Co)-Dissolved	0.45		0.10	ug/L	07-NOV-17	3.8
Copper (Cu)-Dissolved	0.45		0.20	ug/L	07-NOV-17	69
Lead (Pb)-Dissolved	0.102		0.050	ug/L	07-NOV-17	10
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	06-NOV-17	0.1
Molybdenum (Mo)-Dissolved	2.46		0.050	ug/L	07-NOV-17	70
Nickel (Ni)-Dissolved	4.73		0.50	ug/L	07-NOV-17	100
Selenium (Se)-Dissolved	0.725		0.050	ug/L	07-NOV-17	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	07-NOV-17	1.2
Sodium (Na)-Dissolved	6540		500	ug/L	07-NOV-17	490000
Thallium (Tl)-Dissolved	0.055		0.010	ug/L	07-NOV-17	2
Uranium (U)-Dissolved	2.35		0.010	ug/L	07-NOV-17	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	07-NOV-17	6.2
Zinc (Zn)-Dissolved	315		1.0	ug/L	07-NOV-17	890
Speciated Metals						
Chromium, Hexavalent	<1.0		1.0	ug/L	12-NOV-17	25
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	<1.0		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-21 MW17-103S						
Sampled By: CLIENT on 02-NOV-17 @ 13:32						
Matrix: WATER						
Volatile Organic Compounds						
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	4.92		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	95.0		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	98.9		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420
F1-BTEX	<25		25	ug/L	13-NOV-17	420
F2 (C10-C16)	<100		100	ug/L	07-NOV-17	150
F2-Naphth	<100		100	ug/L	13-NOV-17	
F3 (C16-C34)	<250		250	ug/L	07-NOV-17	500
F3-PAH	<250		250	ug/L	13-NOV-17	
F4 (C34-C50)	<250		250	ug/L	07-NOV-17	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	13-NOV-17	
Chrom. to baseline at nC50	YES			No Unit	07-NOV-17	
Surrogate: 2-Bromobenzotrifluoride	104.5		60-140	%	07-NOV-17	
Surrogate: 3,4-Dichlorotoluene	83.3		60-140	%	08-NOV-17	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	08-NOV-17	4.1
Acenaphthylene	<0.020		0.020	ug/L	08-NOV-17	1
Anthracene	<0.020		0.020	ug/L	08-NOV-17	1
Benzo(a)anthracene	<0.020		0.020	ug/L	08-NOV-17	1
Benzo(a)pyrene	<0.010		0.010	ug/L	08-NOV-17	0.01

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-21 MW17-103S						
Sampled By: CLIENT on 02-NOV-17 @ 13:32						
Matrix: WATER						
Polycyclic Aromatic Hydrocarbons						
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-NOV-17	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-NOV-17	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-NOV-17	0.1
Chrysene	<0.020		0.020	ug/L	08-NOV-17	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-NOV-17	0.2
Fluoranthene	<0.020		0.020	ug/L	08-NOV-17	0.41
Fluorene	<0.020		0.020	ug/L	08-NOV-17	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-NOV-17	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	13-NOV-17	3.2
1-Methylnaphthalene	<0.020		0.020	ug/L	08-NOV-17	3.2
2-Methylnaphthalene	<0.020		0.020	ug/L	08-NOV-17	3.2
Naphthalene	<0.050		0.050	ug/L	08-NOV-17	7
Phenanthrene	<0.020		0.020	ug/L	08-NOV-17	1
Pyrene	<0.020		0.020	ug/L	08-NOV-17	4.1
Surrogate: d10-Acenaphthene	88.9		60-140	%	08-NOV-17	
Surrogate: d12-Chrysene	74.0		60-140	%	08-NOV-17	
Surrogate: d8-Naphthalene	102.4		60-140	%	08-NOV-17	
Surrogate: d10-Phenanthrene	108.4		60-140	%	08-NOV-17	
Semi-Volatile Organics						
Biphenyl	<0.40		0.40	ug/L	13-NOV-17	0.5
4-Chloroaniline	<0.40		0.40	ug/L	13-NOV-17	10
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	13-NOV-17	5
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	13-NOV-17	120
2-Chlorophenol	<0.30		0.30	ug/L	13-NOV-17	8.9
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	13-NOV-17	0.5
2,4-Dichlorophenol	<0.30		0.30	ug/L	13-NOV-17	20
Diethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
Dimethylphthalate	<0.20		0.20	ug/L	13-NOV-17	30
2,4-Dimethylphenol	<0.50		0.50	ug/L	13-NOV-17	59
2,4-Dinitrophenol	<1.0		1.0	ug/L	13-NOV-17	10
2,4-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,6-Dinitrotoluene	<0.40		0.40	ug/L	13-NOV-17	5
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L	13-NOV-17	
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	13-NOV-17	10
Pentachlorophenol	<0.50		0.50	ug/L	13-NOV-17	30
Phenanthrene	<0.20		0.20	ug/L	13-NOV-17	1
Phenol	<0.50		0.50	ug/L	13-NOV-17	890
Pyrene	<0.20		0.20	ug/L	13-NOV-17	4.1
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	13-NOV-17	3
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	8.9
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	13-NOV-17	2
Surrogate: 2-Fluorobiphenyl	87.7		50-140	%	13-NOV-17	
Surrogate: Nitrobenzene d5	89.3		50-140	%	13-NOV-17	
Surrogate: Phenol d5	41.7		30-130	%	13-NOV-17	
Surrogate: p-Terphenyl d14	92.1		60-140	%	13-NOV-17	
Surrogate: 2,4,6-Tribromophenol	93.0		50-140	%	13-NOV-17	

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2017929-22	MW17-103D									
Sampled By:	CLIENT on 02-NOV-17 @ 14:54									
Matrix:	WATER						#1			
Volatile Organic Compounds										
Acetone		<30		30	ug/L	08-NOV-17	2700			
Benzene		<0.50		0.50	ug/L	08-NOV-17	0.5			
Bromodichloromethane		<2.0		2.0	ug/L	08-NOV-17	16			
Bromoform		<5.0		5.0	ug/L	08-NOV-17	5			
Bromomethane		<0.50		0.50	ug/L	08-NOV-17	0.89			
Carbon tetrachloride		<0.20		0.20	ug/L	08-NOV-17	0.2			
Chlorobenzene		<0.50		0.50	ug/L	08-NOV-17	30			
Dibromochloromethane		<2.0		2.0	ug/L	08-NOV-17	25			
Chloroform		<1.0		1.0	ug/L	08-NOV-17	2			
1,2-Dibromoethane		<0.20		0.20	ug/L	08-NOV-17	0.2			
1,2-Dichlorobenzene		<0.50		0.50	ug/L	08-NOV-17	3			
1,3-Dichlorobenzene		<0.50		0.50	ug/L	08-NOV-17	59			
1,4-Dichlorobenzene		<0.50		0.50	ug/L	08-NOV-17	0.5			
Dichlorodifluoromethane		<2.0		2.0	ug/L	08-NOV-17	590			
1,1-Dichloroethane		<0.50		0.50	ug/L	08-NOV-17	5			
1,2-Dichloroethane		<0.50		0.50	ug/L	08-NOV-17	0.5			
1,1-Dichloroethylene		<0.50		0.50	ug/L	08-NOV-17	0.5			
cis-1,2-Dichloroethylene		<0.50		0.50	ug/L	08-NOV-17	1.6			
trans-1,2-Dichloroethylene		<0.50		0.50	ug/L	08-NOV-17	1.6			
Methylene Chloride		<5.0		5.0	ug/L	08-NOV-17	26			
1,2-Dichloropropane		<0.50		0.50	ug/L	08-NOV-17	0.58			
cis-1,3-Dichloropropene		<0.30		0.30	ug/L	08-NOV-17				
trans-1,3-Dichloropropene		<0.30		0.30	ug/L	08-NOV-17				
1,3-Dichloropropene (cis & trans)		<0.50		0.50	ug/L	09-NOV-17	0.5			
Ethylbenzene		<0.50		0.50	ug/L	08-NOV-17	2.4			
n-Hexane		<0.50		0.50	ug/L	08-NOV-17	5			
Methyl Ethyl Ketone		<20		20	ug/L	08-NOV-17	1800			
Methyl Isobutyl Ketone		<20		20	ug/L	08-NOV-17	640			
MTBE		<2.0		2.0	ug/L	08-NOV-17	15			
Styrene		<0.50		0.50	ug/L	08-NOV-17	5.4			
1,1,1,2-Tetrachloroethane		<0.50		0.50	ug/L	08-NOV-17	1.1			
1,1,2,2-Tetrachloroethane		<0.50		0.50	ug/L	08-NOV-17	0.5			
Tetrachloroethylene		<0.50		0.50	ug/L	08-NOV-17	0.5			
Toluene		<0.50		0.50	ug/L	08-NOV-17	24			
1,1,1-Trichloroethane		<0.50		0.50	ug/L	08-NOV-17	23			
1,1,2-Trichloroethane		<0.50		0.50	ug/L	08-NOV-17	0.5			
Trichloroethylene		<0.50		0.50	ug/L	08-NOV-17	0.5			
Trichlorofluoromethane		<5.0		5.0	ug/L	08-NOV-17	150			
Vinyl chloride		<0.50		0.50	ug/L	08-NOV-17	0.5			
o-Xylene		<0.30		0.30	ug/L	08-NOV-17				
m+p-Xylenes		<0.40		0.40	ug/L	08-NOV-17				
Xylenes (Total)		<0.50		0.50	ug/L	08-NOV-17	72			
Surrogate: 4-Bromofluorobenzene		97.2		70-130	%	08-NOV-17				
Surrogate: 1,4-Difluorobenzene		98.2		70-130	%	08-NOV-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2017929-23 MW17-102D						
Sampled By: CLIENT on 02-NOV-17 @ 10:59						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-NOV-17	2700
Benzene	1.18		0.50	ug/L	08-NOV-17	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-NOV-17	16
Bromoform	<5.0		5.0	ug/L	08-NOV-17	5
Bromomethane	<0.50		0.50	ug/L	08-NOV-17	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-NOV-17	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-NOV-17	30
Dibromochloromethane	<2.0		2.0	ug/L	08-NOV-17	25
Chloroform	1.5		1.0	ug/L	08-NOV-17	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-NOV-17	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-NOV-17	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-NOV-17	590
1,1-Dichloroethane	1.72		0.50	ug/L	08-NOV-17	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
cis-1,2-Dichloroethylene	5.36		0.50	ug/L	08-NOV-17	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-NOV-17	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-NOV-17	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-NOV-17	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-NOV-17	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-NOV-17	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-NOV-17	2.4
n-Hexane	<0.50		0.50	ug/L	08-NOV-17	5
Methyl Ethyl Ketone	<20		20	ug/L	08-NOV-17	1800
Methyl Isobutyl Ketone	<20		20	ug/L	08-NOV-17	640
MTBE	<2.0		2.0	ug/L	08-NOV-17	15
Styrene	<0.50		0.50	ug/L	08-NOV-17	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Toluene	<0.50		0.50	ug/L	08-NOV-17	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichloroethylene	<0.50		0.50	ug/L	08-NOV-17	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	08-NOV-17	150
Vinyl chloride	<0.50		0.50	ug/L	08-NOV-17	0.5
o-Xylene	<0.30		0.30	ug/L	08-NOV-17	
m+p-Xylenes	<0.40		0.40	ug/L	08-NOV-17	
Xylenes (Total)	<0.50		0.50	ug/L	08-NOV-17	72
Surrogate: 4-Bromofluorobenzene	94.0		70-130	%	08-NOV-17	
Surrogate: 1,4-Difluorobenzene	97.1		70-130	%	08-NOV-17	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	08-NOV-17	420

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2017929-23 MW17-102D Sampled By: CLIENT on 02-NOV-17 @ 10:59 Matrix: WATER									
Hydrocarbons									
F1-BTEX	<25		25	ug/L	08-NOV-17	420			
F2 (C10-C16)	<100		100	ug/L	07-NOV-17	150			
F3 (C16-C34)	<250		250	ug/L	07-NOV-17	500			
F4 (C34-C50)	<250		250	ug/L	07-NOV-17	500			
Total Hydrocarbons (C6-C50)	<370		370	ug/L	08-NOV-17				
Chrom. to baseline at nC50	YES			No Unit	07-NOV-17				
Surrogate: 2-Bromobenzotrifluoride	100.9		60-140	%	07-NOV-17				
Surrogate: 3,4-Dichlorotoluene	89.7		60-140	%	08-NOV-17				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
G	QC result did not meet ALS DQO. Refer to narrative comments for further information.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
1,4-DIOXANE-WT	Water	1,4-Dioxane by Headspace GC/MS	SW846 8260

An aliquot of the sample is analyzed directly by headspace technology, followed by GC/MS using isotopic dilution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT	Water	Diss. Mercury in Water by CVAAS (ug/L)	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Water	PCB-O. Reg 153/04 (July 2011)	SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-617075 17-617076 17-617082

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
1,4-DIOXANE-WT	**Water**							
Batch R3877348								
WG2656313-4 DUP		**WG2656313-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	07-NOV-17
WG2656313-1 LCS								
1,4-Dioxane			99.5		%		60-140	07-NOV-17
WG2656313-2 MB								
1,4-Dioxane			<20		ug/L		20	07-NOV-17
WG2656313-5 MS		**WG2656313-3**						
1,4-Dioxane			93.8		%		50-140	07-NOV-17
Batch R3878599								
WG2655329-4 DUP		**WG2655329-3**						
1,4-Dioxane		<20	<20	RPD-NA	ug/L	N/A	30	08-NOV-17
WG2655329-1 LCS								
1,4-Dioxane			94.4		%		60-140	08-NOV-17
WG2655329-2 MB								
1,4-Dioxane			<20		ug/L		20	08-NOV-17
WG2655329-5 MS		**WG2655329-3**						
1,4-Dioxane			90.4		%		50-140	08-NOV-17
625-511-WT	**Water**							
Batch R3880598								
WG2659189-2 LCS								
1,2,4-Trichlorobenzene			92.5		%		50-140	10-NOV-17
2-Chlorophenol			85.4		%		50-140	10-NOV-17
2,4-Dichlorophenol			92.7		%		50-140	10-NOV-17
2,4-Dimethylphenol			63.0		%		30-130	10-NOV-17
2,4-Dinitrophenol			129.3		%		50-140	10-NOV-17
2,4-Dinitrotoluene			100.4		%		50-140	10-NOV-17
2,4,5-Trichlorophenol			98.3		%		50-140	10-NOV-17
2,4,6-Trichlorophenol			98.8		%		50-140	10-NOV-17
2,6-Dinitrotoluene			100.6		%		50-140	10-NOV-17
3,3'-Dichlorobenzidine			72.3		%		30-130	10-NOV-17
4-Chloroaniline			47.3		%		30-130	10-NOV-17
Biphenyl			93.5		%		50-140	10-NOV-17
Bis(2-chloroethyl)ether			96.8		%		50-140	10-NOV-17
Bis(2-chloroisopropyl)ether			97.7		%		50-140	10-NOV-17
Bis(2-ethylhexyl)phthalate			97.1		%		50-140	10-NOV-17
Diethylphthalate			88.7		%		50-140	10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3880598								
WG2659189-2 LCS								
Dimethylphthalate			89.3		%		50-140	10-NOV-17
Pentachlorophenol			135.3		%		50-140	10-NOV-17
Phenanthrene			101.6		%		50-140	10-NOV-17
Phenol			48.1		%		30-130	10-NOV-17
Pyrene			106.3		%		50-140	10-NOV-17
WG2659189-3 LCSD		**WG2659189-2**						
1,2,4-Trichlorobenzene		92.5	98.2		%	6.1	50	10-NOV-17
2-Chlorophenol		85.4	85.6		%	0.3	50	10-NOV-17
2,4-Dichlorophenol		92.7	94.9		%	2.3	50	10-NOV-17
2,4-Dimethylphenol		63.0	61.7		%	2.1	50	10-NOV-17
2,4-Dinitrophenol		129.3	110.9		%	15	50	10-NOV-17
2,4-Dinitrotoluene		100.4	106.6		%	6.0	50	10-NOV-17
2,4,5-Trichlorophenol		98.3	92.9		%	5.6	50	10-NOV-17
2,4,6-Trichlorophenol		98.8	90.7		%	8.6	50	10-NOV-17
2,6-Dinitrotoluene		100.6	96.6		%	4.0	50	10-NOV-17
3,3'-Dichlorobenzidine		72.3	73.1		%	1.2	50	10-NOV-17
4-Chloroaniline		47.3	56.8		%	18	50	10-NOV-17
Biphenyl		93.5	89.6		%	4.3	50	10-NOV-17
Bis(2-chloroethyl)ether		96.8	97.0		%	0.2	50	10-NOV-17
Bis(2-chloroisopropyl)ether		97.7	95.8		%	2.0	50	10-NOV-17
Bis(2-ethylhexyl)phthalate		97.1	96.4		%	0.6	50	10-NOV-17
Diethylphthalate		88.7	95.5		%	7.4	50	10-NOV-17
Dimethylphthalate		89.3	85.0		%	4.9	50	10-NOV-17
Pentachlorophenol		135.3	129.2		%	4.6	50	10-NOV-17
Phenanthrene		101.6	100.3		%	1.2	50	10-NOV-17
Phenol		48.1	49.4		%	2.8	50	10-NOV-17
Pyrene		106.3	99.9		%	6.3	50	10-NOV-17
WG2659189-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	10-NOV-17
2-Chlorophenol			<0.30		ug/L		0.3	10-NOV-17
2,4-Dichlorophenol			<0.30		ug/L		0.3	10-NOV-17
2,4-Dimethylphenol			<0.50		ug/L		0.5	10-NOV-17
2,4-Dinitrophenol			<1.0		ug/L		1	10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R3880598								
WG2659189-1 MB								
2,4-Dinitrotoluene			<0.40		ug/L		0.4	10-NOV-17
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	10-NOV-17
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	10-NOV-17
2,6-Dinitrotoluene			<0.40		ug/L		0.4	10-NOV-17
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	10-NOV-17
4-Chloroaniline			<0.40		ug/L		0.4	10-NOV-17
Biphenyl			<0.40		ug/L		0.4	10-NOV-17
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	10-NOV-17
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	10-NOV-17
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	10-NOV-17
Diethylphthalate			<0.20		ug/L		0.2	10-NOV-17
Dimethylphthalate			<0.20		ug/L		0.2	10-NOV-17
Pentachlorophenol			<0.50		ug/L		0.5	10-NOV-17
Phenanthrene			<0.20		ug/L		0.2	10-NOV-17
Phenol			<0.50		ug/L		0.5	10-NOV-17
Pyrene			<0.20		ug/L		0.2	10-NOV-17
Surrogate: 2-Fluorobiphenyl			99.7		%		50-140	10-NOV-17
Surrogate: 2,4,6-Tribromophenol			90.7		%		50-140	10-NOV-17
Surrogate: Nitrobenzene d5			95.0		%		50-140	10-NOV-17
Surrogate: p-Terphenyl d14			98.9		%		60-140	10-NOV-17
Surrogate: Phenol d5			40.6		%		30-130	10-NOV-17
CL-IC-N-WT	**Water**							
Batch R3879095								
WG2658468-10 DUP		**WG2658468-8**						
Chloride (Cl)		142	142		mg/L	0.0	20	07-NOV-17
WG2658468-4 DUP		**WG2658468-3**						
Chloride (Cl)		12.1	12.1		mg/L	0.1	20	07-NOV-17
WG2658468-2 LCS								
Chloride (Cl)			100.8		%		90-110	07-NOV-17
WG2658468-7 LCS								
Chloride (Cl)			101.6		%		90-110	07-NOV-17
WG2658468-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-NOV-17
WG2658468-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-WT	**Water**							
Batch R3879095								
WG2658468-5 MS		**WG2658468-3**						
Chloride (Cl)			102.7		%		75-125	07-NOV-17
WG2658468-9 MS		**WG2658468-8**						
Chloride (Cl)			N/A	MS-B	%		-	07-NOV-17
CN-WAD-R511-WT	**Water**							
Batch R3877813								
WG2656230-12 DUP		**L2017929-1**						
Cyanide, Weak Acid Diss		<20	<20	RPD-NA	ug/L	N/A	20	06-NOV-17
WG2656230-7 DUP		**L2015391-20**						
Cyanide, Weak Acid Diss		<20	<20	RPD-NA	ug/L	N/A	20	06-NOV-17
WG2656230-10 LCS								
Cyanide, Weak Acid Diss			95.3		%		80-120	06-NOV-17
WG2656230-6 LCS								
Cyanide, Weak Acid Diss			99.2		%		80-120	06-NOV-17
WG2656230-5 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	06-NOV-17
WG2656230-9 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	06-NOV-17
WG2656230-11 MS		**L2017929-1**						
Cyanide, Weak Acid Diss			94.3		%		70-130	06-NOV-17
WG2656230-8 MS		**L2015391-20**						
Cyanide, Weak Acid Diss			104.2		%		70-130	06-NOV-17
Batch R3878669								
WG2658598-3 DUP		**L2017929-21**						
Cyanide, Weak Acid Diss		<20	<20	RPD-NA	ug/L	N/A	20	07-NOV-17
WG2658598-2 LCS								
Cyanide, Weak Acid Diss			100.1		%		80-120	07-NOV-17
WG2658598-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	07-NOV-17
WG2658598-4 MS		**L2017929-21**						
Cyanide, Weak Acid Diss			101.5		%		70-130	07-NOV-17
CR-CR6-IC-R511-WT	**Water**							
Batch R3880520								
WG2661493-4 DUP		**WG2661493-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	09-NOV-17
WG2661493-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	09-NOV-17
WG2661493-5 MS		**WG2661493-3**						

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-R511-WT	**Water**							
Batch R3880520								
WG2661493-5 MS		**WG2661493-3**						
Chromium, Hexavalent			100.0		%		70-130	09-NOV-17
Batch R3882653								
WG2662287-4 DUP		**WG2662287-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	12-NOV-17
WG2662287-2 LCS								
Chromium, Hexavalent			99.5		%		80-120	12-NOV-17
WG2662287-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	12-NOV-17
WG2662287-5 MS		**WG2662287-3**						
Chromium, Hexavalent			97.8		%		70-130	12-NOV-17
EC-R511-WT	**Water**							
Batch R3876968								
WG2656900-12 DUP		**WG2656900-11**						
Conductivity		2.44	2.46		mS/cm	0.8	10	04-NOV-17
WG2656900-4 DUP		**WG2656900-3**						
Conductivity		1.14	1.14		mS/cm	0.0	10	04-NOV-17
WG2656900-8 DUP		**WG2656900-7**						
Conductivity		1.48	1.48		mS/cm	0.3	10	04-NOV-17
WG2656900-10 LCS								
Conductivity			104.5		%		90-110	04-NOV-17
WG2656900-2 LCS								
Conductivity			107.7		%		90-110	04-NOV-17
WG2656900-1 MB								
Conductivity			<0.0030		mS/cm		0.003	04-NOV-17
WG2656900-5 MB								
Conductivity			<0.0030		mS/cm		0.003	04-NOV-17
WG2656900-9 MB								
Conductivity			<0.0030		mS/cm		0.003	04-NOV-17
Batch R3878152								
WG2658721-4 DUP		**WG2658721-3**						
Conductivity		1.08	1.08		mS/cm	0.0	10	07-NOV-17
WG2658721-2 LCS								
Conductivity			102.8		%		90-110	07-NOV-17
WG2658721-1 MB								
Conductivity			<0.0030		mS/cm		0.003	07-NOV-17
F1-HS-511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R3877348								
WG2656313-4 DUP		**WG2656313-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	07-NOV-17
WG2656313-1 LCS								
F1 (C6-C10)			105.4		%		80-120	07-NOV-17
WG2656313-2 MB								
F1 (C6-C10)			<25		ug/L		25	07-NOV-17
Surrogate: 3,4-Dichlorotoluene			117.4		%		60-140	07-NOV-17
WG2656313-5 MS		**WG2656313-3**						
F1 (C6-C10)			77.8		%		60-140	07-NOV-17
Batch R3878513								
WG2654802-4 DUP		**WG2654802-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	08-NOV-17
WG2654802-1 LCS								
F1 (C6-C10)			99.5		%		80-120	07-NOV-17
WG2654802-2 MB								
F1 (C6-C10)			<25		ug/L		25	08-NOV-17
Surrogate: 3,4-Dichlorotoluene			102.3		%		60-140	08-NOV-17
WG2654802-5 MS		**WG2654802-3**						
F1 (C6-C10)			93.3		%		60-140	08-NOV-17
Batch R3878599								
WG2655329-1 LCS								
F1 (C6-C10)			108.7		%		80-120	08-NOV-17
WG2655329-2 MB								
F1 (C6-C10)			<25		ug/L		25	08-NOV-17
Surrogate: 3,4-Dichlorotoluene			106.5		%		60-140	08-NOV-17
WG2655329-5 MS		**WG2655329-3**						
F1 (C6-C10)			N/A	MS-B	%		-	08-NOV-17
F2-F4-511-WT	**Water**							
Batch R3878572								
WG2658302-2 LCS								
F2 (C10-C16)			110.0		%		70-130	07-NOV-17
F3 (C16-C34)			115.5		%		70-130	07-NOV-17
F4 (C34-C50)			116.6		%		70-130	07-NOV-17
WG2658302-3 LCSD		**WG2658302-2**						
F2 (C10-C16)		110.0	111.5		%	1.3	50	07-NOV-17
F3 (C16-C34)		115.5	113.9		%	1.4	50	07-NOV-17
F4 (C34-C50)		116.6	116.3		%	0.2	50	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R3878572								
WG2658302-1 MB								
F2 (C10-C16)			<100		ug/L		100	07-NOV-17
F3 (C16-C34)			<250		ug/L		250	07-NOV-17
F4 (C34-C50)			<250		ug/L		250	07-NOV-17
Surrogate: 2-Bromobenzotrifluoride			99.5		%		60-140	07-NOV-17
Batch R3879654								
WG2659233-2 LCS								
F2 (C10-C16)			101.2		%		70-130	08-NOV-17
F3 (C16-C34)			104.2		%		70-130	08-NOV-17
F4 (C34-C50)			103.2		%		70-130	08-NOV-17
WG2659233-3 LCSD		**WG2659233-2**						
F2 (C10-C16)		101.2	102.1		%	0.9	50	08-NOV-17
F3 (C16-C34)		104.2	108.5		%	4.0	50	08-NOV-17
F4 (C34-C50)		103.2	108.2		%	4.7	50	08-NOV-17
WG2659233-1 MB								
F2 (C10-C16)			<100		ug/L		100	08-NOV-17
F3 (C16-C34)			<250		ug/L		250	08-NOV-17
F4 (C34-C50)			<250		ug/L		250	08-NOV-17
Surrogate: 2-Bromobenzotrifluoride			65.9		%		60-140	08-NOV-17
Batch R3880500								
WG2659241-2 LCS								
F2 (C10-C16)			109.5		%		70-130	10-NOV-17
F3 (C16-C34)			112.5		%		70-130	10-NOV-17
F4 (C34-C50)			116.7		%		70-130	10-NOV-17
WG2659241-3 LCSD		**WG2659241-2**						
F2 (C10-C16)		109.5	114.2		%	4.2	50	10-NOV-17
F3 (C16-C34)		112.5	121.3		%	7.5	50	10-NOV-17
F4 (C34-C50)		116.7	125.0		%	6.9	50	10-NOV-17
WG2659241-1 MB								
F2 (C10-C16)			<100		ug/L		100	10-NOV-17
F3 (C16-C34)			<250		ug/L		250	10-NOV-17
F4 (C34-C50)			<250		ug/L		250	10-NOV-17
Surrogate: 2-Bromobenzotrifluoride			79.8		%		60-140	10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R3883007								
WG2662466-2 LCS								
F2 (C10-C16)			95.5		%		70-130	13-NOV-17
F3 (C16-C34)			100.1		%		70-130	13-NOV-17
F4 (C34-C50)			101.3		%		70-130	13-NOV-17
WG2662466-3 LCSD		**WG2662466-2**						
F2 (C10-C16)		95.5	102.8		%	7.4	50	13-NOV-17
F3 (C16-C34)		100.1	105.1		%	4.9	50	13-NOV-17
F4 (C34-C50)		101.3	110.1		%	8.3	50	13-NOV-17
WG2662466-1 MB								
F2 (C10-C16)			<100		ug/L		100	13-NOV-17
F3 (C16-C34)			<250		ug/L		250	13-NOV-17
F4 (C34-C50)			<250		ug/L		250	13-NOV-17
Surrogate: 2-Bromobenzotrifluoride			97.1		%		60-140	13-NOV-17
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3875259								
WG2657406-4 DUP		**WG2657406-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	06-NOV-17
WG2657406-2 LCS								
Mercury (Hg)-Dissolved			103.0		%		80-120	06-NOV-17
WG2657406-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	06-NOV-17
WG2657406-6 MS		**WG2657406-5**						
Mercury (Hg)-Dissolved			91.4		%		70-130	06-NOV-17
Batch R3875260								
WG2657408-4 DUP		**WG2657408-3**						
Mercury (Hg)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	06-NOV-17
WG2657408-2 LCS								
Mercury (Hg)-Dissolved			104.0		%		80-120	06-NOV-17
WG2657408-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	06-NOV-17
WG2657408-6 MS		**WG2657408-5**						
Mercury (Hg)-Dissolved			86.6		%		70-130	06-NOV-17
MET-D-UG/L-MS-WT	**Water**							
Batch R3878040								
WG2657255-4 DUP		**WG2657255-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	07-NOV-17
Arsenic (As)-Dissolved		<0.10	0.11					

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3878040								
WG2657255-4 DUP		**WG2657255-3**						
Arsenic (As)-Dissolved		<0.10	0.11	RPD-NA	ug/L	N/A	20	07-NOV-17
Barium (Ba)-Dissolved		220	221		ug/L	0.7	20	07-NOV-17
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	07-NOV-17
Boron (B)-Dissolved		78	78		ug/L	0.2	20	07-NOV-17
Cadmium (Cd)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	07-NOV-17
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	07-NOV-17
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	07-NOV-17
Copper (Cu)-Dissolved		7.53	7.48		ug/L	0.6	20	07-NOV-17
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	07-NOV-17
Molybdenum (Mo)-Dissolved		0.140	0.125		ug/L	12	20	07-NOV-17
Nickel (Ni)-Dissolved		0.60	0.55		ug/L	8.9	20	07-NOV-17
Selenium (Se)-Dissolved		0.071	<0.050	RPD-NA	ug/L	N/A	20	07-NOV-17
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	07-NOV-17
Sodium (Na)-Dissolved		25600	25500		ug/L	0.4	20	07-NOV-17
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	07-NOV-17
Uranium (U)-Dissolved		0.372	0.379		ug/L	1.7	20	07-NOV-17
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	07-NOV-17
Zinc (Zn)-Dissolved		3.4	3.5		ug/L	4.0	20	07-NOV-17
WG2657255-2 LCS								
Antimony (Sb)-Dissolved			99.1		%		80-120	06-NOV-17
Arsenic (As)-Dissolved			103.0		%		80-120	06-NOV-17
Barium (Ba)-Dissolved			102.5		%		80-120	06-NOV-17
Beryllium (Be)-Dissolved			91.8		%		80-120	06-NOV-17
Boron (B)-Dissolved			91.5		%		80-120	06-NOV-17
Cadmium (Cd)-Dissolved			95.3		%		80-120	06-NOV-17
Chromium (Cr)-Dissolved			101.1		%		80-120	06-NOV-17
Cobalt (Co)-Dissolved			100.6		%		80-120	06-NOV-17
Copper (Cu)-Dissolved			99.2		%		80-120	06-NOV-17
Lead (Pb)-Dissolved			104.9		%		80-120	06-NOV-17
Molybdenum (Mo)-Dissolved			97.0		%		80-120	06-NOV-17
Nickel (Ni)-Dissolved			100.3		%		80-120	06-NOV-17
Selenium (Se)-Dissolved			99.1		%		80-120	06-NOV-17
Silver (Ag)-Dissolved			97.2		%		80-120	06-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3878040								
WG2657255-2 LCS								
Sodium (Na)-Dissolved			100.1		%		80-120	06-NOV-17
Thallium (Tl)-Dissolved			103.8		%		80-120	06-NOV-17
Uranium (U)-Dissolved			107.7		%		80-120	06-NOV-17
Vanadium (V)-Dissolved			103.3		%		80-120	06-NOV-17
Zinc (Zn)-Dissolved			94.2		%		80-120	06-NOV-17
WG2657255-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	06-NOV-17
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	06-NOV-17
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	06-NOV-17
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	06-NOV-17
Boron (B)-Dissolved			<10		ug/L		10	06-NOV-17
Cadmium (Cd)-Dissolved			<0.010		ug/L		0.01	06-NOV-17
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	06-NOV-17
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	06-NOV-17
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	06-NOV-17
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	06-NOV-17
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	06-NOV-17
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	06-NOV-17
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	06-NOV-17
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	06-NOV-17
Sodium (Na)-Dissolved			<500		ug/L		500	06-NOV-17
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	06-NOV-17
Uranium (U)-Dissolved			<0.010		ug/L		0.01	06-NOV-17
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	06-NOV-17
Zinc (Zn)-Dissolved			<1.0		ug/L		1	06-NOV-17
WG2657255-5 MS		**WG2657255-3**						
Antimony (Sb)-Dissolved			95.9		%		70-130	07-NOV-17
Arsenic (As)-Dissolved			103.1		%		70-130	07-NOV-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	07-NOV-17
Beryllium (Be)-Dissolved			100.4		%		70-130	07-NOV-17
Boron (B)-Dissolved			N/A	MS-B	%		-	07-NOV-17
Cadmium (Cd)-Dissolved			100.9		%		70-130	07-NOV-17
Chromium (Cr)-Dissolved			97.5		%		70-130	07-NOV-17
Cobalt (Co)-Dissolved			94.1		%		70-130	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3878040								
WG2657255-5 MS		**WG2657255-3**						
Copper (Cu)-Dissolved			87.7		%		70-130	07-NOV-17
Lead (Pb)-Dissolved			96.9		%		70-130	07-NOV-17
Molybdenum (Mo)-Dissolved			101.0		%		70-130	07-NOV-17
Nickel (Ni)-Dissolved			93.7		%		70-130	07-NOV-17
Selenium (Se)-Dissolved			101.2		%		70-130	07-NOV-17
Silver (Ag)-Dissolved			95.5		%		70-130	07-NOV-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	07-NOV-17
Thallium (Tl)-Dissolved			98.2		%		70-130	07-NOV-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	07-NOV-17
Vanadium (V)-Dissolved			100.2		%		70-130	07-NOV-17
Zinc (Zn)-Dissolved			97.1		%		70-130	07-NOV-17
PAH-511-WT	**Water**							
Batch R3879132								
WG2658302-2 LCS								
1-Methylnaphthalene			74.6		%		50-140	08-NOV-17
2-Methylnaphthalene			71.8		%		50-140	08-NOV-17
Acenaphthene			73.9		%		50-140	08-NOV-17
Acenaphthylene			88.2		%		50-140	08-NOV-17
Anthracene			96.2		%		50-140	08-NOV-17
Benzo(a)anthracene			92.0		%		50-140	08-NOV-17
Benzo(a)pyrene			90.2		%		50-140	08-NOV-17
Benzo(b)fluoranthene			69.4		%		50-140	08-NOV-17
Benzo(g,h,i)perylene			106.8		%		50-140	08-NOV-17
Benzo(k)fluoranthene			74.4		%		50-140	08-NOV-17
Chrysene			92.0		%		50-140	08-NOV-17
Dibenzo(ah)anthracene			96.2		%		50-140	08-NOV-17
Fluoranthene			91.0		%		50-140	08-NOV-17
Fluorene			91.4		%		50-140	08-NOV-17
Indeno(1,2,3-cd)pyrene			109.0		%		50-140	08-NOV-17
Naphthalene			83.3		%		50-140	08-NOV-17
Phenanthrene			94.6		%		50-140	08-NOV-17
Pyrene			99.4		%		50-140	08-NOV-17
WG2658302-3 LCSD		**WG2658302-2**						
1-Methylnaphthalene		74.6	83.4		%	11	50	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3879132								
WG2658302-3 LCSD		**WG2658302-2**						
2-Methylnaphthalene		71.8	80.4		%	11	50	08-NOV-17
Acenaphthene		73.9	77.5		%	4.8	50	08-NOV-17
Acenaphthylene		88.2	91.0		%	3.1	50	08-NOV-17
Anthracene		96.2	98.8		%	2.6	50	08-NOV-17
Benzo(a)anthracene		92.0	88.8		%	3.5	50	08-NOV-17
Benzo(a)pyrene		90.2	95.1		%	5.3	50	08-NOV-17
Benzo(b)fluoranthene		69.4	75.4		%	8.4	50	08-NOV-17
Benzo(g,h,i)perylene		106.8	108.4		%	1.5	50	08-NOV-17
Benzo(k)fluoranthene		74.4	81.4		%	8.9	50	08-NOV-17
Chrysene		92.0	87.8		%	4.7	50	08-NOV-17
Dibenzo(ah)anthracene		96.2	93.6		%	2.7	50	08-NOV-17
Fluoranthene		91.0	92.2		%	1.2	50	08-NOV-17
Fluorene		91.4	90.0		%	1.5	50	08-NOV-17
Indeno(1,2,3-cd)pyrene		109.0	110.5		%	1.4	50	08-NOV-17
Naphthalene		83.3	89.8		%	7.5	50	08-NOV-17
Phenanthrene		94.6	95.0		%	0.3	50	08-NOV-17
Pyrene		99.4	86.5		%	14	50	08-NOV-17
WG2658302-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	08-NOV-17
2-Methylnaphthalene			<0.020		ug/L		0.02	08-NOV-17
Acenaphthene			<0.020		ug/L		0.02	08-NOV-17
Acenaphthylene			<0.020		ug/L		0.02	08-NOV-17
Anthracene			<0.020		ug/L		0.02	08-NOV-17
Benzo(a)anthracene			<0.020		ug/L		0.02	08-NOV-17
Benzo(a)pyrene			<0.010		ug/L		0.01	08-NOV-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	08-NOV-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	08-NOV-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	08-NOV-17
Chrysene			<0.020		ug/L		0.02	08-NOV-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	08-NOV-17
Fluoranthene			<0.020		ug/L		0.02	08-NOV-17
Fluorene			<0.020		ug/L		0.02	08-NOV-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3879132								
WG2658302-1 MB								
Naphthalene			<0.050		ug/L		0.05	08-NOV-17
Phenanthrene			<0.020		ug/L		0.02	08-NOV-17
Pyrene			<0.020		ug/L		0.02	08-NOV-17
Surrogate: d8-Naphthalene			95.1		%		60-140	08-NOV-17
Surrogate: d10-Phenanthrene			107.6		%		60-140	08-NOV-17
Surrogate: d12-Chrysene			87.2		%		60-140	08-NOV-17
Surrogate: d10-Acenaphthene			86.8		%		60-140	08-NOV-17
Batch R3880495								
WG2659233-2 LCS								
1-Methylnaphthalene			78.1		%		50-140	10-NOV-17
2-Methylnaphthalene			83.4		%		50-140	10-NOV-17
Acenaphthene			86.5		%		50-140	10-NOV-17
Acenaphthylene			89.8		%		50-140	10-NOV-17
Anthracene			90.2		%		50-140	10-NOV-17
Benzo(a)anthracene			92.2		%		50-140	10-NOV-17
Benzo(a)pyrene			93.2		%		50-140	10-NOV-17
Benzo(b)fluoranthene			75.8		%		50-140	10-NOV-17
Benzo(g,h,i)perylene			79.6		%		50-140	10-NOV-17
Benzo(k)fluoranthene			80.8		%		50-140	10-NOV-17
Chrysene			89.9		%		50-140	10-NOV-17
Dibenzo(ah)anthracene			84.7		%		50-140	10-NOV-17
Fluoranthene			90.0		%		50-140	10-NOV-17
Fluorene			92.6		%		50-140	10-NOV-17
Indeno(1,2,3-cd)pyrene			96.9		%		50-140	10-NOV-17
Naphthalene			79.0		%		50-140	10-NOV-17
Phenanthrene			87.5		%		50-140	10-NOV-17
Pyrene			92.2		%		50-140	10-NOV-17
WG2659233-3 LCSD		**WG2659233-2**						
1-Methylnaphthalene		78.1	75.6		%	3.2	50	10-NOV-17
2-Methylnaphthalene		83.4	78.6		%	5.9	50	10-NOV-17
Acenaphthene		86.5	82.9		%	4.3	50	10-NOV-17
Acenaphthylene		89.8	84.1		%	6.5	50	10-NOV-17
Anthracene		90.2	79.1		%	13	50	10-NOV-17
Benzo(a)anthracene		92.2	88.6		%	4.0	50	10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3880495								
WG2659233-3 LCSD		**WG2659233-2**						
Benzo(a)pyrene		93.2	88.6		%	5.0	50	10-NOV-17
Benzo(b)fluoranthene		75.8	72.4		%	4.6	50	10-NOV-17
Benzo(g,h,i)perylene		79.6	81.9		%	2.9	50	10-NOV-17
Benzo(k)fluoranthene		80.8	83.2		%	2.9	50	10-NOV-17
Chrysene		89.9	84.6		%	6.1	50	10-NOV-17
Dibenzo(ah)anthracene		84.7	86.8		%	2.4	50	10-NOV-17
Fluoranthene		90.0	83.6		%	7.4	50	10-NOV-17
Fluorene		92.6	87.6		%	5.6	50	10-NOV-17
Indeno(1,2,3-cd)pyrene		96.9	91.2		%	6.0	50	10-NOV-17
Naphthalene		79.0	74.1		%	6.4	50	10-NOV-17
Phenanthrene		87.5	77.0		%	13	50	10-NOV-17
Pyrene		92.2	81.8		%	12	50	10-NOV-17
WG2659233-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	10-NOV-17
2-Methylnaphthalene			<0.020		ug/L		0.02	10-NOV-17
Acenaphthene			<0.020		ug/L		0.02	10-NOV-17
Acenaphthylene			<0.020		ug/L		0.02	10-NOV-17
Anthracene			<0.020		ug/L		0.02	10-NOV-17
Benzo(a)anthracene			<0.020		ug/L		0.02	10-NOV-17
Benzo(a)pyrene			<0.010		ug/L		0.01	10-NOV-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	10-NOV-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Chrysene			<0.020		ug/L		0.02	10-NOV-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	10-NOV-17
Fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Fluorene			<0.020		ug/L		0.02	10-NOV-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	10-NOV-17
Naphthalene			<0.050		ug/L		0.05	10-NOV-17
Phenanthrene			<0.020		ug/L		0.02	10-NOV-17
Pyrene			<0.020		ug/L		0.02	10-NOV-17
Surrogate: d8-Naphthalene			74.9		%		60-140	10-NOV-17
Surrogate: d10-Phenanthrene			92.7		%		60-140	10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3880495								
WG2659233-1 MB								
Surrogate: d12-Chrysene			80.7		%		60-140	10-NOV-17
Surrogate: d10-Acenaphthene			82.3		%		60-140	10-NOV-17
Batch R3880660								
WG2659241-2 LCS								
1-Methylnaphthalene			77.8		%		50-140	10-NOV-17
2-Methylnaphthalene			81.8		%		50-140	10-NOV-17
Acenaphthene			84.9		%		50-140	10-NOV-17
Acenaphthylene			88.6		%		50-140	10-NOV-17
Anthracene			91.1		%		50-140	10-NOV-17
Benzo(a)anthracene			93.0		%		50-140	10-NOV-17
Benzo(a)pyrene			89.5		%		50-140	10-NOV-17
Benzo(b)fluoranthene			72.9		%		50-140	10-NOV-17
Benzo(g,h,i)perylene			90.3		%		50-140	10-NOV-17
Benzo(k)fluoranthene			83.1		%		50-140	10-NOV-17
Chrysene			93.3		%		50-140	10-NOV-17
Dibenzo(ah)anthracene			90.5		%		50-140	10-NOV-17
Fluoranthene			89.4		%		50-140	10-NOV-17
Fluorene			91.0		%		50-140	10-NOV-17
Indeno(1,2,3-cd)pyrene			92.9		%		50-140	10-NOV-17
Naphthalene			83.4		%		50-140	10-NOV-17
Phenanthrene			87.9		%		50-140	10-NOV-17
Pyrene			88.3		%		50-140	10-NOV-17
WG2659241-3 LCSD		**WG2659241-2**						
1-Methylnaphthalene		77.8	80.3		%	3.2	50	10-NOV-17
2-Methylnaphthalene		81.8	83.8		%	2.4	50	10-NOV-17
Acenaphthene		84.9	88.6		%	4.3	50	10-NOV-17
Acenaphthylene		88.6	89.4		%	0.9	50	10-NOV-17
Anthracene		91.1	90.3		%	0.9	50	10-NOV-17
Benzo(a)anthracene		93.0	96.0		%	3.1	50	10-NOV-17
Benzo(a)pyrene		89.5	92.3		%	3.1	50	10-NOV-17
Benzo(b)fluoranthene		72.9	76.7		%	5.1	50	10-NOV-17
Benzo(g,h,i)perylene		90.3	91.0		%	0.8	50	10-NOV-17
Benzo(k)fluoranthene		83.1	86.2		%	3.7	50	10-NOV-17
Chrysene		93.3	97.7		%			10-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3880660								
WG2659241-3 LCSD		**WG2659241-2**						
Chrysene		93.3	97.7		%	4.6	50	10-NOV-17
Dibenzo(ah)anthracene		90.5	89.1		%	1.5	50	10-NOV-17
Fluoranthene		89.4	89.8		%	0.5	50	10-NOV-17
Fluorene		91.0	93.1		%	2.3	50	10-NOV-17
Indeno(1,2,3-cd)pyrene		92.9	94.2		%	1.4	50	10-NOV-17
Naphthalene		83.4	79.0		%	5.4	50	10-NOV-17
Phenanthrene		87.9	89.0		%	1.3	50	10-NOV-17
Pyrene		88.3	88.4		%	0.1	50	10-NOV-17
WG2659241-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	10-NOV-17
2-Methylnaphthalene			<0.020		ug/L		0.02	10-NOV-17
Acenaphthene			<0.020		ug/L		0.02	10-NOV-17
Acenaphthylene			<0.020		ug/L		0.02	10-NOV-17
Anthracene			<0.020		ug/L		0.02	10-NOV-17
Benzo(a)anthracene			<0.020		ug/L		0.02	10-NOV-17
Benzo(a)pyrene			<0.010		ug/L		0.01	10-NOV-17
Benzo(b)fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	10-NOV-17
Benzo(k)fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Chrysene			<0.020		ug/L		0.02	10-NOV-17
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	10-NOV-17
Fluoranthene			<0.020		ug/L		0.02	10-NOV-17
Fluorene			<0.020		ug/L		0.02	10-NOV-17
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	10-NOV-17
Naphthalene			<0.050		ug/L		0.05	10-NOV-17
Phenanthrene			<0.020		ug/L		0.02	10-NOV-17
Pyrene			<0.020		ug/L		0.02	10-NOV-17
Surrogate: d8-Naphthalene			83.1		%		60-140	10-NOV-17
Surrogate: d10-Phenanthrene			104.3		%		60-140	10-NOV-17
Surrogate: d12-Chrysene			91.3		%		60-140	10-NOV-17
Surrogate: d10-Acenaphthene			85.6		%		60-140	10-NOV-17
PCB-511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Water**							
Batch R3878045								
WG2657272-2 LCS								
Aroclor 1242			78.5		%		60-140	07-NOV-17
Aroclor 1248			92.5		%		60-140	07-NOV-17
Aroclor 1254			99.9		%		60-140	07-NOV-17
Aroclor 1260			111.6		%		60-140	07-NOV-17
WG2657272-3 LCSD		**WG2657272-2**						
Aroclor 1242		78.5	65.5		%	18	50	07-NOV-17
Aroclor 1248		92.5	92.5		%	0.0	50	07-NOV-17
Aroclor 1254		99.9	90.2		%	10	50	07-NOV-17
Aroclor 1260		111.6	102.3		%	8.7	50	07-NOV-17
WG2657272-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	07-NOV-17
Aroclor 1248			<0.020		ug/L		0.02	07-NOV-17
Aroclor 1254			<0.020		ug/L		0.02	07-NOV-17
Aroclor 1260			<0.020		ug/L		0.02	07-NOV-17
Surrogate: 2-fluorobiphenyl			89.6		%		50-150	07-NOV-17
PH-WT	**Water**							
Batch R3876968								
WG2656900-12 DUP		**WG2656900-11**						
pH		5.19	5.19	J	pH units	0.00	0.2	04-NOV-17
WG2656900-4 DUP		**WG2656900-3**						
pH		8.13	8.14	J	pH units	0.00	0.2	04-NOV-17
WG2656900-8 DUP		**WG2656900-7**						
pH		7.81	7.85	J	pH units	0.05	0.2	04-NOV-17
WG2656900-10 LCS								
pH			6.99		pH units		6.9-7.1	04-NOV-17
WG2656900-2 LCS								
pH			6.99		pH units		6.9-7.1	04-NOV-17
WG2656900-6 LCS								
pH			6.99		pH units		6.9-7.1	04-NOV-17
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-4 DUP		**WG2656313-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-4 DUP		**WG2656313-3**						
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,1-Dichloroethane		0.74	0.75		ug/L	1.3	30	07-NOV-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-NOV-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	07-NOV-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-NOV-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-NOV-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-NOV-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	07-NOV-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-NOV-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-NOV-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-NOV-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	07-NOV-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-NOV-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	07-NOV-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-NOV-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	07-NOV-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-NOV-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
trans-1,2-Dichloroethylene		<0.50	<0.50		ug/L			07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-4 DUP		**WG2656313-3**						
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	07-NOV-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	07-NOV-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	07-NOV-17
WG2656313-1 LCS								
1,1,1,2-Tetrachloroethane			98.0		%		70-130	07-NOV-17
1,1,2,2-Tetrachloroethane			111.4		%		70-130	07-NOV-17
1,1,1-Trichloroethane			96.8		%		70-130	07-NOV-17
1,1,2-Trichloroethane			110.1		%		70-130	07-NOV-17
1,1-Dichloroethane			100.8		%		70-130	07-NOV-17
1,1-Dichloroethylene			88.1		%		70-130	07-NOV-17
1,2-Dibromoethane			112.2		%		70-130	07-NOV-17
1,2-Dichlorobenzene			99.9		%		70-130	07-NOV-17
1,2-Dichloroethane			115.5		%		70-130	07-NOV-17
1,2-Dichloropropane			109.0		%		70-130	07-NOV-17
1,3-Dichlorobenzene			93.4		%		70-130	07-NOV-17
1,4-Dichlorobenzene			97.5		%		70-130	07-NOV-17
Acetone			121.9		%		60-140	07-NOV-17
Benzene			102.7		%		70-130	07-NOV-17
Bromodichloromethane			105.0		%		70-130	07-NOV-17
Bromoform			105.3		%		70-130	07-NOV-17
Bromomethane			103.5		%		60-140	07-NOV-17
Carbon tetrachloride			92.0		%		70-130	07-NOV-17
Chlorobenzene			99.9		%		70-130	07-NOV-17
Chloroform			104.5		%		70-130	07-NOV-17
cis-1,2-Dichloroethylene			103.5		%		70-130	07-NOV-17
cis-1,3-Dichloropropene			110.5		%		70-130	07-NOV-17
Dibromochloromethane			108.6		%		70-130	07-NOV-17
Dichlorodifluoromethane			90.2		%		50-140	07-NOV-17
Ethylbenzene			89.0		%		70-130	07-NOV-17
n-Hexane			101.1		%		70-130	07-NOV-17
m+p-Xylenes			92.4		%		70-130	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-1 LCS								
Methyl Ethyl Ketone			127.3		%		60-140	07-NOV-17
Methyl Isobutyl Ketone			120.9		%		60-140	07-NOV-17
Methylene Chloride			109.7		%		70-130	07-NOV-17
MTBE			99.1		%		70-130	07-NOV-17
o-Xylene			92.2		%		70-130	07-NOV-17
Styrene			95.9		%		70-130	07-NOV-17
Tetrachloroethylene			88.5		%		70-130	07-NOV-17
Toluene			92.5		%		70-130	07-NOV-17
trans-1,2-Dichloroethylene			98.7		%		70-130	07-NOV-17
trans-1,3-Dichloropropene			107.0		%		70-130	07-NOV-17
Trichloroethylene			100.3		%		70-130	07-NOV-17
Trichlorofluoromethane			94.8		%		60-140	07-NOV-17
Vinyl chloride			94.7		%		60-140	07-NOV-17
WG2656313-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	07-NOV-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	07-NOV-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	07-NOV-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	07-NOV-17
1,1-Dichloroethane			<0.50		ug/L		0.5	07-NOV-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	07-NOV-17
1,2-Dibromoethane			<0.20		ug/L		0.2	07-NOV-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	07-NOV-17
1,2-Dichloroethane			<0.50		ug/L		0.5	07-NOV-17
1,2-Dichloropropane			<0.50		ug/L		0.5	07-NOV-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	07-NOV-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	07-NOV-17
Acetone			<30		ug/L		30	07-NOV-17
Benzene			<0.50		ug/L		0.5	07-NOV-17
Bromodichloromethane			<2.0		ug/L		2	07-NOV-17
Bromoform			<5.0		ug/L		5	07-NOV-17
Bromomethane			<0.50		ug/L		0.5	07-NOV-17
Carbon tetrachloride			<0.20		ug/L		0.2	07-NOV-17
Chlorobenzene			<0.50		ug/L		0.5	07-NOV-17
Chloroform			<1.0		ug/L		1	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-2 MB								
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-NOV-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	07-NOV-17
Dibromochloromethane			<2.0		ug/L		2	07-NOV-17
Dichlorodifluoromethane			<2.0		ug/L		2	07-NOV-17
Ethylbenzene			<0.50		ug/L		0.5	07-NOV-17
n-Hexane			<0.50		ug/L		0.5	07-NOV-17
m+p-Xylenes			<0.40		ug/L		0.4	07-NOV-17
Methyl Ethyl Ketone			<20		ug/L		20	07-NOV-17
Methyl Isobutyl Ketone			<20		ug/L		20	07-NOV-17
Methylene Chloride			<5.0		ug/L		5	07-NOV-17
MTBE			<2.0		ug/L		2	07-NOV-17
o-Xylene			<0.30		ug/L		0.3	07-NOV-17
Styrene			<0.50		ug/L		0.5	07-NOV-17
Tetrachloroethylene			<0.50		ug/L		0.5	07-NOV-17
Toluene			<0.50		ug/L		0.5	07-NOV-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	07-NOV-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	07-NOV-17
Trichloroethylene			<0.50		ug/L		0.5	07-NOV-17
Trichlorofluoromethane			<5.0		ug/L		5	07-NOV-17
Vinyl chloride			<0.50		ug/L		0.5	07-NOV-17
Surrogate: 1,4-Difluorobenzene			98.3		%		70-130	07-NOV-17
Surrogate: 4-Bromofluorobenzene			97.4		%		70-130	07-NOV-17
WG2656313-5 MS		**WG2656313-3**						
1,1,1,2-Tetrachloroethane			98.6		%		50-140	07-NOV-17
1,1,2,2-Tetrachloroethane			111.1		%		50-140	07-NOV-17
1,1,1-Trichloroethane			98.6		%		50-140	07-NOV-17
1,1,2-Trichloroethane			110.2		%		50-140	07-NOV-17
1,1-Dichloroethane			102.8		%		50-140	07-NOV-17
1,1-Dichloroethylene			87.3		%		50-140	07-NOV-17
1,2-Dibromoethane			111.4		%		50-140	07-NOV-17
1,2-Dichlorobenzene			99.5		%		50-140	07-NOV-17
1,2-Dichloroethane			117.1		%		50-140	07-NOV-17
1,2-Dichloropropane			110.1		%		50-140	07-NOV-17
1,3-Dichlorobenzene			92.6		%		50-140	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3877348								
WG2656313-5 MS		**WG2656313-3**						
1,4-Dichlorobenzene			96.7		%		50-140	07-NOV-17
Acetone			123.2		%		50-140	07-NOV-17
Benzene			103.5		%		50-140	07-NOV-17
Bromodichloromethane			106.9		%		50-140	07-NOV-17
Bromoform			105.0		%		50-140	07-NOV-17
Bromomethane			98.0		%		50-140	07-NOV-17
Carbon tetrachloride			93.6		%		50-140	07-NOV-17
Chlorobenzene			99.4		%		50-140	07-NOV-17
Chloroform			106.8		%		50-140	07-NOV-17
cis-1,2-Dichloroethylene			104.7		%		50-140	07-NOV-17
cis-1,3-Dichloropropene			104.4		%		50-140	07-NOV-17
Dibromochloromethane			108.7		%		50-140	07-NOV-17
Dichlorodifluoromethane			75.4		%		50-140	07-NOV-17
Ethylbenzene			86.6		%		50-140	07-NOV-17
n-Hexane			96.8		%		50-140	07-NOV-17
m+p-Xylenes			91.2		%		50-140	07-NOV-17
Methyl Ethyl Ketone			128.6		%		50-140	07-NOV-17
Methyl Isobutyl Ketone			116.5		%		50-140	07-NOV-17
Methylene Chloride			110.1		%		50-140	07-NOV-17
MTBE			98.7		%		50-140	07-NOV-17
o-Xylene			89.7		%		50-140	07-NOV-17
Styrene			92.0		%		50-140	07-NOV-17
Tetrachloroethylene			87.6		%		50-140	07-NOV-17
Toluene			90.8		%		50-140	07-NOV-17
trans-1,2-Dichloroethylene			98.1		%		50-140	07-NOV-17
trans-1,3-Dichloropropene			97.1		%		50-140	07-NOV-17
Trichloroethylene			100.7		%		50-140	07-NOV-17
Trichlorofluoromethane			92.7		%		50-140	07-NOV-17
Vinyl chloride			87.6		%		50-140	07-NOV-17
Batch R3878513								
WG2654802-4 DUP		**WG2654802-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1,1-Trichloroethane		<0.50	<0.50		ug/L			08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878513								
WG2654802-4 DUP		**WG2654802-3**						
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	08-NOV-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-NOV-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	08-NOV-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-NOV-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	08-NOV-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-NOV-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-NOV-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-NOV-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Toluene		<0.50	<0.50		ug/L			08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878513								
WG2654802-4 DUP		**WG2654802-3**						
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-NOV-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
WG2654802-1 LCS								
1,1,1,2-Tetrachloroethane			97.0		%		70-130	07-NOV-17
1,1,2,2-Tetrachloroethane			85.7		%		70-130	07-NOV-17
1,1,1-Trichloroethane			106.6		%		70-130	07-NOV-17
1,1,2-Trichloroethane			91.4		%		70-130	07-NOV-17
1,1-Dichloroethane			103.3		%		70-130	07-NOV-17
1,1-Dichloroethylene			96.5		%		70-130	07-NOV-17
1,2-Dibromoethane			90.0		%		70-130	07-NOV-17
1,2-Dichlorobenzene			101.1		%		70-130	07-NOV-17
1,2-Dichloroethane			92.3		%		70-130	07-NOV-17
1,2-Dichloropropane			96.9		%		70-130	07-NOV-17
1,3-Dichlorobenzene			102.8		%		70-130	07-NOV-17
1,4-Dichlorobenzene			103.6		%		70-130	07-NOV-17
Acetone			97.4		%		60-140	07-NOV-17
Benzene			100.8		%		70-130	07-NOV-17
Bromodichloromethane			92.0		%		70-130	07-NOV-17
Bromoform			87.8		%		70-130	07-NOV-17
Bromomethane			101.8		%		60-140	07-NOV-17
Carbon tetrachloride			105.0		%		70-130	07-NOV-17
Chlorobenzene			101.6		%		70-130	07-NOV-17
Chloroform			100.3		%		70-130	07-NOV-17
cis-1,2-Dichloroethylene			89.6		%		70-130	07-NOV-17
cis-1,3-Dichloropropene			94.6		%		70-130	07-NOV-17
Dibromochloromethane			95.6		%		70-130	07-NOV-17
Dichlorodifluoromethane			94.5		%		50-140	07-NOV-17
Ethylbenzene			101.5		%		70-130	07-NOV-17
n-Hexane			119.0		%		70-130	07-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878513								
WG2654802-1 LCS								
m+p-Xylenes			103.8		%		70-130	07-NOV-17
Methyl Ethyl Ketone			85.0		%		60-140	07-NOV-17
Methyl Isobutyl Ketone			76.2		%		60-140	07-NOV-17
Methylene Chloride			99.8		%		70-130	07-NOV-17
MTBE			100.4		%		70-130	07-NOV-17
o-Xylene			99.3		%		70-130	07-NOV-17
Styrene			97.9		%		70-130	07-NOV-17
Tetrachloroethylene			107.4		%		70-130	07-NOV-17
Toluene			100.1		%		70-130	07-NOV-17
trans-1,2-Dichloroethylene			104.2		%		70-130	07-NOV-17
trans-1,3-Dichloropropene			92.2		%		70-130	07-NOV-17
Trichloroethylene			105.0		%		70-130	07-NOV-17
Trichlorofluoromethane			107.8		%		60-140	07-NOV-17
Vinyl chloride			103.6		%		60-140	07-NOV-17
WG2654802-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1-Dichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
1,2-Dibromoethane			<0.20		ug/L		0.2	08-NOV-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
1,2-Dichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,2-Dichloropropane			<0.50		ug/L		0.5	08-NOV-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
Acetone			<30		ug/L		30	08-NOV-17
Benzene			<0.50		ug/L		0.5	08-NOV-17
Bromodichloromethane			<2.0		ug/L		2	08-NOV-17
Bromoform			<5.0		ug/L		5	08-NOV-17
Bromomethane			<0.50		ug/L		0.5	08-NOV-17
Carbon tetrachloride			<0.20		ug/L		0.2	08-NOV-17
Chlorobenzene			<0.50		ug/L		0.5	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878513								
WG2654802-2 MB								
Chloroform			<1.0		ug/L		1	08-NOV-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	08-NOV-17
Dibromochloromethane			<2.0		ug/L		2	08-NOV-17
Dichlorodifluoromethane			<2.0		ug/L		2	08-NOV-17
Ethylbenzene			<0.50		ug/L		0.5	08-NOV-17
n-Hexane			<0.50		ug/L		0.5	08-NOV-17
m+p-Xylenes			<0.40		ug/L		0.4	08-NOV-17
Methyl Ethyl Ketone			<20		ug/L		20	08-NOV-17
Methyl Isobutyl Ketone			<20		ug/L		20	08-NOV-17
Methylene Chloride			<5.0		ug/L		5	08-NOV-17
MTBE			<2.0		ug/L		2	08-NOV-17
o-Xylene			<0.30		ug/L		0.3	08-NOV-17
Styrene			<0.50		ug/L		0.5	08-NOV-17
Tetrachloroethylene			<0.50		ug/L		0.5	08-NOV-17
Toluene			<0.50		ug/L		0.5	08-NOV-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	08-NOV-17
Trichloroethylene			<0.50		ug/L		0.5	08-NOV-17
Trichlorofluoromethane			<5.0		ug/L		5	08-NOV-17
Vinyl chloride			<0.50		ug/L		0.5	08-NOV-17
Surrogate: 1,4-Difluorobenzene			100.2		%		70-130	08-NOV-17
Surrogate: 4-Bromofluorobenzene			96.7		%		70-130	08-NOV-17
WG2654802-5 MS		**WG2654802-3**						
1,1,1,2-Tetrachloroethane			98.5		%		50-140	08-NOV-17
1,1,2,2-Tetrachloroethane			97.9		%		50-140	08-NOV-17
1,1,1-Trichloroethane			102.6		%		50-140	08-NOV-17
1,1,2-Trichloroethane			98.7		%		50-140	08-NOV-17
1,1-Dichloroethane			99.6		%		50-140	08-NOV-17
1,1-Dichloroethylene			89.4		%		50-140	08-NOV-17
1,2-Dibromoethane			97.1		%		50-140	08-NOV-17
1,2-Dichlorobenzene			100.2		%		50-140	08-NOV-17
1,2-Dichloroethane			98.2		%		50-140	08-NOV-17
1,2-Dichloropropane			101.9		%		50-140	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878513								
WG2654802-5 MS		**WG2654802-3**						
1,3-Dichlorobenzene			99.0		%		50-140	08-NOV-17
1,4-Dichlorobenzene			101.2		%		50-140	08-NOV-17
Acetone			107.7		%		50-140	08-NOV-17
Benzene			101.1		%		50-140	08-NOV-17
Bromodichloromethane			96.8		%		50-140	08-NOV-17
Bromoform			94.5		%		50-140	08-NOV-17
Bromomethane			92.6		%		50-140	08-NOV-17
Carbon tetrachloride			99.7		%		50-140	08-NOV-17
Chlorobenzene			101.2		%		50-140	08-NOV-17
Chloroform			101.4		%		50-140	08-NOV-17
cis-1,2-Dichloroethylene			90.5		%		50-140	08-NOV-17
cis-1,3-Dichloropropene			96.0		%		50-140	08-NOV-17
Dibromochloromethane			100.9		%		50-140	08-NOV-17
Dichlorodifluoromethane			76.9		%		50-140	08-NOV-17
Ethylbenzene			97.1		%		50-140	08-NOV-17
n-Hexane			107.3		%		50-140	08-NOV-17
m+p-Xylenes			99.4		%		50-140	08-NOV-17
Methyl Ethyl Ketone			98.8		%		50-140	08-NOV-17
Methyl Isobutyl Ketone			93.7		%		50-140	08-NOV-17
Methylene Chloride			101.8		%		50-140	08-NOV-17
MTBE			99.4		%		50-140	08-NOV-17
o-Xylene			97.4		%		50-140	08-NOV-17
Styrene			98.7		%		50-140	08-NOV-17
Tetrachloroethylene			98.4		%		50-140	08-NOV-17
Toluene			97.5		%		50-140	08-NOV-17
trans-1,2-Dichloroethylene			99.8		%		50-140	08-NOV-17
trans-1,3-Dichloropropene			91.9		%		50-140	08-NOV-17
Trichloroethylene			101.4		%		50-140	08-NOV-17
Trichlorofluoromethane			97.1		%		50-140	08-NOV-17
Vinyl chloride			90.9		%		50-140	08-NOV-17
Batch R3878599								
WG2655329-4 DUP		**WG2655329-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878599								
WG2655329-4 DUP		**WG2655329-3**						
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	08-NOV-17
Benzene		3.02	3.01		ug/L	0.3	30	08-NOV-17
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-NOV-17
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	08-NOV-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-NOV-17
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Ethylbenzene		105	107		ug/L	1.0	30	08-NOV-17
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
m+p-Xylenes		138	138		ug/L	0.1	30	08-NOV-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-NOV-17
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-NOV-17
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-NOV-17
o-Xylene		46.5	46.9		ug/L	0.8	30	08-NOV-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Toluene		0.92	1.08		ug/L			08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878599								
WG2655329-4 DUP		**WG2655329-3**						
Toluene		0.92	1.08		ug/L	16	30	08-NOV-17
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-NOV-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-NOV-17
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-NOV-17
WG2655329-1 LCS								
1,1,1,2-Tetrachloroethane			101.0		%		70-130	08-NOV-17
1,1,2,2-Tetrachloroethane			100.2		%		70-130	08-NOV-17
1,1,1-Trichloroethane			97.1		%		70-130	08-NOV-17
1,1,2-Trichloroethane			108.2		%		70-130	08-NOV-17
1,1-Dichloroethane			103.1		%		70-130	08-NOV-17
1,1-Dichloroethylene			91.2		%		70-130	08-NOV-17
1,2-Dibromoethane			106.0		%		70-130	08-NOV-17
1,2-Dichlorobenzene			99.7		%		70-130	08-NOV-17
1,2-Dichloroethane			110.0		%		70-130	08-NOV-17
1,2-Dichloropropane			106.9		%		70-130	08-NOV-17
1,3-Dichlorobenzene			95.0		%		70-130	08-NOV-17
1,4-Dichlorobenzene			98.5		%		70-130	08-NOV-17
Acetone			119.5		%		60-140	08-NOV-17
Benzene			101.5		%		70-130	08-NOV-17
Bromodichloromethane			102.2		%		70-130	08-NOV-17
Bromoform			105.3		%		70-130	08-NOV-17
Bromomethane			101.0		%		60-140	08-NOV-17
Carbon tetrachloride			94.9		%		70-130	08-NOV-17
Chlorobenzene			100.4		%		70-130	08-NOV-17
Chloroform			102.7		%		70-130	08-NOV-17
cis-1,2-Dichloroethylene			93.9		%		70-130	08-NOV-17
cis-1,3-Dichloropropene			103.0		%		70-130	08-NOV-17
Dibromochloromethane			107.2		%		70-130	08-NOV-17
Dichlorodifluoromethane			90.2		%		50-140	08-NOV-17
Ethylbenzene			97.3		%		70-130	08-NOV-17
n-Hexane			105.9		%		70-130	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878599								
WG2655329-1 LCS								
m+p-Xylenes			98.9		%		70-130	08-NOV-17
Methyl Ethyl Ketone			119.7		%		60-140	08-NOV-17
Methyl Isobutyl Ketone			116.1		%		60-140	08-NOV-17
Methylene Chloride			106.3		%		70-130	08-NOV-17
MTBE			97.8		%		70-130	08-NOV-17
o-Xylene			98.1		%		70-130	08-NOV-17
Styrene			98.0		%		70-130	08-NOV-17
Tetrachloroethylene			92.5		%		70-130	08-NOV-17
Toluene			94.2		%		70-130	08-NOV-17
trans-1,2-Dichloroethylene			100.9		%		70-130	08-NOV-17
trans-1,3-Dichloropropene			102.9		%		70-130	08-NOV-17
Trichloroethylene			99.98		%		70-130	08-NOV-17
Trichlorofluoromethane			97.7		%		60-140	08-NOV-17
Vinyl chloride			97.8		%		60-140	08-NOV-17
WG2655329-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,1-Trichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1,2-Trichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1-Dichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,1-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
1,2-Dibromoethane			<0.20		ug/L		0.2	08-NOV-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
1,2-Dichloroethane			<0.50		ug/L		0.5	08-NOV-17
1,2-Dichloropropane			<0.50		ug/L		0.5	08-NOV-17
1,3-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	08-NOV-17
Acetone			<30		ug/L		30	08-NOV-17
Benzene			<0.50		ug/L		0.5	08-NOV-17
Bromodichloromethane			<2.0		ug/L		2	08-NOV-17
Bromoform			<5.0		ug/L		5	08-NOV-17
Bromomethane			<0.50		ug/L		0.5	08-NOV-17
Carbon tetrachloride			<0.20		ug/L		0.2	08-NOV-17
Chlorobenzene			<0.50		ug/L		0.5	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878599								
WG2655329-2 MB								
Chloroform			<1.0		ug/L		1	08-NOV-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	08-NOV-17
Dibromochloromethane			<2.0		ug/L		2	08-NOV-17
Dichlorodifluoromethane			<2.0		ug/L		2	08-NOV-17
Ethylbenzene			<0.50		ug/L		0.5	08-NOV-17
n-Hexane			<0.50		ug/L		0.5	08-NOV-17
m+p-Xylenes			<0.40		ug/L		0.4	08-NOV-17
Methyl Ethyl Ketone			<20		ug/L		20	08-NOV-17
Methyl Isobutyl Ketone			<20		ug/L		20	08-NOV-17
Methylene Chloride			<5.0		ug/L		5	08-NOV-17
MTBE			<2.0		ug/L		2	08-NOV-17
o-Xylene			<0.30		ug/L		0.3	08-NOV-17
Styrene			<0.50		ug/L		0.5	08-NOV-17
Tetrachloroethylene			<0.50		ug/L		0.5	08-NOV-17
Toluene			<0.50		ug/L		0.5	08-NOV-17
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-NOV-17
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	08-NOV-17
Trichloroethylene			<0.50		ug/L		0.5	08-NOV-17
Trichlorofluoromethane			<5.0		ug/L		5	08-NOV-17
Vinyl chloride			<0.50		ug/L		0.5	08-NOV-17
Surrogate: 1,4-Difluorobenzene			98.8		%		70-130	08-NOV-17
Surrogate: 4-Bromofluorobenzene			96.2		%		70-130	08-NOV-17
WG2655329-5 MS		**WG2655329-3**						
1,1,1,2-Tetrachloroethane			100.5		%		50-140	08-NOV-17
1,1,2,2-Tetrachloroethane			103.5		%		50-140	08-NOV-17
1,1,1-Trichloroethane			96.1		%		50-140	08-NOV-17
1,1,2-Trichloroethane			108.5		%		50-140	08-NOV-17
1,1-Dichloroethane			98.5		%		50-140	08-NOV-17
1,1-Dichloroethylene			87.6		%		50-140	08-NOV-17
1,2-Dibromoethane			105.7		%		50-140	08-NOV-17
1,2-Dichlorobenzene			96.8		%		50-140	08-NOV-17
1,2-Dichloroethane			109.4		%		50-140	08-NOV-17
1,2-Dichloropropane			106.8		%		50-140	08-NOV-17

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3878599								
WG2655329-5 MS		**WG2655329-3**						
1,3-Dichlorobenzene			92.8		%		50-140	08-NOV-17
1,4-Dichlorobenzene			94.6		%		50-140	08-NOV-17
Acetone			117.9		%		50-140	08-NOV-17
Benzene			100.5		%		50-140	08-NOV-17
Bromodichloromethane			101.1		%		50-140	08-NOV-17
Bromoform			101.9		%		50-140	08-NOV-17
Bromomethane			94.3		%		50-140	08-NOV-17
Carbon tetrachloride			92.9		%		50-140	08-NOV-17
Chlorobenzene			99.8		%		50-140	08-NOV-17
Chloroform			102.5		%		50-140	08-NOV-17
cis-1,2-Dichloroethylene			93.8		%		50-140	08-NOV-17
cis-1,3-Dichloropropene			97.6		%		50-140	08-NOV-17
Dibromochloromethane			106.7		%		50-140	08-NOV-17
Dichlorodifluoromethane			71.5		%		50-140	08-NOV-17
Ethylbenzene			N/A	MS-B	%		-	08-NOV-17
n-Hexane			97.3		%		50-140	08-NOV-17
m+p-Xylenes			95.5		%		50-140	08-NOV-17
Methyl Ethyl Ketone			116.0		%		50-140	08-NOV-17
Methyl Isobutyl Ketone			111.0		%		50-140	08-NOV-17
Methylene Chloride			105.5		%		50-140	08-NOV-17
MTBE			96.9		%		50-140	08-NOV-17
o-Xylene			98.8		%		50-140	08-NOV-17
Styrene			93.4		%		50-140	08-NOV-17
Tetrachloroethylene			90.9		%		50-140	08-NOV-17
Toluene			94.2		%		50-140	08-NOV-17
trans-1,2-Dichloroethylene			98.0		%		50-140	08-NOV-17
trans-1,3-Dichloropropene			97.8		%		50-140	08-NOV-17
Trichloroethylene			98.1		%		50-140	08-NOV-17
Trichlorofluoromethane			90.7		%		50-140	08-NOV-17
Vinyl chloride			89.5		%		50-140	08-NOV-17

Quality Control Report

Workorder: L2017929 Report Date: 13-NOV-17

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

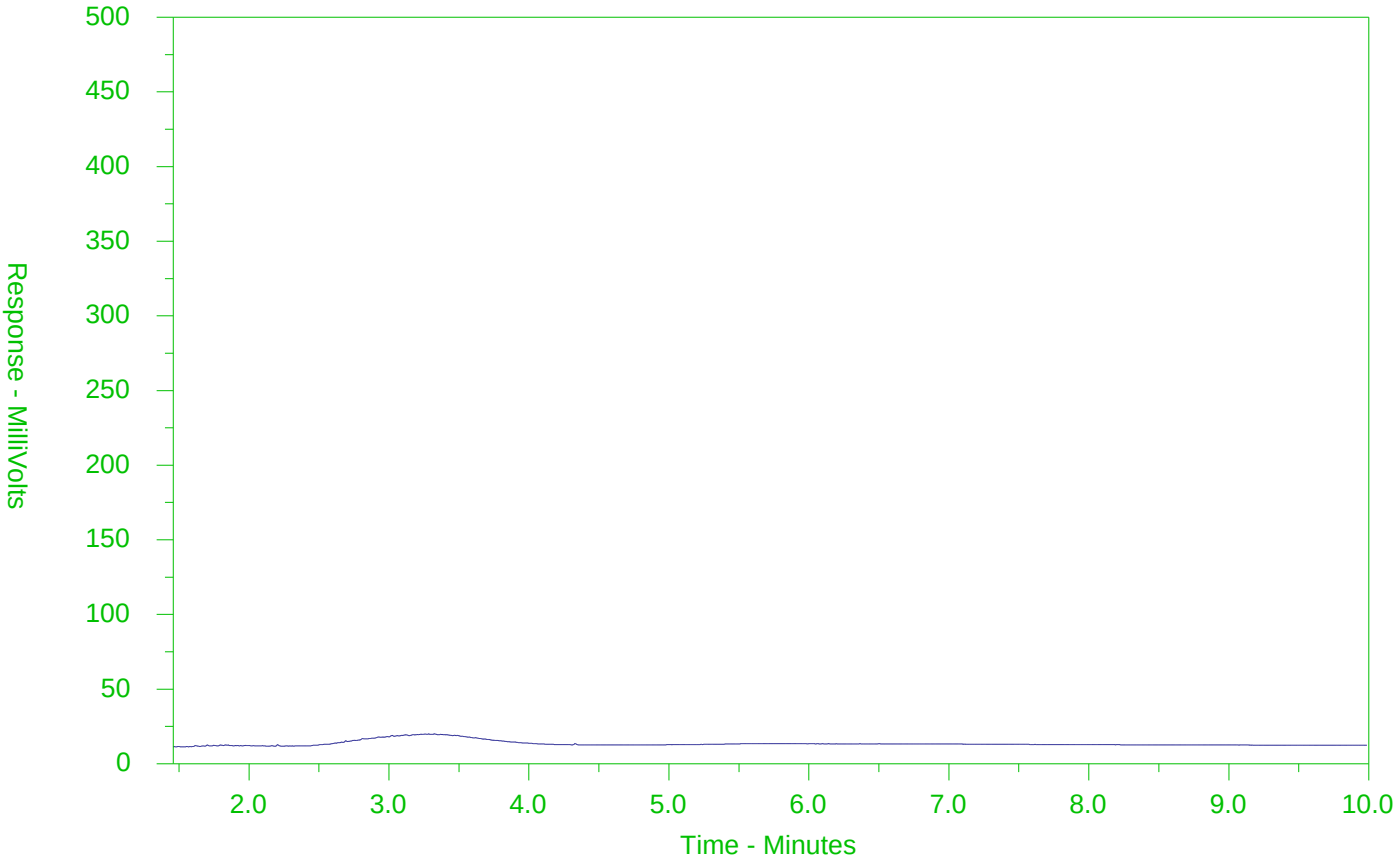
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-1
Client Sample ID: MW17-108S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

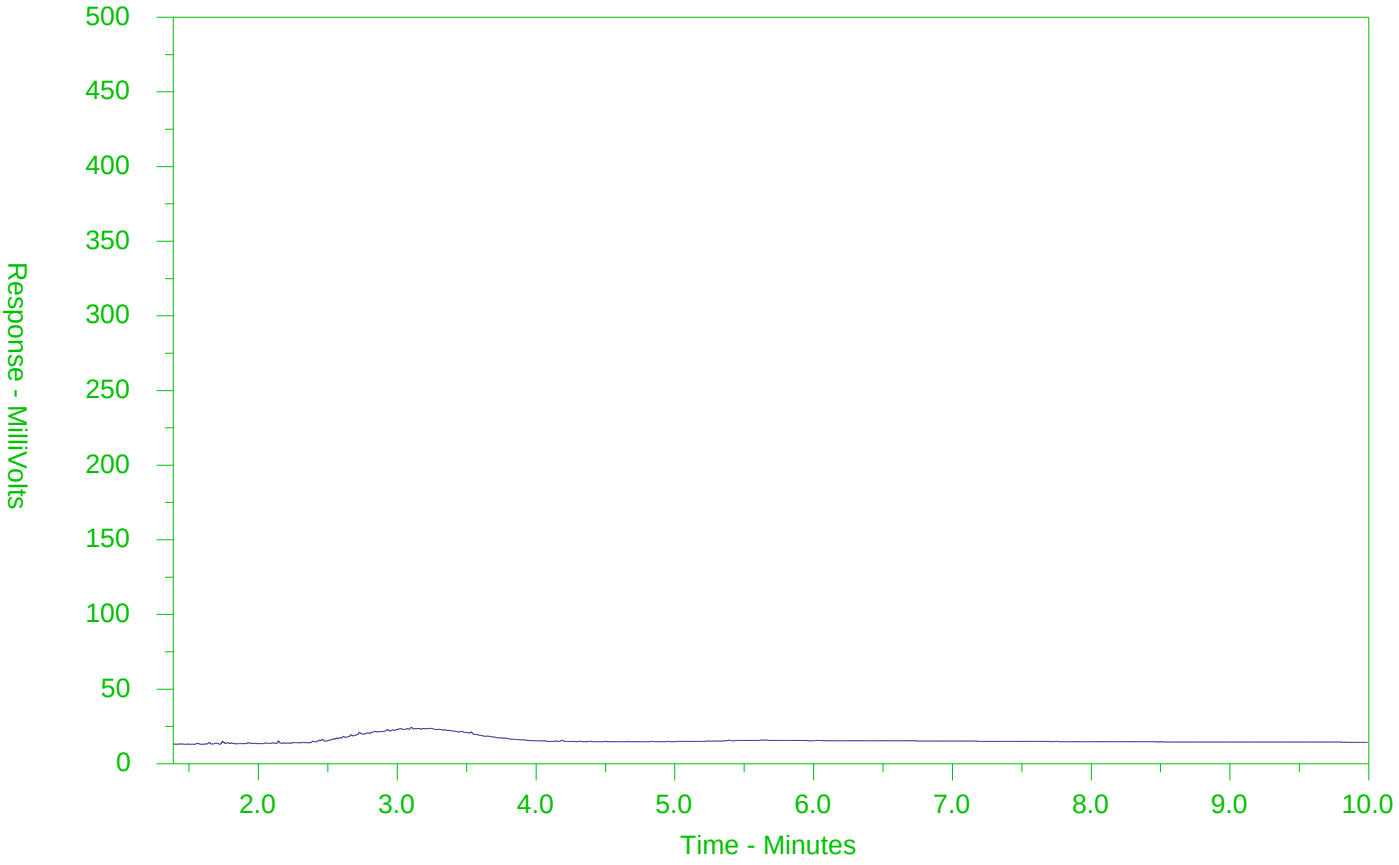
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-2
Client Sample ID: DUP 1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

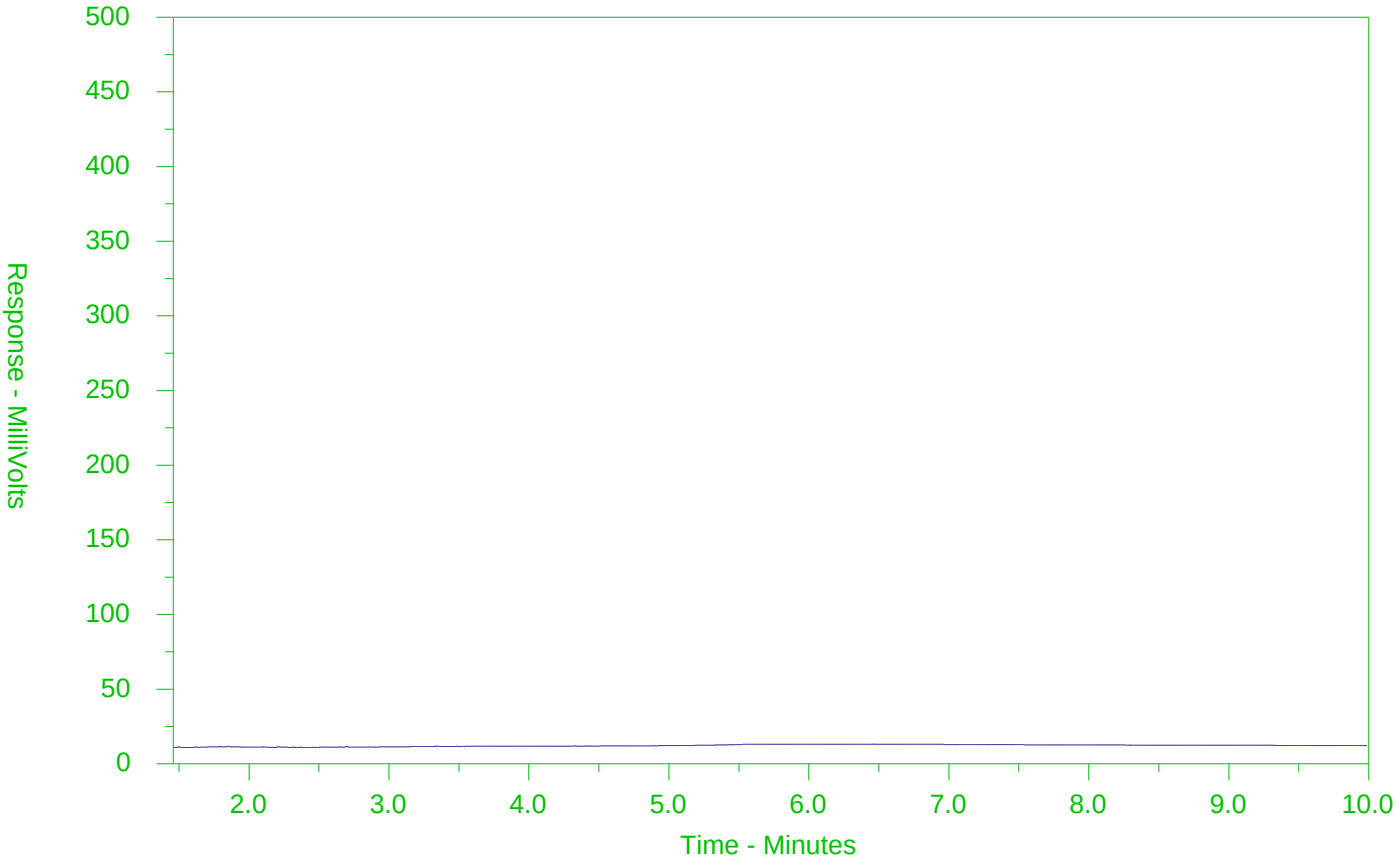
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-3
Client Sample ID: MW17-105D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

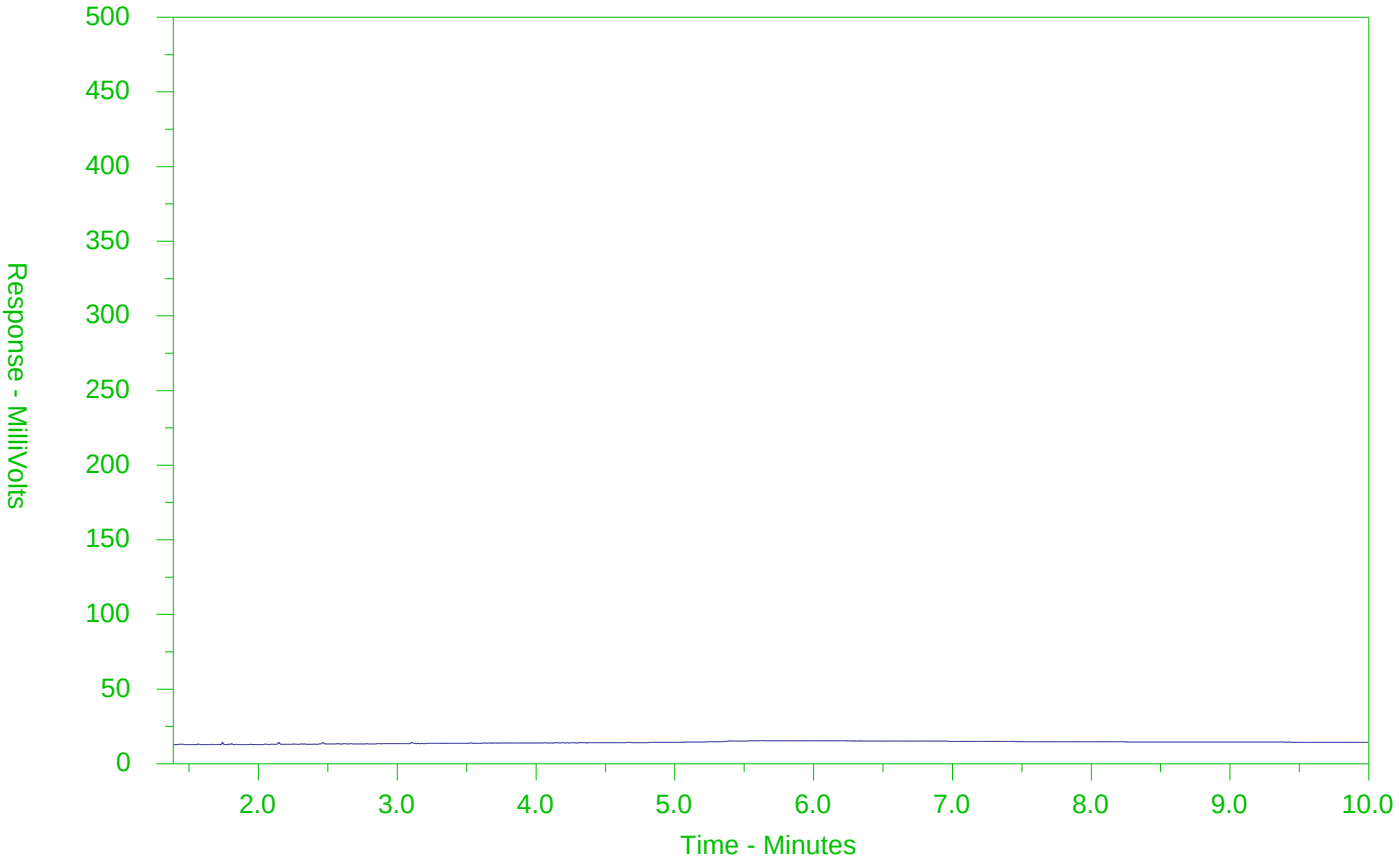
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-4
Client Sample ID: DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

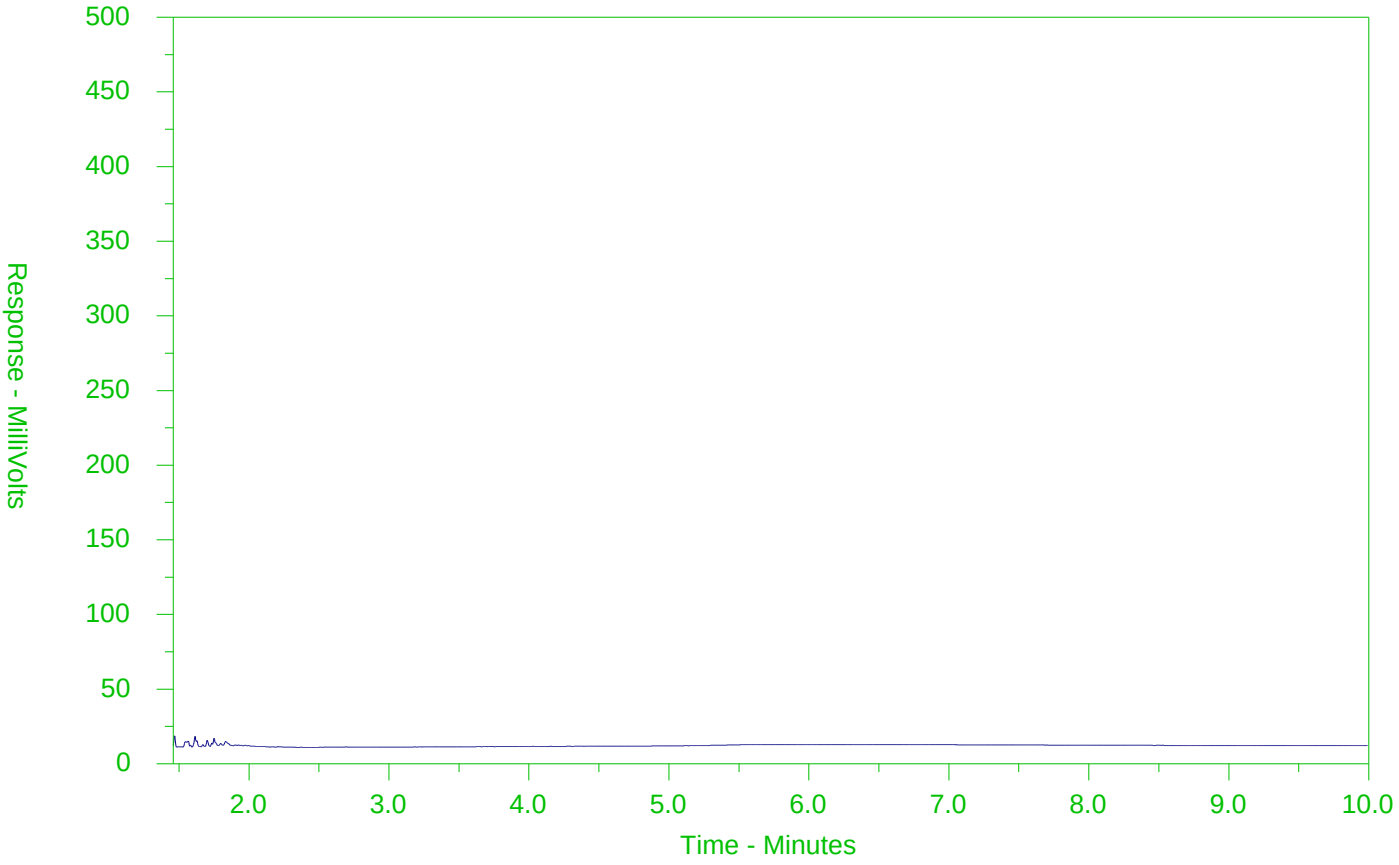
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-5
Client Sample ID: MW17-105S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

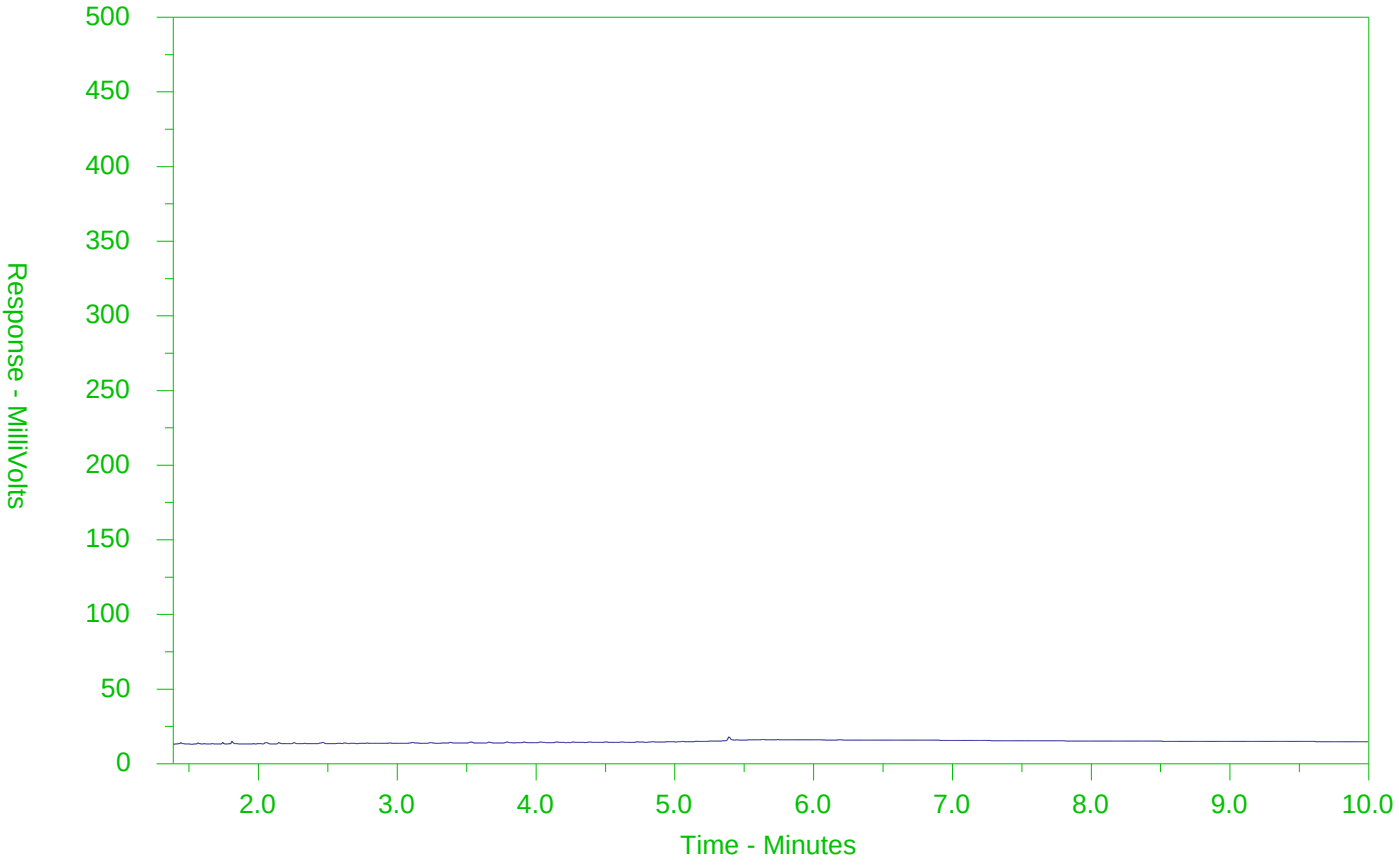
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-6
Client Sample ID: MW17-100S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

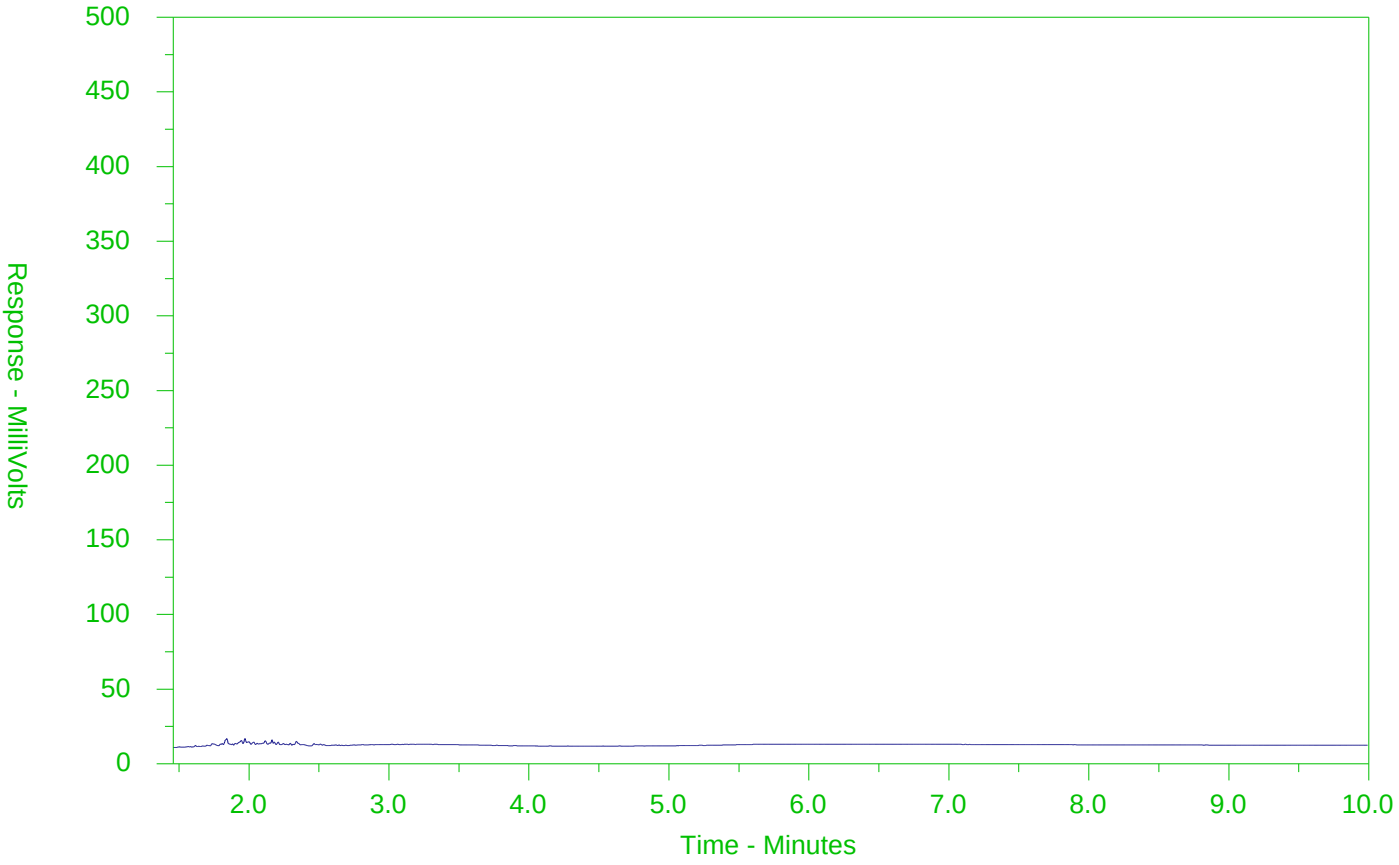
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-8
Client Sample ID: MW17-101S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

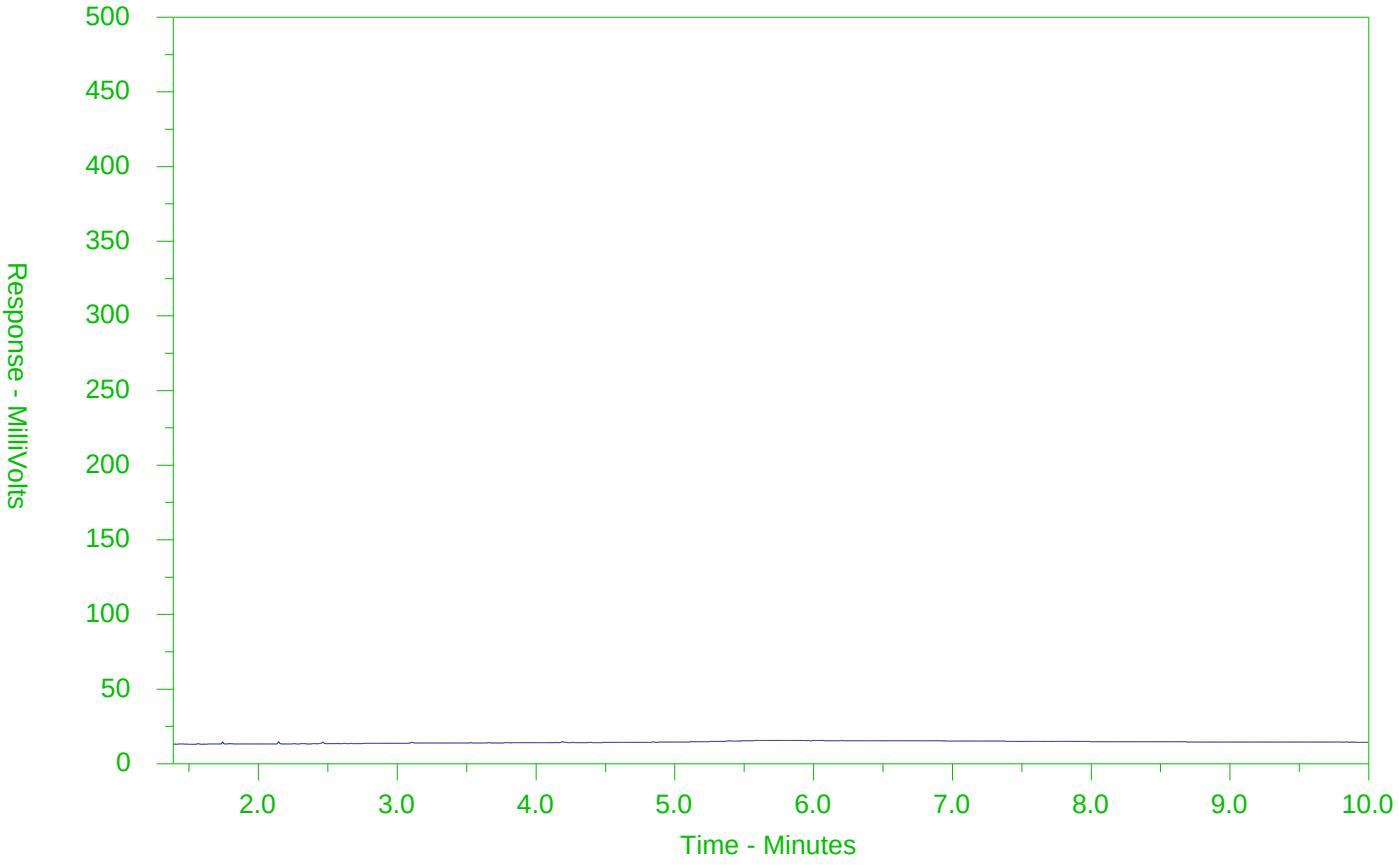
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-10
Client Sample ID: MW17-101D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

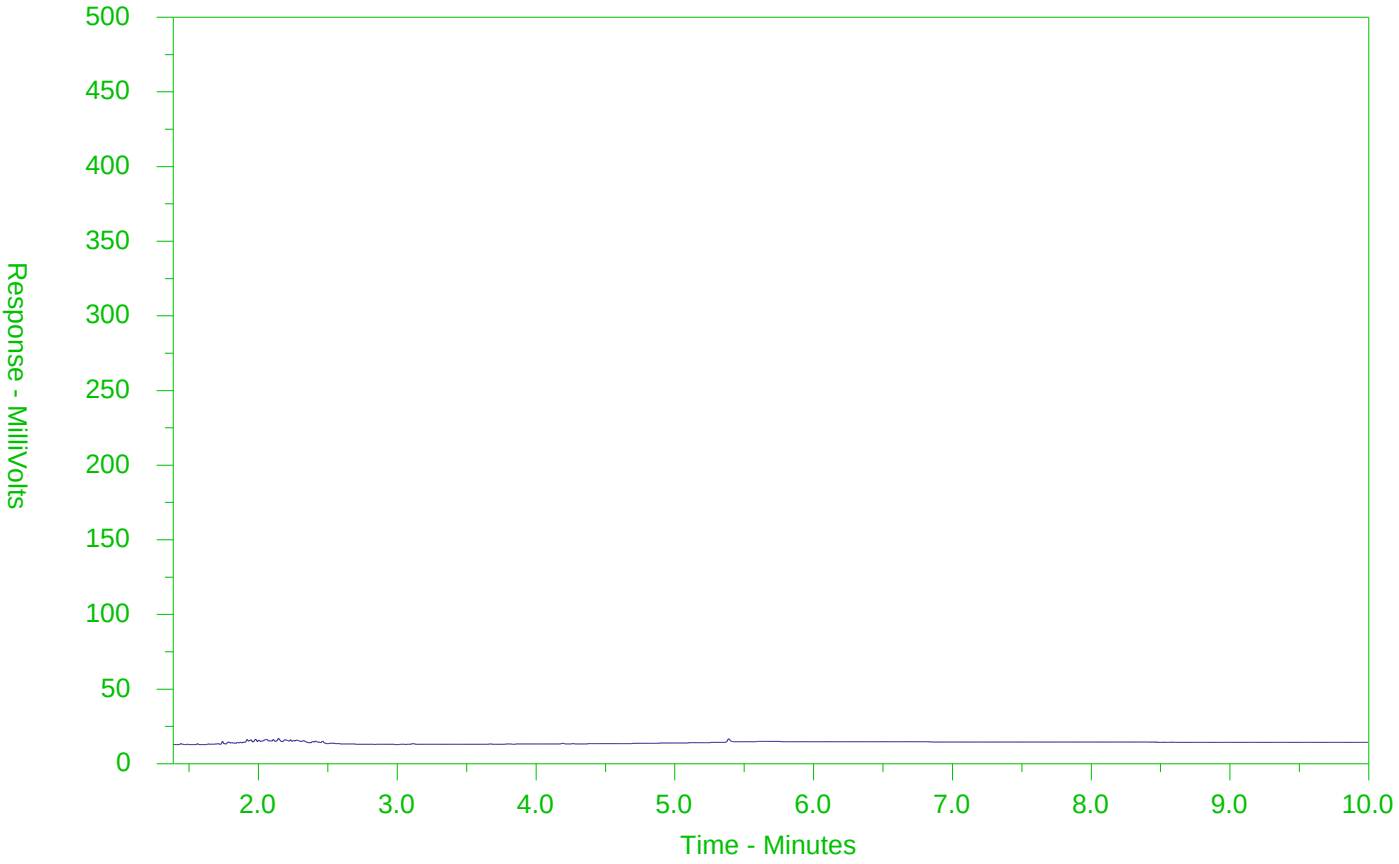
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-11
Client Sample ID: MW17-104D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

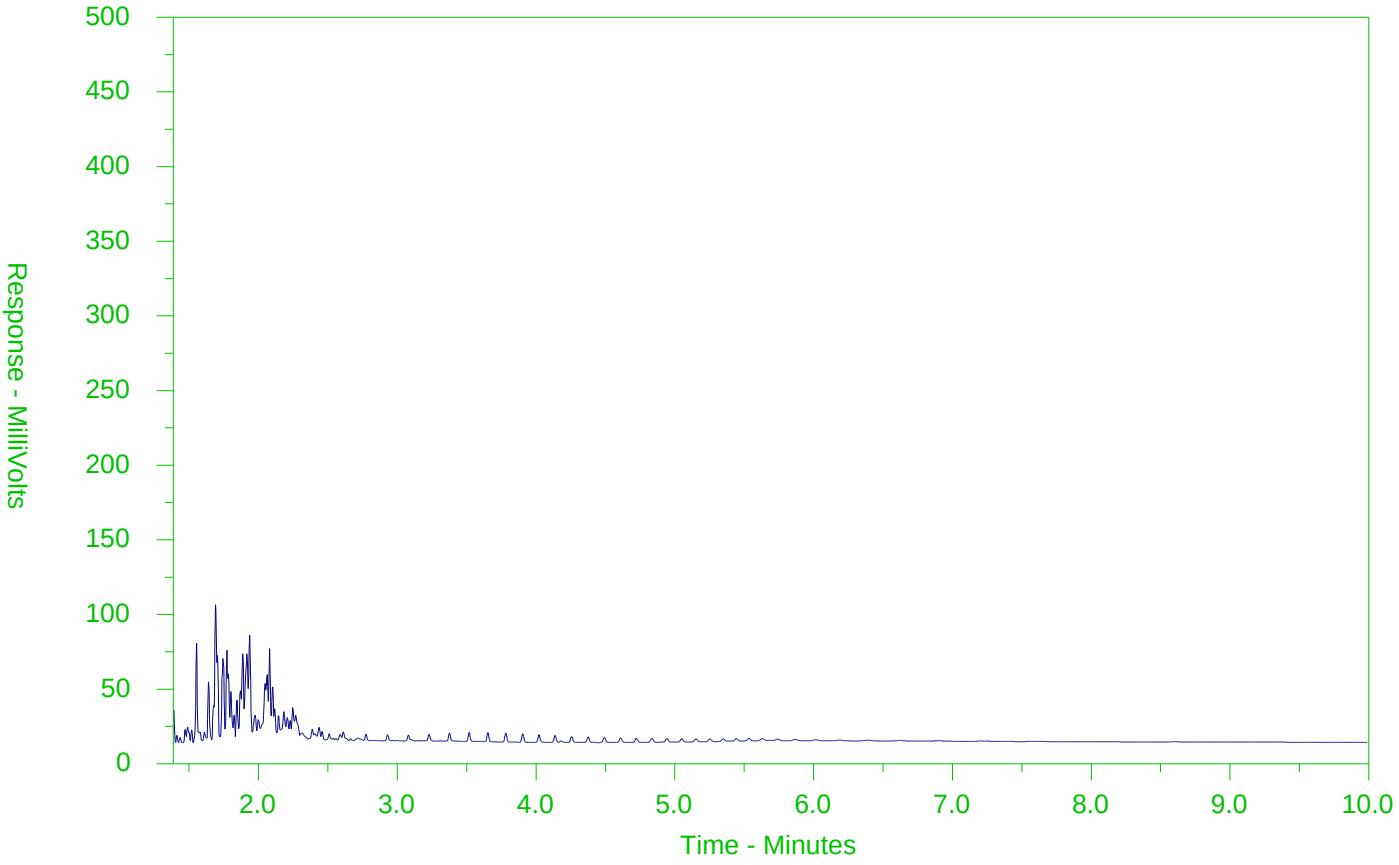
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-12
Client Sample ID: MW17-104S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

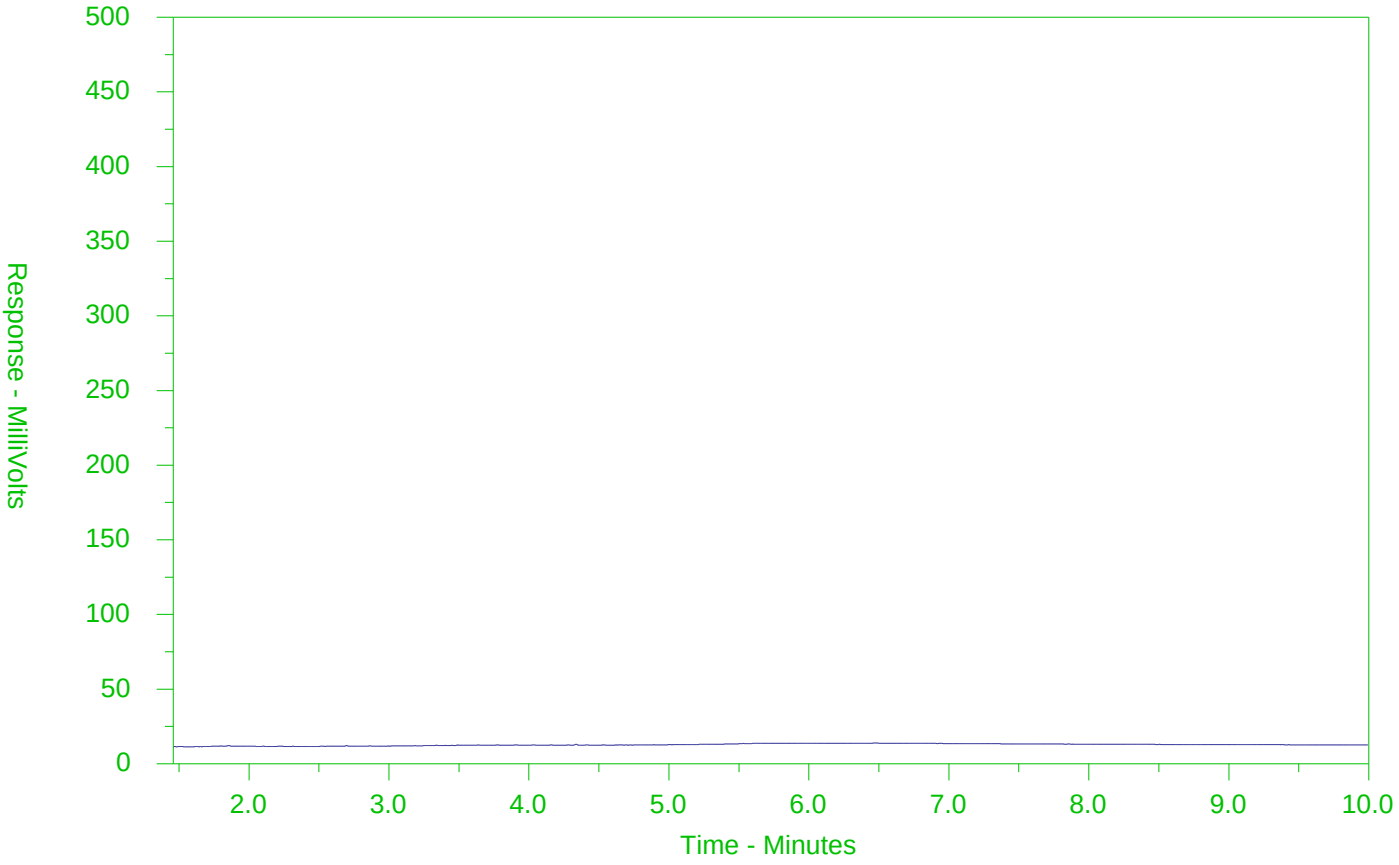
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-13
Client Sample ID: MW17-106S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

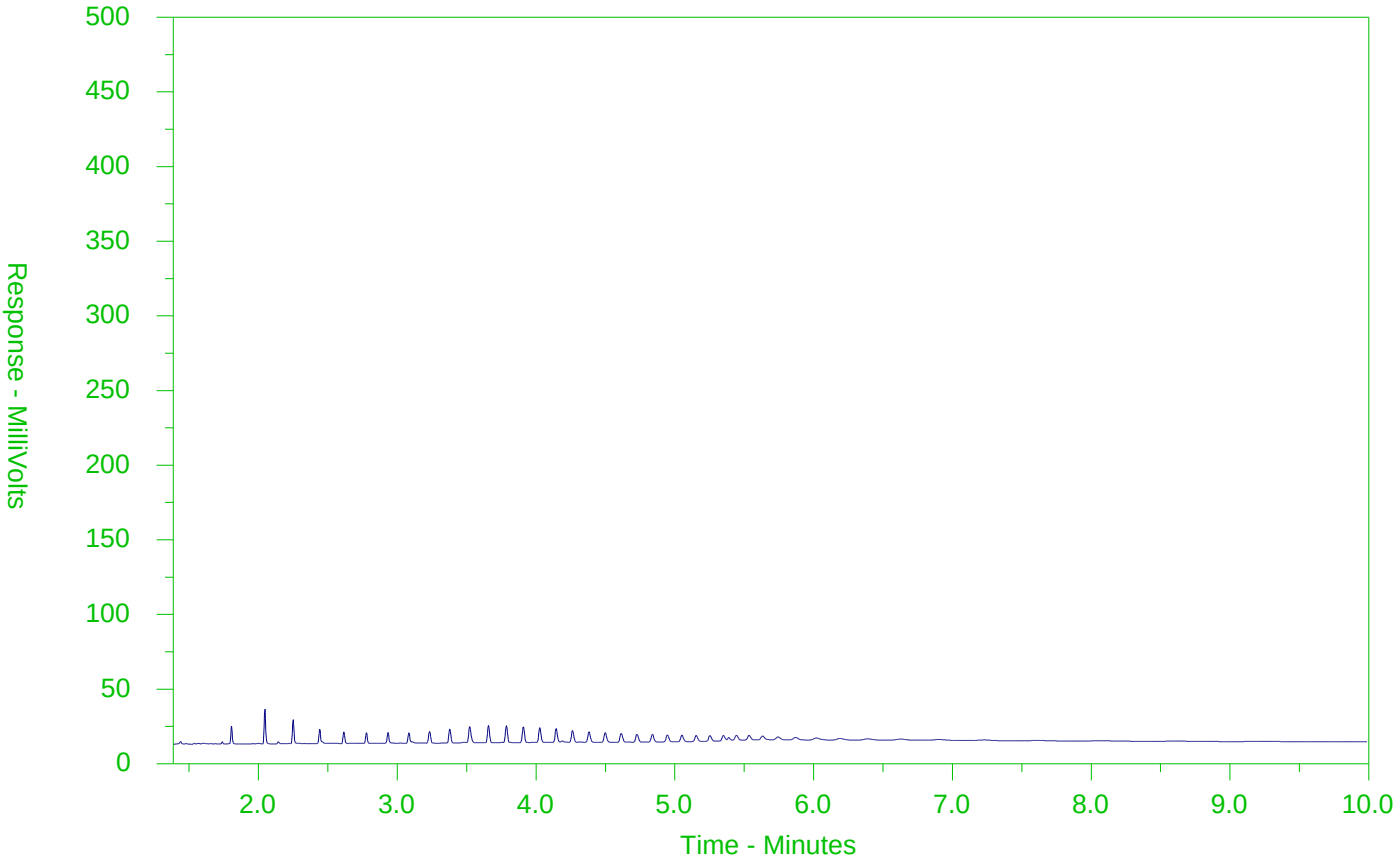
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-14
Client Sample ID: MW17-106D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

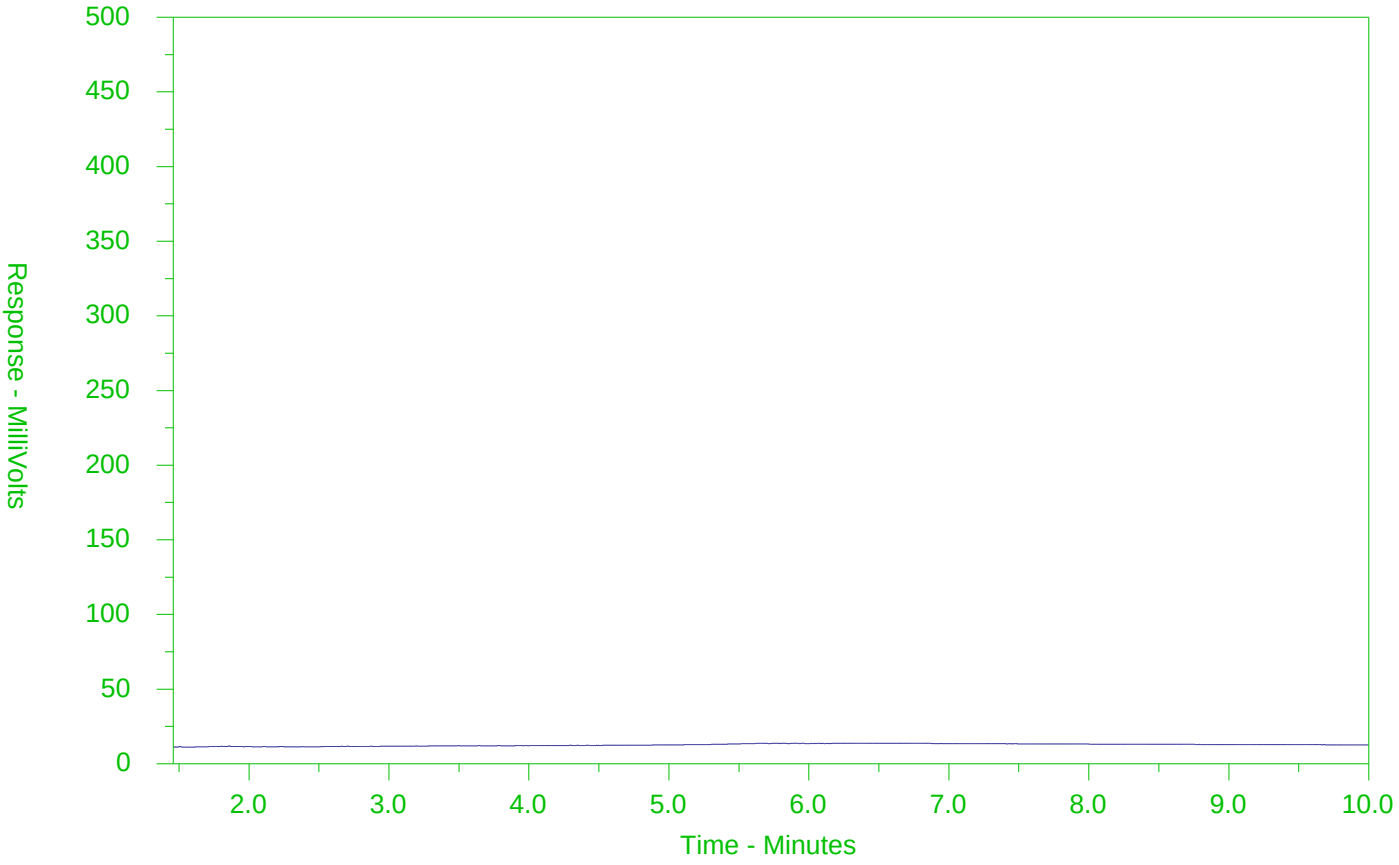
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-15
Client Sample ID: MW17-107S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

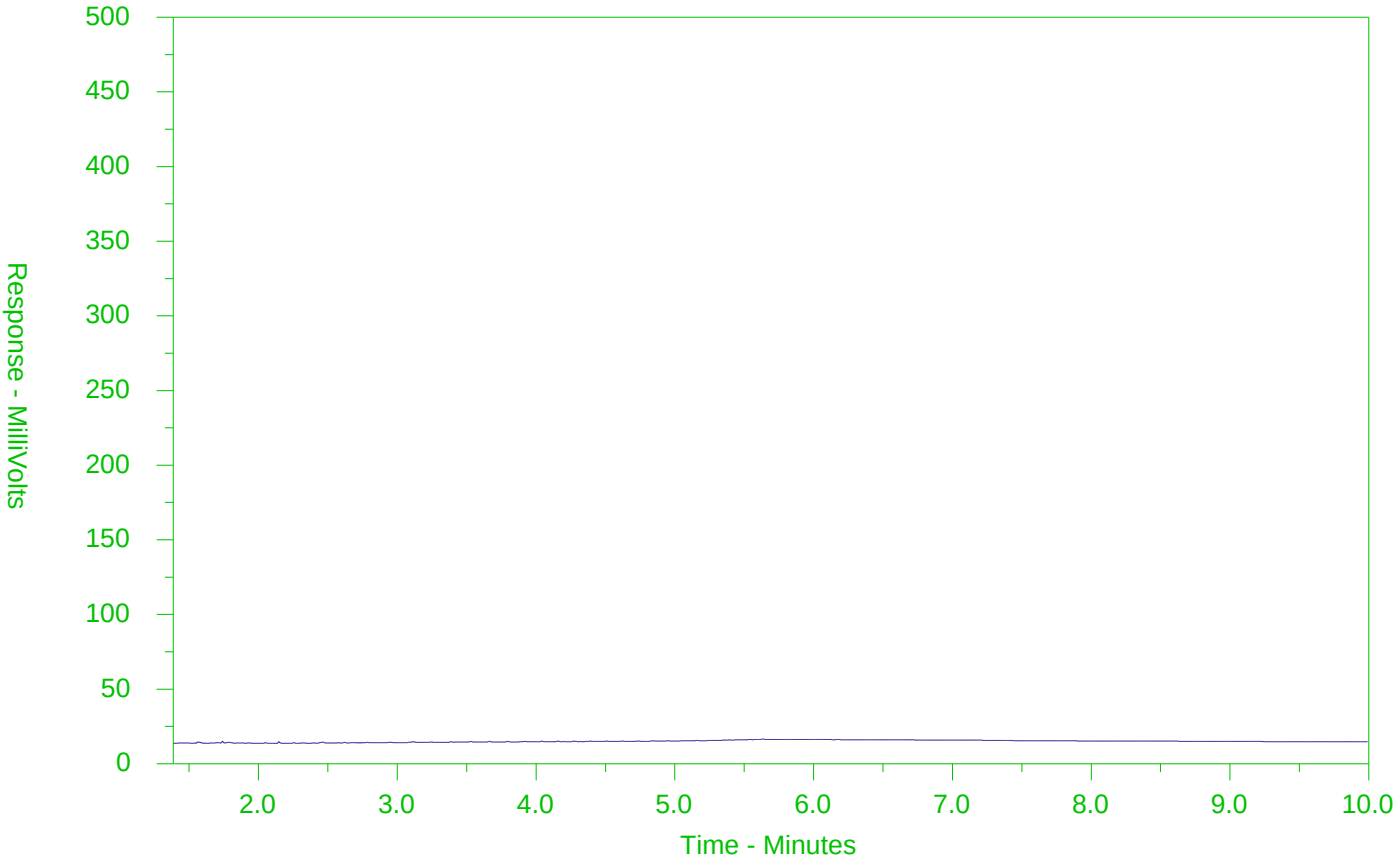
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-17
Client Sample ID: MW17-109S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

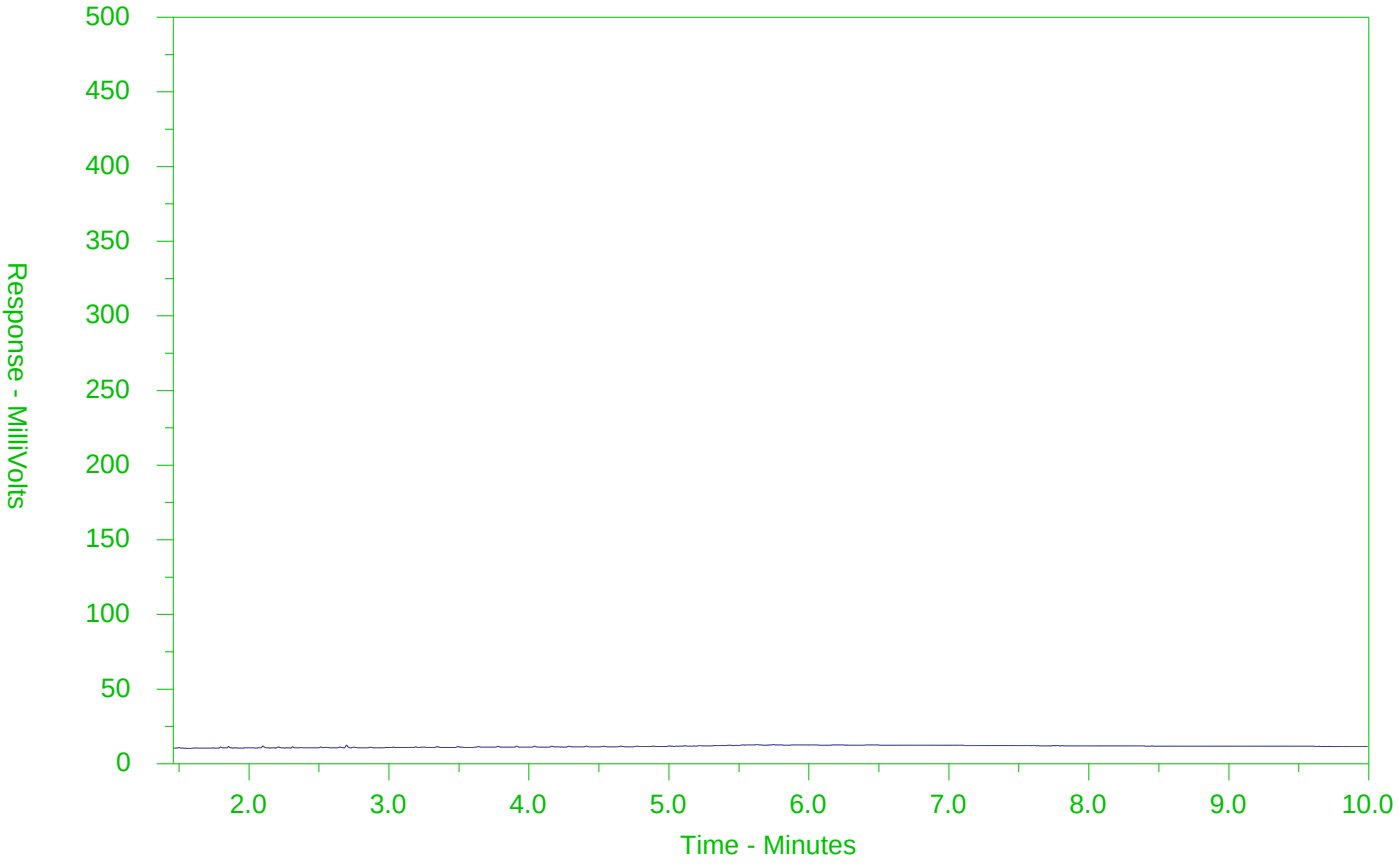
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-19
Client Sample ID: MW17-110S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

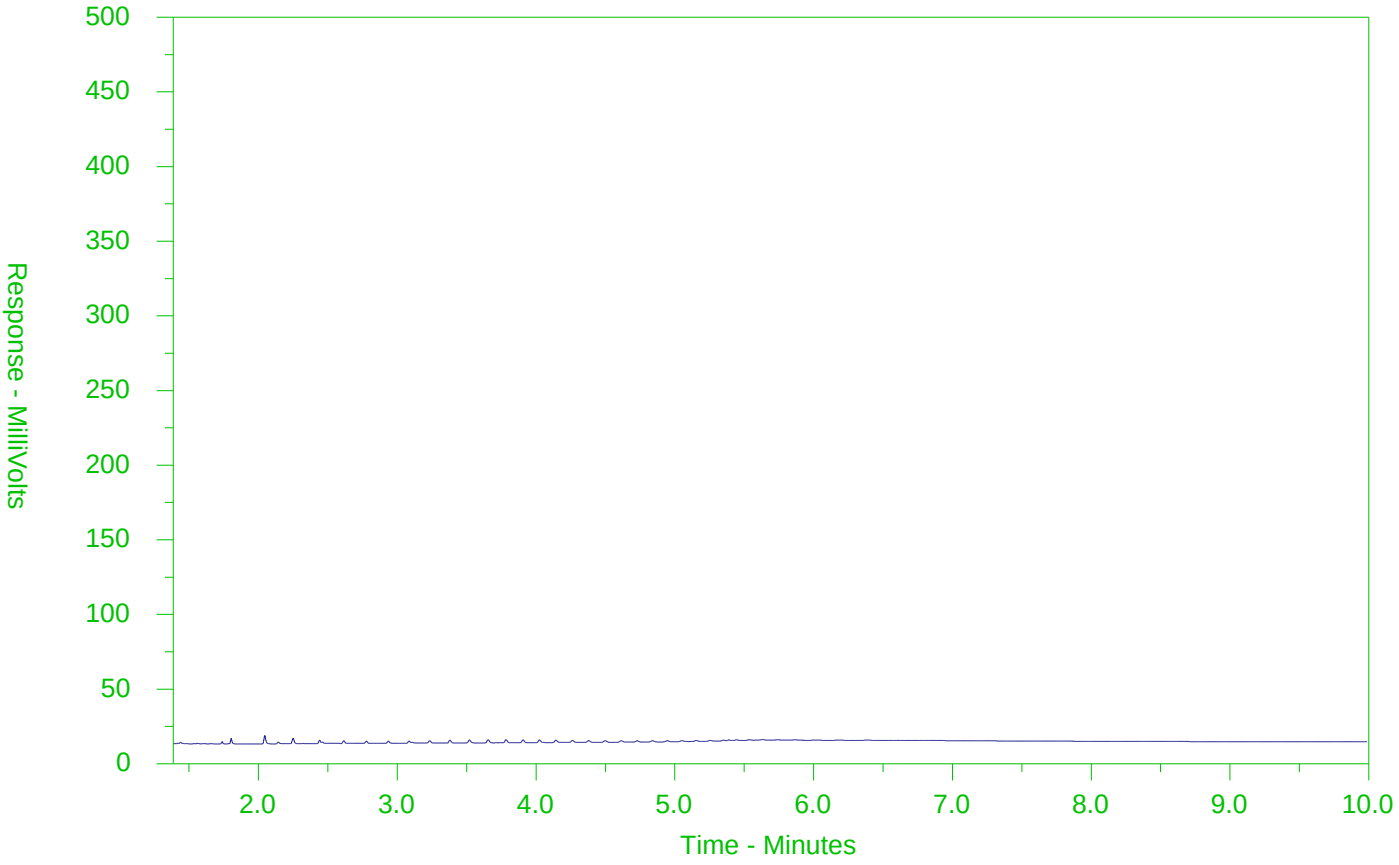
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-20
Client Sample ID: MW17-111S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

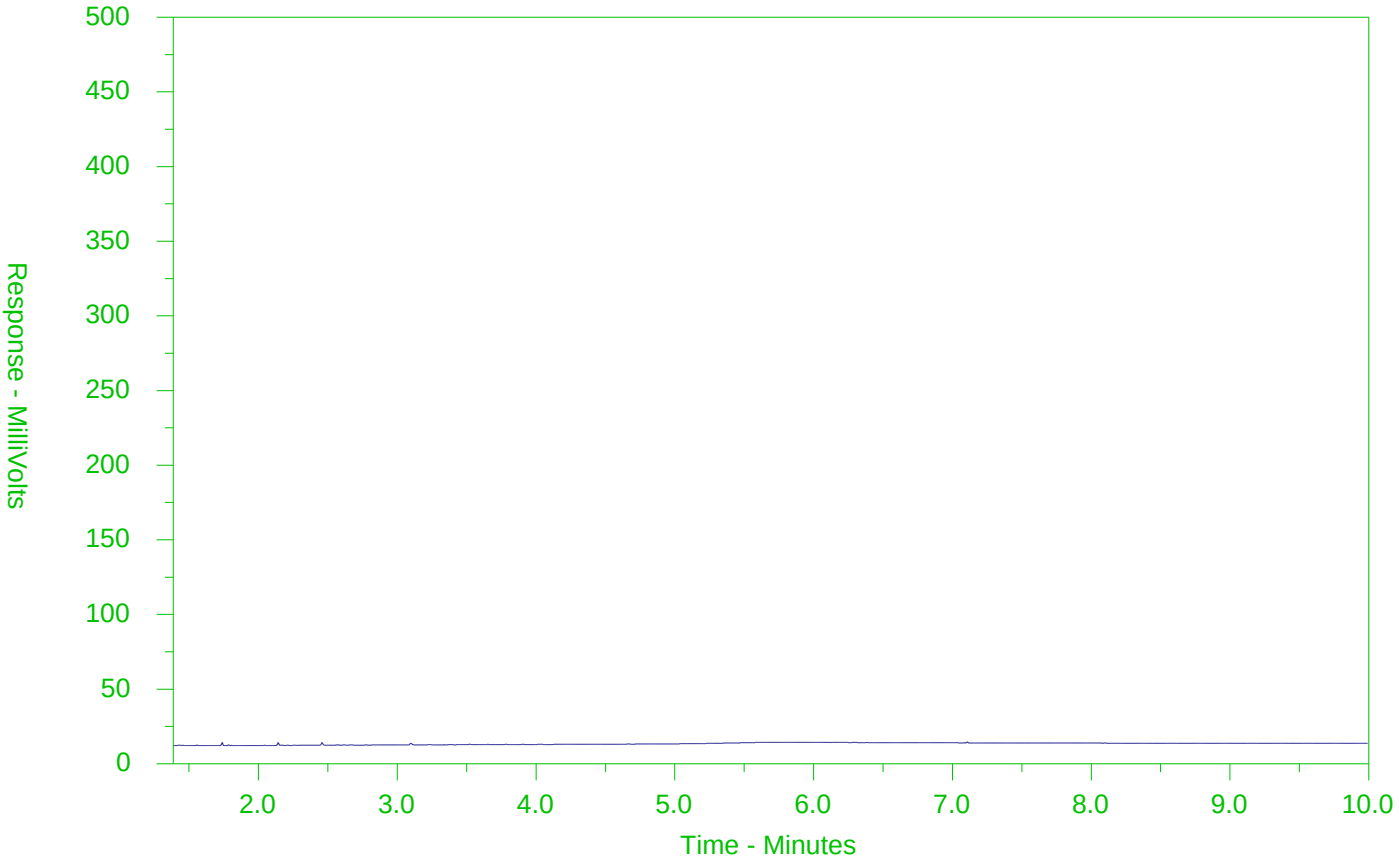
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-21
Client Sample ID: MW17-103S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

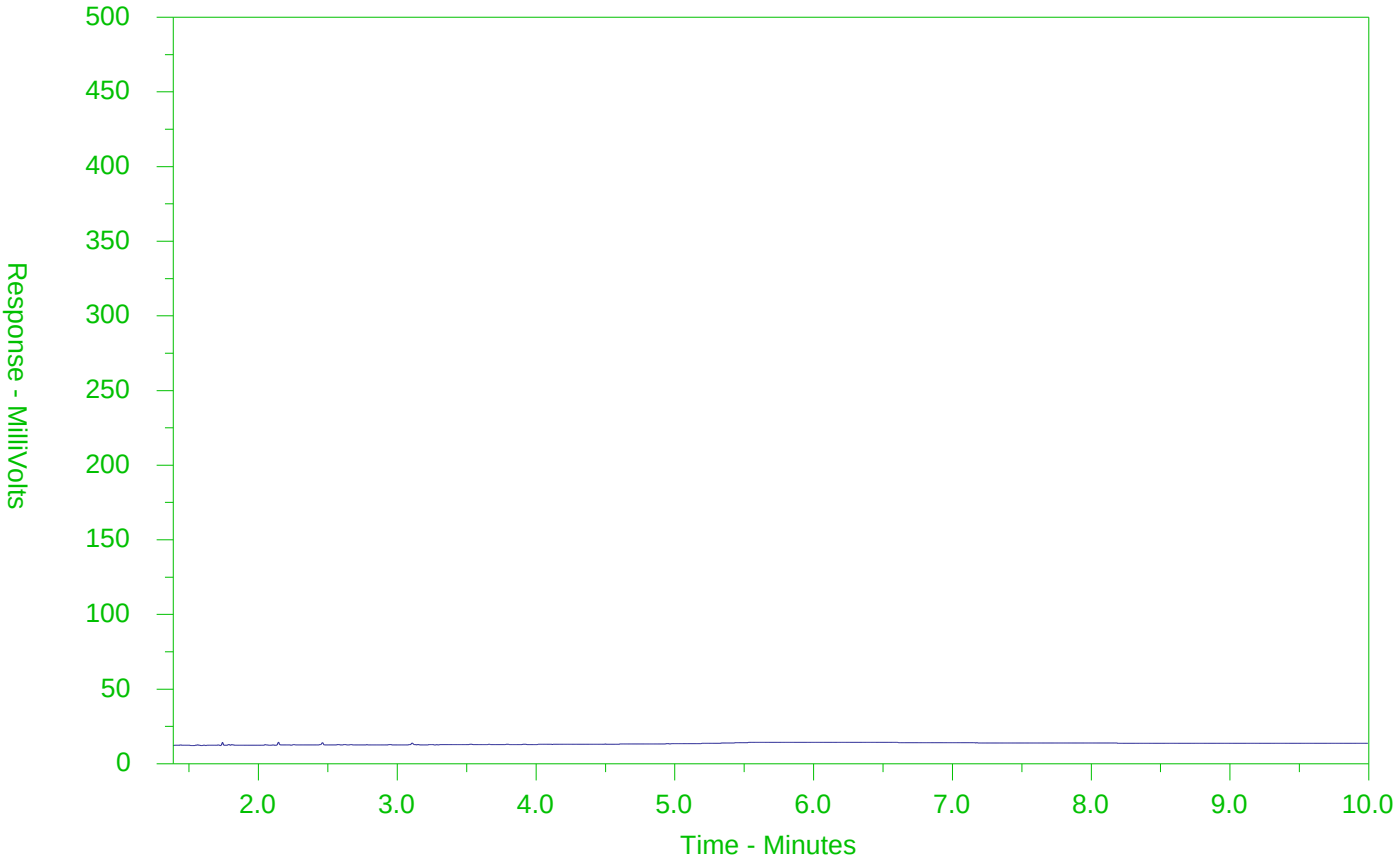
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2017929-23
Client Sample ID: MW17-102D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2017929-COFC

COC Number: 17 - 617075

Page 1 of 3

Report To	Contact and company name below will appear on the final report
Company:	CH2M
Contact:	Peter Memo
Phone:	519-818-4239
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	CH2M
Contact:	Accounts Payable

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Mike
Email 2	Dirk
Email 3	Sylvie / Tania

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	Q62156
Job #:	694757
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only)	L2017929

Oil and Gas Required Fields (client use)	
AFE/Cost Center	PO#
Major/Minor Code	Routing Code
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days)		Emergency	
4 day [P4-20%]	☐	1 Business day [E-100%]	☐
3 day [P3-25%]	☐	Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]	☐
2 day [P2-50%]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals / Inorganics	PAH	SVOC	PHC	VOC	1,4 Dioxane	PCB	SAMPLES ON HOLD	Sample is Hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW17-108S	31/oct/17	11:05	GW	✓	✓		✓	✓					13
2	Dup 1	—	—		✓	✓		✓	✓					13
3	MW17-105D	31/oct/17	13:47		✓			✓	✓					11
4	Dup 2	—	—		✓			✓	✓					11
5	MW17-105S	31/oct/17	14:43		✓	✓		✓	✓					13
6	MW17-100S	31/oct/17	16:10	GW	✓			✓	✓					11
7	Trip Blank 1	31/oct/17	11:05	W					✓					2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 6 RPI

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				2.4	2.3	2.9	4.9

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Peter Memo	Date: 17/11/03	Time: 1335	Received by:	Date:	Time:	Received by:	Date: 3/11/17	Time: 13:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2017929-COFC

COC Number: 17 - 617076

Report To	Contact and company name below will appear on the final report
Company:	CHDM
Contact:	Peter Mung
Phone:	519-818-4239
Company address below will appear on the final report	
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	CHDM
Contact:	Accounts Payable

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: Mike
Email 2: Dirk
Email 3: Kyrie / Tessa

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days): 4 day [P4-20%] ☐ | 3 day [P3-25%] ☐ | 2 day [P2-50%] ☐
Emergency: 1 Business day [E-100%] ☐ | Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:
For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: Q62156
Job #: C944757
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#:
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2017929
ALS Contact:
Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals / Inorganics	PAH	SVOC	PHC	VOC	1,4 Dioxane	PCB	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
8	MW17-101S	01/Nov/17	9:50	GW	✓	✓		✓	✓	✓				16
9	Dup 3	—	—							✓				3
10	MW17-101D	01/Nov/17	10:50		✓	✓		✓	✓	✓				16
11	MW17-104D	01/Nov/17	12:05		✓	✓		✓	✓					13
12	MW17-104S	01/Nov/17	13:00		✓	✓		✓	✓					13
13	MW17-106S	01/Nov/17	14:35		✓	✓		✓	✓					13
14	MW17-106D	01/Nov/17	15:35					✓	✓					6
15	MW17-107S	01/Nov/17	16:25		✓		✓	✓	✓					14
16	Dup 4	—	—	GW			✓							3

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO
Are samples for human consumption/ use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 6 RPI

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations: Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact: Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				2.4	2.3	2.9	4.9

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Peter Mung	17/11/03	1335

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
[illegible]	3/11/17	13:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2017929-COFC

COC Number: 17 - 617082

Report To	Contact and company name below will appear on the final report
Company:	CH2M
Contact:	Peter Mamo
Phone:	519-818-4239
	Company address below will appear on the final report
Street:	
City/Province:	
Postal Code:	
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	CH2M
Contact:	Accounts Payable

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: Mike
Email 2: Dirk
Email 3: Kytric / Tanja

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax:
Email 2:

Project Information

ALS Account # / Quote #: Q62156
Job #: 694757
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2017929
ALS Contact: Sampler:

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4-20%] ☐; 3 day [P3-25%] ☐; 2 day [P2-50%] ☐
EMERGENCY: 1 Business day [E-100%] ☐; Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐

Date and Time Required for all E&P TATs:
For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals Inorganics	PAH	SVOC	PHC	VOC	1,4 Dioxane	PCB	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
17	MW17-109S	02/Nov/17	9:43	GW	✓	✓		✓	✓		✓			15
18	Dup 5	—	—								✓			2
19	MW17-110S	02/Nov/17	10:40		✓	✓		✓	✓					13
20	MW17-111S	02/Nov/17	11:58		✓			✓	✓		✓			13
21	MW17-103S	02/Nov/17	13:32		✓		✓	✓	✓					14
22	MW17-103D	02/Nov/17	14:54						✓					2
23	MW17-102D	03/Nov/17	10:59	GW				✓	✓					6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO
Are samples for human consumption/ use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Table 6 RPI

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				2.4	2.3	2.9	4.9

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Peter Mamo	17/11/03	1335

INITIAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by:	Date:	Time:
AK	3/11/17	13:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: TANIA MCCARTHY
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 21-MAR-18
Report Date: 29-MAR-18 14:44 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2070926

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-622470, 17-622471
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-1 MW17-1085 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	0.61		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-1 MW17-1085 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	103.5		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		23-MAR-18	R3994159
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		26-MAR-18	R3995262
F1-BTEX	<25		25	ug/L		28-MAR-18	
F2 (C10-C16)	<100		100	ug/L	26-MAR-18	26-MAR-18	R3995906
F2-Naphth	<100		100	ug/L		28-MAR-18	
F3 (C16-C34)	<250		250	ug/L	26-MAR-18	26-MAR-18	R3995906
F3-PAH	<250		250	ug/L		28-MAR-18	
F4 (C34-C50)	<250		250	ug/L	26-MAR-18	26-MAR-18	R3995906
Total Hydrocarbons (C6-C50)	<370		370	ug/L		28-MAR-18	
Chrom. to baseline at nC50	YES				26-MAR-18	26-MAR-18	R3995906
Surrogate: 2-Bromobenzotrifluoride	91.0		60-140	%	26-MAR-18	26-MAR-18	R3995906
Surrogate: 3,4-Dichlorotoluene	79.8		60-140	%		26-MAR-18	R3995262
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.026	R	0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Acenaphthylene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Anthracene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Benzo(a)anthracene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Benzo(a)pyrene	<0.010		0.010	ug/L	26-MAR-18	28-MAR-18	R3997800
Benzo(b)fluoranthene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Chrysene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Fluoranthene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Fluorene	0.122		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		28-MAR-18	
1-Methylnaphthalene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
2-Methylnaphthalene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Naphthalene	<0.050		0.050	ug/L	26-MAR-18	28-MAR-18	R3997800
Phenanthrene	<0.020		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Pyrene	0.034		0.020	ug/L	26-MAR-18	28-MAR-18	R3997800
Surrogate: d10-Acenaphthene	97.9		60-140	%	26-MAR-18	28-MAR-18	R3997800
Surrogate: d12-Chrysene	80.0		60-140	%	26-MAR-18	28-MAR-18	R3997800
Surrogate: d8-Naphthalene	93.8		60-140	%	26-MAR-18	28-MAR-18	R3997800
Surrogate: d10-Phenanthrene	97.8		60-140	%	26-MAR-18	28-MAR-18	R3997800
L2070926-2 OW9-II Sampled By: LR/MS on 20-MAR-18 @ 17:00 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-2 OW9-II Sampled By: LR/MS on 20-MAR-18 @ 17:00 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	17.9		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	135		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	76		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	0.46		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	2.38		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Molybdenum (Mo)-Dissolved	2.00		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	4.81		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.074		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	12200		500	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	0.110		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	1.11		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	581		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
L2070926-3 OW11-II Sampled By: LR/MS on 20-MAR-18 @ 13:40 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	2.09		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	134		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	123		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	0.174		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	1.36		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	0.46		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	4.08		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Molybdenum (Mo)-Dissolved	1.06		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	1.54		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.432		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	92700		500	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	0.225		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	1.15		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-3 OW11-II Sampled By: LR/MS on 20-MAR-18 @ 13:40 Matrix: WATER							
Dissolved Metals							
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	383		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
L2070926-4 OW12 Sampled By: LR/MS on 20-MAR-18 @ 14:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	0.83		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	6.58		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-4 OW12 Sampled By: LR/MS on 20-MAR-18 @ 14:50 Matrix: WATER							
Volatile Organic Compounds							
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	103.3		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%		23-MAR-18	R3994159
L2070926-5 OW13 Sampled By: LR/MS on 20-MAR-18 @ 17:45 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	2.67		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-5 OW13 Sampled By: LR/MS on 20-MAR-18 @ 17:45 Matrix: WATER							
Volatile Organic Compounds							
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	0.75		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	104.0		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%		23-MAR-18	R3994159
L2070926-6 OW235 Sampled By: LR/MS on 20-MAR-18 @ 17:20 Matrix: WATER							
Physical Tests							
Conductivity	0.827		0.0030	mS/cm		23-MAR-18	R3994819
pH	7.02		0.10	pH units		23-MAR-18	R3994819
Anions and Nutrients							
Chloride (Cl)	3.08		0.50	mg/L		26-MAR-18	R3996206
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		23-MAR-18	R3994290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					23-MAR-18	R3994134
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	1.13		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	84.4		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	55		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	23-MAR-18	R3994430
Molybdenum (Mo)-Dissolved	0.310		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.185		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-6 OW235 Sampled By: LR/MS on 20-MAR-18 @ 17:20 Matrix: WATER							
Dissolved Metals							
Sodium (Na)-Dissolved	8740		500	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	0.119		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	0.64		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		27-MAR-18	R3996507
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-6 OW235 Sampled By: LR/MS on 20-MAR-18 @ 17:20 Matrix: WATER							
Volatile Organic Compounds							
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	0.49		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	102.4		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		23-MAR-18	R3994159
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		26-MAR-18	R3995262
F1-BTEX	<25		25	ug/L		29-MAR-18	
F2 (C10-C16)	120		100	ug/L	26-MAR-18	26-MAR-18	R3995906
F2-Naphth	120		100	ug/L		29-MAR-18	
F3 (C16-C34)	7360		250	ug/L	26-MAR-18	26-MAR-18	R3995906
F3-PAH	7350		250	ug/L		29-MAR-18	
F4 (C34-C50)	430		250	ug/L	26-MAR-18	26-MAR-18	R3995906
Total Hydrocarbons (C6-C50)	7900		370	ug/L		29-MAR-18	
Chrom. to baseline at nC50	YES				26-MAR-18	26-MAR-18	R3995906
Surrogate: 2-Bromobenzotrifluoride	96.8		60-140	%	26-MAR-18	26-MAR-18	R3995906
Surrogate: 3,4-Dichlorotoluene	82.4		60-140	%		26-MAR-18	R3995262
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.086		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Acenaphthylene	0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Anthracene	0.068		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(a)anthracene	0.108		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(a)pyrene	<0.025	DLM	0.025	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(b)fluoranthene	0.028		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Chrysene	0.222		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Fluoranthene	0.142		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Fluorene	0.318		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
1+2-Methylnaphthalenes	0.526		0.028	ug/L		29-MAR-18	
1-Methylnaphthalene	0.456		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
2-Methylnaphthalene	0.070		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Naphthalene	0.118		0.050	ug/L	26-MAR-18	29-MAR-18	R3997800

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-6 OW235 Sampled By: LR/MS on 20-MAR-18 @ 17:20 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Phenanthrene	1.33		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Pyrene	0.308		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Surrogate: d10-Acenaphthene	99		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d12-Chrysene	61		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d8-Naphthalene	94		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d10-Phenanthrene	96		60-140	%	26-MAR-18	29-MAR-18	R3997800
L2070926-7 OW07-33 Sampled By: LR/MS on 20-MAR-18 @ 15:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	0.23		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	0.42		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	41.7		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	56		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	0.712		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	1.28		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	4.33		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	8.92		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Molybdenum (Mo)-Dissolved	2.98		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	4.68		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.422		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	122000	DLHC	5000	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	0.108		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	4.23		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	655		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
L2070926-8 DUP 1 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Physical Tests							
Conductivity	0.835		0.0030	mS/cm		23-MAR-18	R3994819
pH	7.01		0.10	pH units		23-MAR-18	R3994819
Anions and Nutrients							
Chloride (Cl)	3.04		0.50	mg/L		26-MAR-18	R3996206
Cyanides							
Cyanide, Weak Acid Diss	<2.0		2.0	ug/L		23-MAR-18	R3994290
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					23-MAR-18	R3994134

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-8 DUP 1 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	1.17		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	83.1		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	56		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Mercury (Hg)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	23-MAR-18	R3994430
Molybdenum (Mo)-Dissolved	0.318		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.270		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	8870		500	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	0.123		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	0.63		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	1.0		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Speciated Metals							
Chromium, Hexavalent	<1.0		1.0	ug/L		27-MAR-18	R3996507
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-8 DUP 1 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Volatile Organic Compounds							
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	0.48		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	102.2		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%		23-MAR-18	R3994159
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		26-MAR-18	R3995262
F1-BTEX	<25		25	ug/L		29-MAR-18	
F2 (C10-C16)	130		100	ug/L	26-MAR-18	26-MAR-18	R3995906
F2-Naphth	130		100	ug/L		29-MAR-18	
F3 (C16-C34)	8060		250	ug/L	26-MAR-18	26-MAR-18	R3995906
F3-PAH	8050		250	ug/L		29-MAR-18	
F4 (C34-C50)	550		250	ug/L	26-MAR-18	26-MAR-18	R3995906
Total Hydrocarbons (C6-C50)	8730		370	ug/L		29-MAR-18	
Chrom. to baseline at nC50	YES				26-MAR-18	26-MAR-18	R3995906
Surrogate: 2-Bromobenzotrifluoride	87.2		60-140	%	26-MAR-18	26-MAR-18	R3995906
Surrogate: 3,4-Dichlorotoluene	78.2		60-140	%		26-MAR-18	R3995262
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.072		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-8 DUP 1 Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthylene	0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Anthracene	0.102		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(a)anthracene	0.114		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(a)pyrene	<0.025	DLM	0.025	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(b)fluoranthene	0.030		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Benzo(k)fluoranthene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Chrysene	0.266		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Fluoranthene	0.140		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Fluorene	0.332		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
1+2-Methylnaphthalenes	0.532		0.028	ug/L		29-MAR-18	
1-Methylnaphthalene	0.456		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
2-Methylnaphthalene	0.076		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Naphthalene	0.112		0.050	ug/L	26-MAR-18	29-MAR-18	R3997800
Phenanthrene	1.43		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Pyrene	0.322		0.020	ug/L	26-MAR-18	29-MAR-18	R3997800
Surrogate: d10-Acenaphthene	100		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d12-Chrysene	64		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d8-Naphthalene	97		60-140	%	26-MAR-18	29-MAR-18	R3997800
Surrogate: d10-Phenanthrene	93		60-140	%	26-MAR-18	29-MAR-18	R3997800
L2070926-9 MW17-101D Sampled By: LR/MS on 21-MAR-18 @ 10:30 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	6.87		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
L2070926-10 OW14 Sampled By: LR/MS on 21-MAR-18 @ 12:10 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-10 OW14 Sampled By: LR/MS on 21-MAR-18 @ 12:10 Matrix: WATER							
Volatile Organic Compounds							
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	0.85		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	103.0		70-130	%		23-MAR-18	R3994159
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%		23-MAR-18	R3994159
L2070926-11 OW19 Sampled By: LR/MS on 21-MAR-18 @ 11:35 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994159
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994159

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-11 OW19 Sampled By: LR/MS on 21-MAR-18 @ 11:35 Matrix: WATER							
Volatile Organic Compounds							
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994159
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994159
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994159
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994159
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994159
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994159
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994159
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994159
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994159
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994159
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994159
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Tetrachloroethylene	1.14		0.50	ug/L		23-MAR-18	R3994159
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994159
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994159
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994159
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994159
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994159
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	102.6		70-130	%		23-MAR-18	R3994159

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-11 OW19 Sampled By: LR/MS on 21-MAR-18 @ 11:35 Matrix: WATER							
Volatile Organic Compounds							
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%		23-MAR-18	R3994159
L2070926-12 OW225 Sampled By: LR/MS on 21-MAR-18 @ 11:15 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	18.9	DLHC	1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	<100	DLHC	100	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	0.240	DLHC	0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	6.7	DLHC	2.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Lead (Pb)-Dissolved	1.90	DLHC	0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Molybdenum (Mo)-Dissolved	12.5	DLHC	0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	12.0	DLHC	5.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	<5000	DLHC	5000	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	7.24	DLHC	0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	1740	DLHC	10	ug/L	23-MAR-18	26-MAR-18	R3995938
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994268
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994268
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994268
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994268
1,2-Dibromoethane	<3.0	DLVH	3.0	ug/L		23-MAR-18	R3994268
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-12 OW225 Sampled By: LR/MS on 21-MAR-18 @ 11:15 Matrix: WATER							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994268
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994268
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994268
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994268
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994268
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994268
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994268
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,2,2-Tetrachloroethane	<20	DLVH	20	ug/L		23-MAR-18	R3994268
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,2-Trichloroethane	<3.0	DLVH	3.0	ug/L		23-MAR-18	R3994268
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994268
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994268
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994268
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994268
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	102.7		70-130	%		23-MAR-18	R3994268
Surrogate: 1,4-Difluorobenzene	99.1		70-130	%		23-MAR-18	R3994268
L2070926-13 OW07-31 Sampled By: LR/MS on 21-MAR-18 @ 09:40 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-MAR-18	R3994014
Antimony (Sb)-Dissolved	0.14		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Arsenic (As)-Dissolved	33.9		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Barium (Ba)-Dissolved	50.6		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Boron (B)-Dissolved	52		10	ug/L	23-MAR-18	26-MAR-18	R3995938
Cadmium (Cd)-Dissolved	0.018		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Cobalt (Co)-Dissolved	0.51		0.10	ug/L	23-MAR-18	26-MAR-18	R3995938
Copper (Cu)-Dissolved	0.39		0.20	ug/L	23-MAR-18	26-MAR-18	R3995938

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-13 OW07-31 Sampled By: LR/MS on 21-MAR-18 @ 09:40 Matrix: WATER							
Dissolved Metals							
Lead (Pb)-Dissolved	0.299		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Molybdenum (Mo)-Dissolved	1.67		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Nickel (Ni)-Dissolved	1.37		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Selenium (Se)-Dissolved	0.318		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	23-MAR-18	26-MAR-18	R3995938
Sodium (Na)-Dissolved	97500		500	ug/L	23-MAR-18	26-MAR-18	R3995938
Thallium (Tl)-Dissolved	0.012		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Uranium (U)-Dissolved	1.77		0.010	ug/L	23-MAR-18	26-MAR-18	R3995938
Vanadium (V)-Dissolved	1.14		0.50	ug/L	23-MAR-18	26-MAR-18	R3995938
Zinc (Zn)-Dissolved	73.3		1.0	ug/L	23-MAR-18	26-MAR-18	R3995938
L2070926-14 TRIP BLANK Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-MAR-18	R3994268
Benzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Bromodichloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
Bromoform	<5.0		5.0	ug/L		23-MAR-18	R3994268
Bromomethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Carbon tetrachloride	<0.20		0.20	ug/L		23-MAR-18	R3994268
Chlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Dibromochloromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
Chloroform	<1.0		1.0	ug/L		23-MAR-18	R3994268
1,2-Dibromoethane	<0.20		0.20	ug/L		23-MAR-18	R3994268
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-MAR-18	R3994268
1,1-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,2-Dichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Methylene Chloride	<5.0		5.0	ug/L		23-MAR-18	R3994268
1,2-Dichloropropane	<0.50		0.50	ug/L		23-MAR-18	R3994268
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994268
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-MAR-18	R3994268
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-MAR-18	
Ethylbenzene	<0.50		0.50	ug/L		23-MAR-18	R3994268
n-Hexane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Methyl Ethyl Ketone	<20		20	ug/L		23-MAR-18	R3994268
Methyl Isobutyl Ketone	<20		20	ug/L		23-MAR-18	R3994268

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2070926-14 TRIP BLANK Sampled By: LR/MS on 20-MAR-18 @ 16:05 Matrix: WATER							
Volatile Organic Compounds							
MTBE	<2.0		2.0	ug/L		23-MAR-18	R3994268
Styrene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Tetrachloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Toluene	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-MAR-18	R3994268
Trichloroethylene	<0.50		0.50	ug/L		23-MAR-18	R3994268
Trichlorofluoromethane	<5.0		5.0	ug/L		23-MAR-18	R3994268
Vinyl chloride	<0.50		0.50	ug/L		23-MAR-18	R3994268
o-Xylene	<0.30		0.30	ug/L		23-MAR-18	R3994268
m+p-Xylenes	<0.40		0.40	ug/L		23-MAR-18	R3994268
Xylenes (Total)	<0.50		0.50	ug/L		23-MAR-18	
Surrogate: 4-Bromofluorobenzene	94.0		70-130	%		23-MAR-18	R3994268
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%		23-MAR-18	R3994268
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		23-MAR-18	R3994268
F1-BTEX	<25		25	ug/L		23-MAR-18	
Surrogate: 3,4-Dichlorotoluene	104.5		60-140	%		23-MAR-18	R3994268

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Dichlorodifluoromethane	MES	L2070926-1, -10, -11, -4, -5, -6, -8
Matrix Spike	Dichlorodifluoromethane	MES	L2070926-12, -14
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2070926-12, -13, -2, -3, -6, -7, -8
Matrix Spike	Boron (B)-Dissolved	MS-B	L2070926-12, -13, -2, -3, -6, -7, -8
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2070926-12, -13, -2, -3, -6, -7, -8
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2070926-12, -13, -2, -3, -6, -7, -8
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L2070926-12, -13, -2, -3, -6, -7, -8

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Water	Cyanide (WAD)-O.Reg 153/04	APHA 4500CN I-Weak acid Dist Colorimet

Weak acid dissociable cyanide (WAD) is determined by undergoing a distillation procedure. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-R511-WT	Water	Hex Chrom-O.Reg 153/04 (July 2011)	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-R511-WT	Water	Conductivity-O.Reg 153/04 (July 2011)	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:

Reference Information

1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Water F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Water F2-F4-O.Reg 153/04 (July 2011) EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-D-UG/L-CVAA-WT Water Diss. Mercury in Water by CVAAS (ug/L) EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-UG/L-MS-WT Water Diss. Metals in Water by ICPMS (ug/L) EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Water PAH-Calculated Parameters SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PH-WT Water pH APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

VOC-1,3-DCP-CALC-WT Water Regulation 153 VOCs SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT Water Sum of Xylene Isomer Concentrations CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Reference Information

WT ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-622470 17-622471

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-IC-N-WT	**Water**							
Batch R3996206								
WG2739654-2 LCS								
Chloride (Cl)			100.1		%		90-110	26-MAR-18
WG2739654-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	26-MAR-18
CN-WAD-R511-WT	**Water**							
Batch R3994290								
WG2738389-2 LCS								
Cyanide, Weak Acid Diss			101.6		%		80-120	23-MAR-18
WG2738389-1 MB								
Cyanide, Weak Acid Diss			<2.0		ug/L		2	23-MAR-18
CR-CR6-IC-R511-WT	**Water**							
Batch R3996507								
WG2740462-2 LCS								
Chromium, Hexavalent			103.3		%		80-120	27-MAR-18
WG2740462-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	27-MAR-18
EC-R511-WT	**Water**							
Batch R3994819								
WG2738267-2 LCS								
Conductivity			99.3		%		90-110	23-MAR-18
WG2738267-1 MB								
Conductivity			<0.0030		mS/cm		0.003	23-MAR-18
F1-HS-511-WT	**Water**							
Batch R3994268								
WG2736500-1 LCS								
F1 (C6-C10)			111.7		%		80-120	23-MAR-18
WG2736500-2 MB								
F1 (C6-C10)			<25		ug/L		25	23-MAR-18
Surrogate: 3,4-Dichlorotoluene			109.7		%		60-140	23-MAR-18
Batch R3995262								
WG2735043-1 LCS								
F1 (C6-C10)			95.8		%		80-120	23-MAR-18
WG2735043-2 MB								
F1 (C6-C10)			<25		ug/L		25	26-MAR-18
Surrogate: 3,4-Dichlorotoluene			100.6		%		60-140	26-MAR-18
F2-F4-511-WT	**Water**							

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R3995906								
WG2739458-2 LCS								
F2 (C10-C16)			107.1		%		70-130	26-MAR-18
F3 (C16-C34)			109.1		%		70-130	26-MAR-18
F4 (C34-C50)			106.5		%		70-130	26-MAR-18
WG2739458-3 LCSD		**WG2739458-2**						
F2 (C10-C16)		107.1	113		%	5.4	50	26-MAR-18
F3 (C16-C34)		109.1	116		%	6.2	50	26-MAR-18
F4 (C34-C50)		106.5	113		%	6.3	50	26-MAR-18
WG2739458-1 MB								
F2 (C10-C16)			<100		ug/L		100	26-MAR-18
F3 (C16-C34)			<250		ug/L		250	26-MAR-18
F4 (C34-C50)			<250		ug/L		250	26-MAR-18
Surrogate: 2-Bromobenzotrifluoride			105.9		%		60-140	26-MAR-18
HG-D-UG/L-CVAA-WT	**Water**							
Batch R3994430								
WG2738375-2 LCS								
Mercury (Hg)-Dissolved			101.0		%		80-120	23-MAR-18
WG2738375-1 MB								
Mercury (Hg)-Dissolved			<0.010		ug/L		0.01	23-MAR-18
MET-D-UG/L-MS-WT	**Water**							
Batch R3995938								
WG2738198-2 LCS								
Antimony (Sb)-Dissolved			97.4		%		80-120	26-MAR-18
Arsenic (As)-Dissolved			102.8		%		80-120	26-MAR-18
Barium (Ba)-Dissolved			98.2		%		80-120	26-MAR-18
Beryllium (Be)-Dissolved			104.5		%		80-120	26-MAR-18
Boron (B)-Dissolved			103.0		%		80-120	26-MAR-18
Cadmium (Cd)-Dissolved			103.7		%		80-120	26-MAR-18
Chromium (Cr)-Dissolved			102.7		%		80-120	26-MAR-18
Cobalt (Co)-Dissolved			102.2		%		80-120	26-MAR-18
Copper (Cu)-Dissolved			102.1		%		80-120	26-MAR-18
Lead (Pb)-Dissolved			96.3		%		80-120	26-MAR-18
Molybdenum (Mo)-Dissolved			107.4		%		80-120	26-MAR-18
Nickel (Ni)-Dissolved			99.3		%		80-120	26-MAR-18
Selenium (Se)-Dissolved			104.3		%		80-120	26-MAR-18
Silver (Ag)-Dissolved			96.3		%		80-120	26-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3995938								
WG2738198-2 LCS								
Sodium (Na)-Dissolved			111.1		%		80-120	26-MAR-18
Thallium (Tl)-Dissolved			95.5		%		80-120	26-MAR-18
Uranium (U)-Dissolved			97.9		%		80-120	26-MAR-18
Vanadium (V)-Dissolved			104.0		%		80-120	26-MAR-18
Zinc (Zn)-Dissolved			99.5		%		80-120	26-MAR-18
WG2738198-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	26-MAR-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	26-MAR-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	26-MAR-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	26-MAR-18
Boron (B)-Dissolved			<10		ug/L		10	26-MAR-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	26-MAR-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	26-MAR-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	26-MAR-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	26-MAR-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	26-MAR-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	26-MAR-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	26-MAR-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	26-MAR-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	26-MAR-18
Sodium (Na)-Dissolved			<500		ug/L		500	26-MAR-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	26-MAR-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	26-MAR-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	26-MAR-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	26-MAR-18
WG2738198-5 MS		**L2070926-3**						
Antimony (Sb)-Dissolved			89.1		%		70-130	26-MAR-18
Arsenic (As)-Dissolved			100.6		%		70-130	26-MAR-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	26-MAR-18
Beryllium (Be)-Dissolved			98.5		%		70-130	26-MAR-18
Boron (B)-Dissolved			N/A	MS-B	%		-	26-MAR-18
Cadmium (Cd)-Dissolved			95.0		%		70-130	26-MAR-18
Chromium (Cr)-Dissolved			96.0		%		70-130	26-MAR-18
Cobalt (Co)-Dissolved			91.9		%		70-130	26-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R3995938								
WG2738198-5 MS		**L2070926-3**						
Copper (Cu)-Dissolved			90.4		%		70-130	26-MAR-18
Lead (Pb)-Dissolved			83.8		%		70-130	26-MAR-18
Molybdenum (Mo)-Dissolved			99.6		%		70-130	26-MAR-18
Nickel (Ni)-Dissolved			88.2		%		70-130	26-MAR-18
Selenium (Se)-Dissolved			100.1		%		70-130	26-MAR-18
Silver (Ag)-Dissolved			87.3		%		70-130	26-MAR-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	26-MAR-18
Thallium (Tl)-Dissolved			84.3		%		70-130	26-MAR-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	26-MAR-18
Vanadium (V)-Dissolved			100.0		%		70-130	26-MAR-18
Zinc (Zn)-Dissolved			N/A	MS-B	%		-	26-MAR-18
PAH-511-WT	**Water**							
Batch R3997800								
WG2739458-2 LCS								
1-Methylnaphthalene			99.2		%		50-140	28-MAR-18
2-Methylnaphthalene			102.2		%		50-140	28-MAR-18
Acenaphthene			103.6		%		50-140	28-MAR-18
Acenaphthylene			103.7		%		50-140	28-MAR-18
Anthracene			109.0		%		50-140	28-MAR-18
Benzo(a)anthracene			121.7		%		50-140	28-MAR-18
Benzo(a)pyrene			96.8		%		50-140	28-MAR-18
Benzo(b)fluoranthene			95.3		%		50-140	28-MAR-18
Benzo(g,h,i)perylene			115.6		%		50-140	28-MAR-18
Benzo(k)fluoranthene			93.7		%		50-140	28-MAR-18
Chrysene			115.7		%		50-140	28-MAR-18
Dibenzo(ah)anthracene			110.9		%		50-140	28-MAR-18
Fluoranthene			105.7		%		50-140	28-MAR-18
Fluorene			104.5		%		50-140	28-MAR-18
Indeno(1,2,3-cd)pyrene			121.7		%		50-140	28-MAR-18
Naphthalene			97.7		%		50-140	28-MAR-18
Phenanthrene			108.5		%		50-140	28-MAR-18
Pyrene			107.7		%		50-140	28-MAR-18
WG2739458-3 LCSD		**WG2739458-2**						
1-Methylnaphthalene		99.2	98		%	0.7	50	28-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3997800								
WG2739458-3 LCSD		**WG2739458-2**						
2-Methylnaphthalene		102.2	101		%	0.9	50	28-MAR-18
Acenaphthene		103.6	101		%	3.0	50	28-MAR-18
Acenaphthylene		103.7	100		%	3.5	50	28-MAR-18
Anthracene		109.0	104		%	5.0	50	28-MAR-18
Benzo(a)anthracene		121.7	117		%	3.7	50	28-MAR-18
Benzo(a)pyrene		96.8	93		%	4.2	50	28-MAR-18
Benzo(b)fluoranthene		95.3	91		%	4.1	50	28-MAR-18
Benzo(g,h,i)perylene		115.6	108		%	7.1	50	28-MAR-18
Benzo(k)fluoranthene		93.7	92		%	1.5	50	28-MAR-18
Chrysene		115.7	110		%	4.9	50	28-MAR-18
Dibenzo(ah)anthracene		110.9	105		%	5.4	50	28-MAR-18
Fluoranthene		105.7	102		%	3.3	50	28-MAR-18
Fluorene		104.5	101		%	3.0	50	28-MAR-18
Indeno(1,2,3-cd)pyrene		121.7	117		%	4.0	50	28-MAR-18
Naphthalene		97.7	98		%	0.2	50	28-MAR-18
Phenanthrene		108.5	104		%	4.5	50	28-MAR-18
Pyrene		107.7	104		%	3.4	50	28-MAR-18
WG2739458-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	28-MAR-18
2-Methylnaphthalene			<0.020		ug/L		0.02	28-MAR-18
Acenaphthene			<0.020		ug/L		0.02	28-MAR-18
Acenaphthylene			<0.020		ug/L		0.02	28-MAR-18
Anthracene			<0.020		ug/L		0.02	28-MAR-18
Benzo(a)anthracene			<0.020		ug/L		0.02	28-MAR-18
Benzo(a)pyrene			<0.010		ug/L		0.01	28-MAR-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	28-MAR-18
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	28-MAR-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	28-MAR-18
Chrysene			<0.020		ug/L		0.02	28-MAR-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	28-MAR-18
Fluoranthene			<0.020		ug/L		0.02	28-MAR-18
Fluorene			<0.020		ug/L		0.02	28-MAR-18
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	28-MAR-18
Naphthalene			<0.050		ug/L		0.05	28-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R3997800								
WG2739458-1 MB								
Phenanthrene			<0.020		ug/L		0.02	28-MAR-18
Pyrene			<0.020		ug/L		0.02	28-MAR-18
Surrogate: d8-Naphthalene			91.8		%		60-140	28-MAR-18
Surrogate: d10-Phenanthrene			101.5		%		60-140	28-MAR-18
Surrogate: d12-Chrysene			107.4		%		60-140	28-MAR-18
Surrogate: d10-Acenaphthene			99.0		%		60-140	28-MAR-18
PH-WT	**Water**							
Batch R3994819								
WG2738267-2 LCS								
pH			6.98		pH units		6.9-7.1	23-MAR-18
VOC-511-HS-WT	**Water**							
Batch R3994159								
WG2732053-1 LCS								
1,1,1,2-Tetrachloroethane			103.7		%		70-130	22-MAR-18
1,1,2,2-Tetrachloroethane			103.4		%		70-130	22-MAR-18
1,1,1-Trichloroethane			97.5		%		70-130	22-MAR-18
1,1,2-Trichloroethane			108.9		%		70-130	22-MAR-18
1,1-Dichloroethane			99.3		%		70-130	22-MAR-18
1,1-Dichloroethylene			87.6		%		70-130	22-MAR-18
1,2-Dibromoethane			108.6		%		70-130	22-MAR-18
1,2-Dichlorobenzene			99.3		%		70-130	22-MAR-18
1,2-Dichloroethane			105.8		%		70-130	22-MAR-18
1,2-Dichloropropane			105.8		%		70-130	22-MAR-18
1,3-Dichlorobenzene			94.6		%		70-130	22-MAR-18
1,4-Dichlorobenzene			95.2		%		70-130	22-MAR-18
Acetone			123.5		%		60-140	22-MAR-18
Benzene			100.9		%		70-130	22-MAR-18
Bromodichloromethane			100.1		%		70-130	22-MAR-18
Bromoform			102.4		%		70-130	22-MAR-18
Bromomethane			90.8		%		60-140	22-MAR-18
Carbon tetrachloride			95.0		%		70-130	22-MAR-18
Chlorobenzene			101.5		%		70-130	22-MAR-18
Chloroform			101.1		%		70-130	22-MAR-18
cis-1,2-Dichloroethylene			100.3		%		70-130	22-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3994159								
WG2732053-1 LCS								
cis-1,3-Dichloropropene			99.4		%		70-130	22-MAR-18
Dibromochloromethane			107.8		%		70-130	22-MAR-18
Dichlorodifluoromethane			49.7	MES	%		50-140	22-MAR-18
Ethylbenzene			99.0		%		70-130	22-MAR-18
n-Hexane			110.9		%		70-130	22-MAR-18
m+p-Xylenes			98.0		%		70-130	22-MAR-18
Methyl Ethyl Ketone			109.0		%		60-140	22-MAR-18
Methyl Isobutyl Ketone			105.4		%		60-140	22-MAR-18
Methylene Chloride			103.3		%		70-130	22-MAR-18
MTBE			101.8		%		70-130	22-MAR-18
o-Xylene			99.8		%		70-130	22-MAR-18
Styrene			101.1		%		70-130	22-MAR-18
Tetrachloroethylene			96.0		%		70-130	22-MAR-18
Toluene			101.0		%		70-130	22-MAR-18
trans-1,2-Dichloroethylene			95.3		%		70-130	22-MAR-18
trans-1,3-Dichloropropene			99.5		%		70-130	22-MAR-18
Trichloroethylene			98.7		%		70-130	22-MAR-18
Trichlorofluoromethane			95.5		%		60-140	22-MAR-18
Vinyl chloride			85.0		%		60-140	22-MAR-18
WG2732053-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	22-MAR-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	22-MAR-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	22-MAR-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	22-MAR-18
1,1-Dichloroethane			<0.50		ug/L		0.5	22-MAR-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	22-MAR-18
1,2-Dibromoethane			<0.20		ug/L		0.2	22-MAR-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	22-MAR-18
1,2-Dichloroethane			<0.50		ug/L		0.5	22-MAR-18
1,2-Dichloropropane			<0.50		ug/L		0.5	22-MAR-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	22-MAR-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	22-MAR-18
Acetone			<30		ug/L		30	22-MAR-18
Benzene			<0.50		ug/L		0.5	22-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3994159								
WG2732053-2 MB								
Bromodichloromethane			<2.0		ug/L		2	22-MAR-18
Bromoform			<5.0		ug/L		5	22-MAR-18
Bromomethane			<0.50		ug/L		0.5	22-MAR-18
Carbon tetrachloride			<0.20		ug/L		0.2	22-MAR-18
Chlorobenzene			<0.50		ug/L		0.5	22-MAR-18
Chloroform			<1.0		ug/L		1	22-MAR-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	22-MAR-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	22-MAR-18
Dibromochloromethane			<2.0		ug/L		2	22-MAR-18
Dichlorodifluoromethane			<2.0		ug/L		2	22-MAR-18
Ethylbenzene			<0.50		ug/L		0.5	22-MAR-18
n-Hexane			<0.50		ug/L		0.5	22-MAR-18
m+p-Xylenes			<0.40		ug/L		0.4	22-MAR-18
Methyl Ethyl Ketone			<20		ug/L		20	22-MAR-18
Methyl Isobutyl Ketone			<20		ug/L		20	22-MAR-18
Methylene Chloride			<5.0		ug/L		5	22-MAR-18
MTBE			<2.0		ug/L		2	22-MAR-18
o-Xylene			<0.30		ug/L		0.3	22-MAR-18
Styrene			<0.50		ug/L		0.5	22-MAR-18
Tetrachloroethylene			<0.50		ug/L		0.5	22-MAR-18
Toluene			<0.50		ug/L		0.5	22-MAR-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	22-MAR-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	22-MAR-18
Trichloroethylene			<0.50		ug/L		0.5	22-MAR-18
Trichlorofluoromethane			<5.0		ug/L		5	22-MAR-18
Vinyl chloride			<0.50		ug/L		0.5	22-MAR-18
Surrogate: 1,4-Difluorobenzene			98.8		%		70-130	22-MAR-18
Surrogate: 4-Bromofluorobenzene			100.5		%		70-130	22-MAR-18
Batch R3994268								
WG2736500-1 LCS								
1,1,1,2-Tetrachloroethane			96.2		%		70-130	23-MAR-18
1,1,2,2-Tetrachloroethane			98.0		%		70-130	23-MAR-18
1,1,1-Trichloroethane			100.5		%		70-130	23-MAR-18
1,1,2-Trichloroethane			102.7		%		70-130	23-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3994268								
WG2736500-1 LCS								
1,1-Dichloroethane			105.1		%		70-130	23-MAR-18
1,1-Dichloroethylene			98.7		%		70-130	23-MAR-18
1,2-Dibromoethane			101.3		%		70-130	23-MAR-18
1,2-Dichlorobenzene			101.2		%		70-130	23-MAR-18
1,2-Dichloroethane			106.4		%		70-130	23-MAR-18
1,2-Dichloropropane			105.9		%		70-130	23-MAR-18
1,3-Dichlorobenzene			100.4		%		70-130	23-MAR-18
1,4-Dichlorobenzene			102.3		%		70-130	23-MAR-18
Acetone			114.8		%		60-140	23-MAR-18
Benzene			105.9		%		70-130	23-MAR-18
Bromodichloromethane			99.5		%		70-130	23-MAR-18
Bromoform			90.9		%		70-130	23-MAR-18
Bromomethane			104.6		%		60-140	23-MAR-18
Carbon tetrachloride			98.7		%		70-130	23-MAR-18
Chlorobenzene			101.8		%		70-130	23-MAR-18
Chloroform			104.2		%		70-130	23-MAR-18
cis-1,2-Dichloroethylene			104.0		%		70-130	23-MAR-18
cis-1,3-Dichloropropene			101.1		%		70-130	23-MAR-18
Dibromochloromethane			99.4		%		70-130	23-MAR-18
Dichlorodifluoromethane			86.6		%		50-140	23-MAR-18
Ethylbenzene			98.2		%		70-130	23-MAR-18
n-Hexane			127.6		%		70-130	23-MAR-18
m+p-Xylenes			100.8		%		70-130	23-MAR-18
Methyl Ethyl Ketone			102.0		%		60-140	23-MAR-18
Methyl Isobutyl Ketone			97.4		%		60-140	23-MAR-18
Methylene Chloride			107.6		%		70-130	23-MAR-18
MTBE			100.6		%		70-130	23-MAR-18
o-Xylene			97.7		%		70-130	23-MAR-18
Styrene			94.6		%		70-130	23-MAR-18
Tetrachloroethylene			99.4		%		70-130	23-MAR-18
Toluene			101.2		%		70-130	23-MAR-18
trans-1,2-Dichloroethylene			107.0		%		70-130	23-MAR-18
trans-1,3-Dichloropropene			97.9		%		70-130	23-MAR-18
Trichloroethylene			102.7		%		70-130	23-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R3994268								
WG2736500-1 LCS								
Trichlorofluoromethane			108.2		%		60-140	23-MAR-18
Vinyl chloride			106.1		%		60-140	23-MAR-18
WG2736500-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	23-MAR-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	23-MAR-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	23-MAR-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	23-MAR-18
1,1-Dichloroethane			<0.50		ug/L		0.5	23-MAR-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	23-MAR-18
1,2-Dibromoethane			<0.20		ug/L		0.2	23-MAR-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	23-MAR-18
1,2-Dichloroethane			<0.50		ug/L		0.5	23-MAR-18
1,2-Dichloropropane			<0.50		ug/L		0.5	23-MAR-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	23-MAR-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	23-MAR-18
Acetone			<30		ug/L		30	23-MAR-18
Benzene			<0.50		ug/L		0.5	23-MAR-18
Bromodichloromethane			<2.0		ug/L		2	23-MAR-18
Bromoform			<5.0		ug/L		5	23-MAR-18
Bromomethane			<0.50		ug/L		0.5	23-MAR-18
Carbon tetrachloride			<0.20		ug/L		0.2	23-MAR-18
Chlorobenzene			<0.50		ug/L		0.5	23-MAR-18
Chloroform			<1.0		ug/L		1	23-MAR-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-MAR-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	23-MAR-18
Dibromochloromethane			<2.0		ug/L		2	23-MAR-18
Dichlorodifluoromethane			<2.0		ug/L		2	23-MAR-18
Ethylbenzene			<0.50		ug/L		0.5	23-MAR-18
n-Hexane			<0.50		ug/L		0.5	23-MAR-18
m+p-Xylenes			<0.40		ug/L		0.4	23-MAR-18
Methyl Ethyl Ketone			<20		ug/L		20	23-MAR-18
Methyl Isobutyl Ketone			<20		ug/L		20	23-MAR-18
Methylene Chloride			<5.0		ug/L		5	23-MAR-18
MTBE			<2.0		ug/L		2	23-MAR-18

Quality Control Report

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch	**R3994268**							
WG2736500-2	**MB**							
o-Xylene			<0.30		ug/L		0.3	23-MAR-18
Styrene			<0.50		ug/L		0.5	23-MAR-18
Tetrachloroethylene			<0.50		ug/L		0.5	23-MAR-18
Toluene			<0.50		ug/L		0.5	23-MAR-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-MAR-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	23-MAR-18
Trichloroethylene			<0.50		ug/L		0.5	23-MAR-18
Trichlorofluoromethane			<5.0		ug/L		5	23-MAR-18
Vinyl chloride			<0.50		ug/L		0.5	23-MAR-18
Surrogate: 1,4-Difluorobenzene			99.4		%		70-130	23-MAR-18
Surrogate: 4-Bromofluorobenzene			94.0		%		70-130	23-MAR-18

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

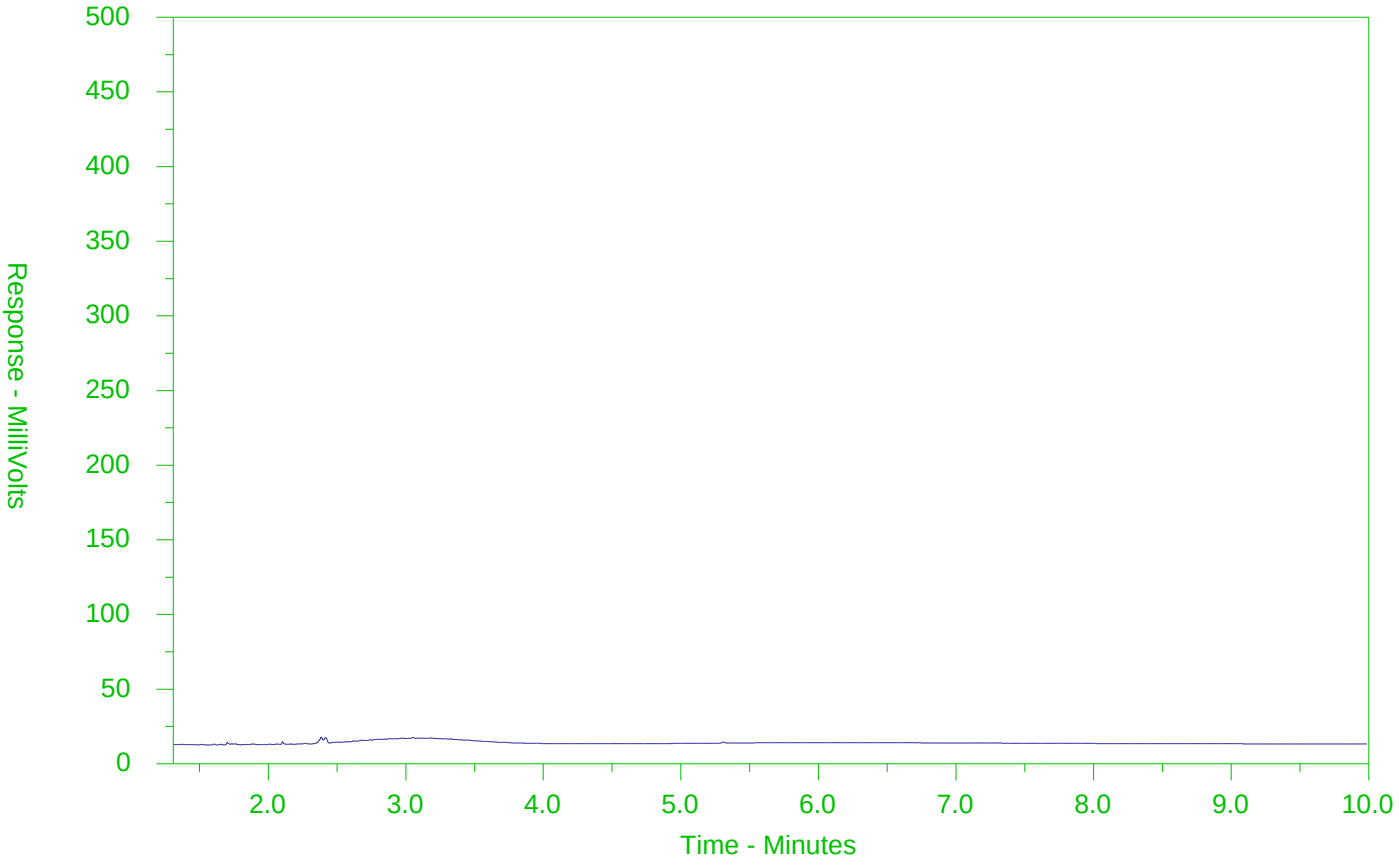
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2070926-1
Client Sample ID: MW17-1085



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

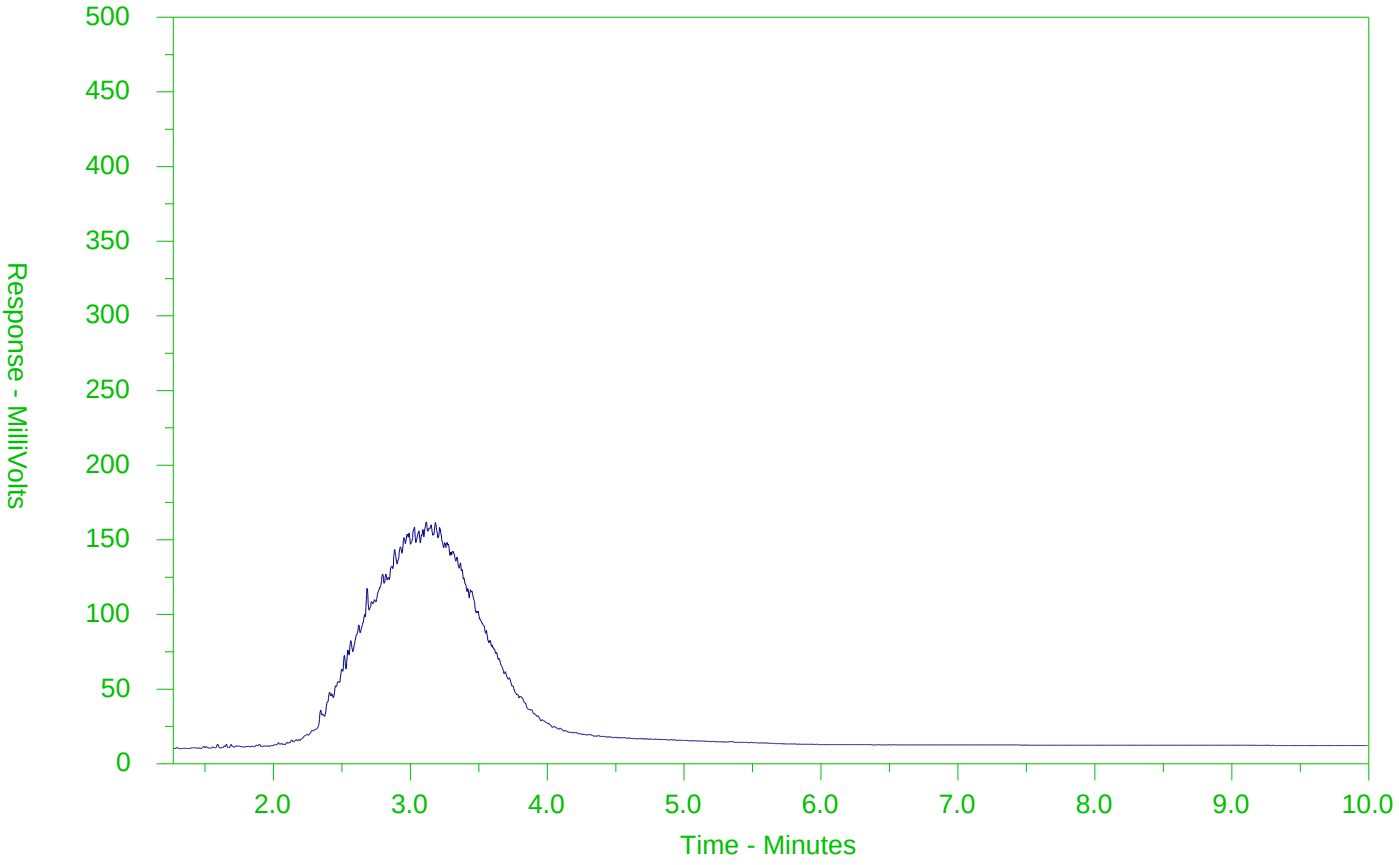
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2070926-6
Client Sample ID: OW235



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

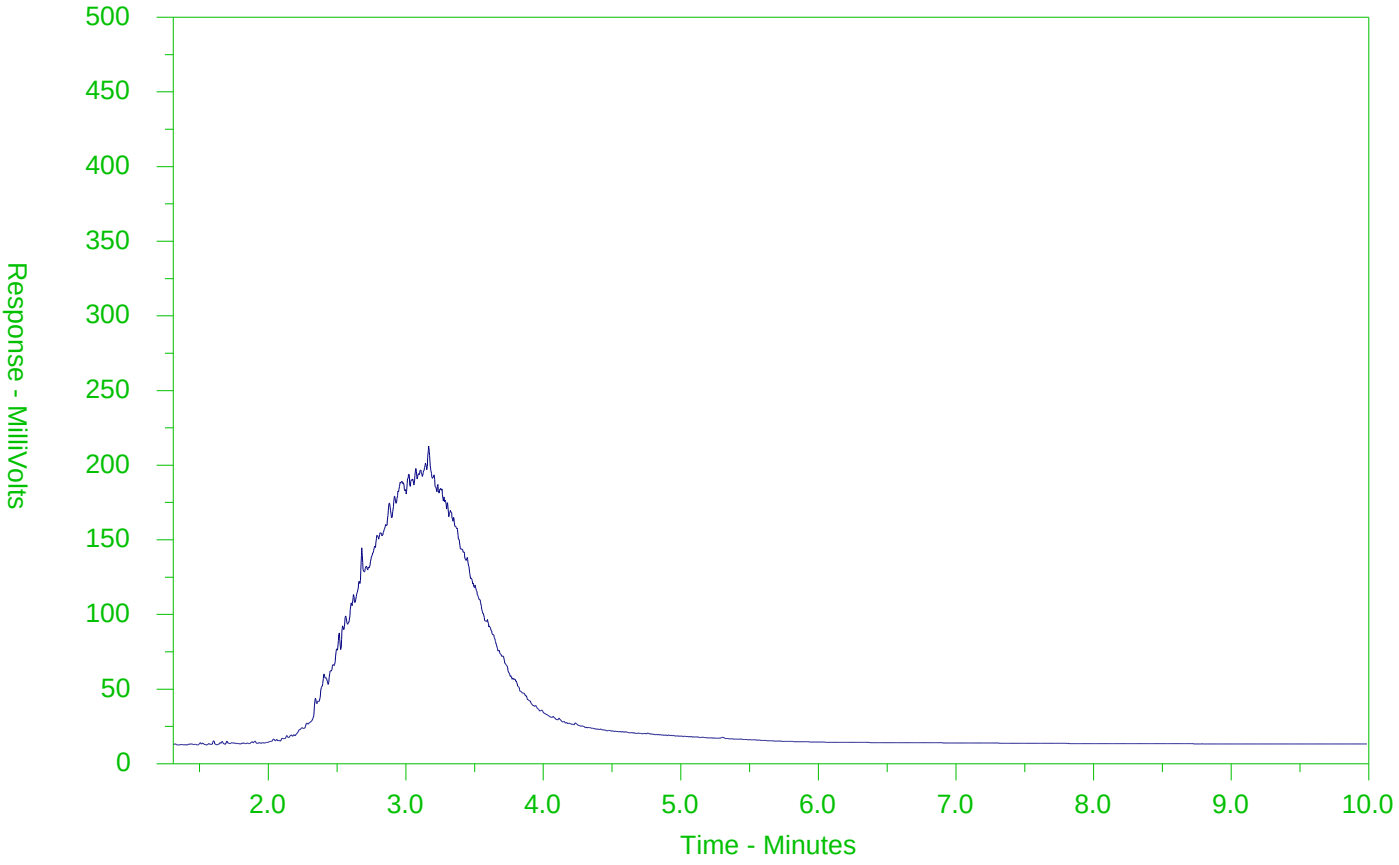
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2070926-8
Client Sample ID: DUP 1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2070926-COFC

COC Number: 17 - 622471

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company	CH2M	Select Report Format: [X] PDF [X] EXCEL [X] EDD (DIGITAL)	Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact	T. MacCarthy / E. Tawes	Quality Control (QC) Report with Report [X] YES [ ] NO	PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]
Phone:		[X] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] [ ]; Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] [ ]
	Company address below will appear on the final report	Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2	
Postal Code:		Email 3	

Invoice To	Same as Report To [ ] YES [X] NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report [ ] YES [X] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	644757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2070926	ALS Contact: Mathy	Sampler: M. Sharp

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F&P O.Reg Metals + Tanes	F O.Reg Hydride Metals (As, Se)	P O.Reg Metals (Hg)	F O.Reg PAH	F O.Reg PHCs	F O.Reg VOCs	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW17-1085	20-Mar-18	1605	Water				X	X	X			6
2	OW9-II		1700				X						1
3	OW11-II		1540				X						1
4	OW12		1450							X			2
5	OW13		1745							X			2
6	OW23S		1720		X			X	X	X			11
7	OW~~17~~-3.3		1550				X						1
8	DUP 1		—		X			X	X	X			11
9	MW17-101D	21-Mar-18	1030			X							1
10	OW14		12:10							X			2
11	OW19		1135							X			2
12	OW22S		1115				X			X			3

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [X] NO	
Are samples for human consumption/ use? [ ] YES [X] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	[ ]	SIF Observations	Yes [ ]	No	[ ]
Ice Packs	[X] Ice Cubes [X]	Custody seal intact	Yes [ ]	No	[ ]
Cooling Initiated	[ ]				

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
4.0	6.6

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Ribeiro	Date: 20/Mar/18	Time: 1540	Received by: Mel	Date: 21/03/18	Time: 15:14	Received by: AP	Date: 21-3-18	Time: 17:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If drinking water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2070926-COFC

COC Number 17 - 622470

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CHZM	Select Report Format: ☒ PDF ☐ EXCEL ☒ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	T. McCarthy / T. Graves	Quality Control (QC) Report with Report: ☒ YES ☐ NO	Priority (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:		☒ Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%] ☐ / Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply) ☐
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
Street:		Email 1 or Fax	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:		Email 2	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:		Email 3	

Invoice To		Invoice Distribution	
	Same as Report To ☐ YES ☒ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
	Copy of Invoice with Report ☐ YES ☒ NO		
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q62156	AFE/Cost Center	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):		ALS Contact: Kathy	Sampler: M. Stevens

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOCs + F1	G/B/Hydrides only (Soil) F	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
13	0407-3	21-Mar-18	9:40	Water		X			1
14	Trip Blank	↓	—	↓	X				2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	
Are samples for human consumption/ use? ☐ YES ☒ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs	☒	Ice Cubes ☒	Custody seal intact	Yes ☐	No ☐
Cooling Initiated	☐				

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
4.0					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Ribeiro	Date: 2018/Mar/21	Time: 15:40	Received by: Mel	Date: 21/03/18	Time: 15:15	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of this white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: JON GOWING
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 13-APR-18
Report Date: 17-APR-18 09:24 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2080020

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 15-612164
Legal Site Desc:

Comments: ADDITIONAL 17-APR-18 08:57

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2080020-1 OW11-11 Sampled By: J.GOWING on 13-APR-18 @ 08:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	0.13		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	0.19		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Barium (Ba)-Dissolved	37.4		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Boron (B)-Dissolved	54		10	ug/L	16-APR-18	16-APR-18	R4015472
Cadmium (Cd)-Dissolved	0.103		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Copper (Cu)-Dissolved	1.70		0.20	ug/L	16-APR-18	16-APR-18	R4015472
Lead (Pb)-Dissolved	4.76		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Molybdenum (Mo)-Dissolved	0.172		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Nickel (Ni)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	3.25		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Sodium (Na)-Dissolved	2810		500	ug/L	16-APR-18	16-APR-18	R4015472
Thallium (Tl)-Dissolved	0.025		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Uranium (U)-Dissolved	0.990		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Zinc (Zn)-Dissolved	50.4		1.0	ug/L	16-APR-18	16-APR-18	R4015472
L2080020-2 OW07-33 Sampled By: J.GOWING on 13-APR-18 @ 09:55 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	0.23		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	0.46		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Barium (Ba)-Dissolved	45.3		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Boron (B)-Dissolved	53		10	ug/L	16-APR-18	16-APR-18	R4015472
Cadmium (Cd)-Dissolved	0.779		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Chromium (Cr)-Dissolved	0.51		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Cobalt (Co)-Dissolved	1.28		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Copper (Cu)-Dissolved	4.63		0.20	ug/L	16-APR-18	16-APR-18	R4015472
Lead (Pb)-Dissolved	7.37		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Molybdenum (Mo)-Dissolved	2.76		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Nickel (Ni)-Dissolved	4.72		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	0.480		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Sodium (Na)-Dissolved	129000	DLHC	500	ug/L	16-APR-18	16-APR-18	R4015472
Thallium (Tl)-Dissolved	0.088		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Uranium (U)-Dissolved	4.25		0.010	ug/L	16-APR-18	16-APR-18	R4015472

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2080020-2 OW07-33 Sampled By: J.GOWING on 13-APR-18 @ 09:55 Matrix: WATER							
Dissolved Metals							
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Zinc (Zn)-Dissolved	685		1.0	ug/L	16-APR-18	16-APR-18	R4015472
L2080020-3 OW22S Sampled By: J.GOWING on 13-APR-18 @ 11:05 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	16-APR-18	16-APR-18	R4015472
Barium (Ba)-Dissolved	16.7	DLHC	1.0	ug/L	16-APR-18	16-APR-18	R4015472
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	16-APR-18	16-APR-18	R4015472
Boron (B)-Dissolved	<100	DLHC	100	ug/L	16-APR-18	16-APR-18	R4015472
Cadmium (Cd)-Dissolved	0.193	DLHC	0.050	ug/L	16-APR-18	16-APR-18	R4015472
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	16-APR-18	16-APR-18	R4015472
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	16-APR-18	16-APR-18	R4015472
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	16-APR-18	16-APR-18	R4015472
Lead (Pb)-Dissolved	2.08	DLHC	0.50	ug/L	16-APR-18	16-APR-18	R4015472
Molybdenum (Mo)-Dissolved	11.9	DLHC	0.50	ug/L	16-APR-18	16-APR-18	R4015472
Nickel (Ni)-Dissolved	10.3	DLHC	5.0	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	<0.50	DLHC	0.50	ug/L	16-APR-18	16-APR-18	R4015472
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	16-APR-18	16-APR-18	R4015472
Sodium (Na)-Dissolved	1300	DLHC	500	ug/L	16-APR-18	16-APR-18	R4015472
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	16-APR-18	16-APR-18	R4015472
Uranium (U)-Dissolved	6.05	DLHC	0.10	ug/L	16-APR-18	16-APR-18	R4015472
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	16-APR-18	16-APR-18	R4015472
Zinc (Zn)-Dissolved	1390	DLHC	10	ug/L	16-APR-18	16-APR-18	R4015472
L2080020-4 OW9-11 Sampled By: J.GOWING on 13-APR-18 @ 13:55 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	21.4		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Barium (Ba)-Dissolved	154		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Boron (B)-Dissolved	72		10	ug/L	16-APR-18	16-APR-18	R4015472
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Cobalt (Co)-Dissolved	0.47		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	16-APR-18	16-APR-18	R4015472
Lead (Pb)-Dissolved	14.3		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Molybdenum (Mo)-Dissolved	1.82		0.050	ug/L	16-APR-18	16-APR-18	R4015472

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2080020-4 OW9-11 Sampled By: J.GOWING on 13-APR-18 @ 13:55 Matrix: WATER							
Dissolved Metals							
Nickel (Ni)-Dissolved	4.96		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	0.073		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Sodium (Na)-Dissolved	13700		500	ug/L	16-APR-18	16-APR-18	R4015472
Thallium (Tl)-Dissolved	0.109		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Uranium (U)-Dissolved	1.18		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Zinc (Zn)-Dissolved	601		1.0	ug/L	16-APR-18	16-APR-18	R4015472
L2080020-5 DUP1 Sampled By: J.GOWING on 13-APR-18 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	0.25		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	0.41		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Barium (Ba)-Dissolved	45.8		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Boron (B)-Dissolved	52		10	ug/L	16-APR-18	16-APR-18	R4015472
Cadmium (Cd)-Dissolved	0.765		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Cobalt (Co)-Dissolved	1.27		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Copper (Cu)-Dissolved	4.54		0.20	ug/L	16-APR-18	16-APR-18	R4015472
Lead (Pb)-Dissolved	7.68		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Molybdenum (Mo)-Dissolved	2.75		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Nickel (Ni)-Dissolved	4.70		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	0.485		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	16-APR-18	16-APR-18	R4015472
Sodium (Na)-Dissolved	128000	DLHC	500	ug/L	16-APR-18	16-APR-18	R4015472
Thallium (Tl)-Dissolved	0.093		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Uranium (U)-Dissolved	4.43		0.010	ug/L	16-APR-18	16-APR-18	R4015472
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	16-APR-18	16-APR-18	R4015472
Zinc (Zn)-Dissolved	680		1.0	ug/L	16-APR-18	16-APR-18	R4015472
L2080020-6 MW17-101D Sampled By: J.GOWING on 13-APR-18 @ 12:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-APR-18	R4013367
Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Arsenic (As)-Dissolved	6.19		0.10	ug/L	16-APR-18	16-APR-18	R4015472
Selenium (Se)-Dissolved	0.097		0.050	ug/L	16-APR-18	16-APR-18	R4015472

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2080020-1, -2, -3, -4, -5
Matrix Spike	Boron (B)-Dissolved	MS-B	L2080020-1, -2, -3, -4, -5
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2080020-1, -2, -3, -4, -5
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2080020-1, -2, -3, -4, -5
Matrix Spike	Zinc (Zn)-Dissolved	MS-B	L2080020-1, -2, -3, -4, -5

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

15-612164

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4015472								
WG2751699-4 DUP		**WG2751699-3**						
Antimony (Sb)-Dissolved		0.13	0.12		ug/L	3.6	20	16-APR-18
Arsenic (As)-Dissolved		0.19	0.19		ug/L	0.5	20	16-APR-18
Barium (Ba)-Dissolved		37.4	37.1		ug/L	0.8	20	16-APR-18
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	16-APR-18
Boron (B)-Dissolved		54	53		ug/L	0.5	20	16-APR-18
Cadmium (Cd)-Dissolved		0.103	0.103		ug/L	0.7	20	16-APR-18
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	16-APR-18
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	16-APR-18
Copper (Cu)-Dissolved		1.70	1.73		ug/L	1.6	20	16-APR-18
Lead (Pb)-Dissolved		4.76	4.61		ug/L	3.2	20	16-APR-18
Molybdenum (Mo)-Dissolved		0.172	0.152		ug/L	13	20	16-APR-18
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	16-APR-18
Selenium (Se)-Dissolved		3.25	3.12		ug/L	4.1	20	16-APR-18
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	16-APR-18
Sodium (Na)-Dissolved		2810	2890		ug/L	2.8	20	16-APR-18
Thallium (Tl)-Dissolved		0.025	0.026		ug/L	2.7	20	16-APR-18
Uranium (U)-Dissolved		0.990	0.946		ug/L	4.5	20	16-APR-18
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	16-APR-18
Zinc (Zn)-Dissolved		50.4	50.4		ug/L	0.0	20	16-APR-18
WG2751699-2 LCS								
Antimony (Sb)-Dissolved			98.1		%		80-120	16-APR-18
Arsenic (As)-Dissolved			99.0		%		80-120	16-APR-18
Barium (Ba)-Dissolved			94.9		%		80-120	16-APR-18
Beryllium (Be)-Dissolved			97.5		%		80-120	16-APR-18
Boron (B)-Dissolved			95.0		%		80-120	16-APR-18
Cadmium (Cd)-Dissolved			100.9		%		80-120	16-APR-18
Chromium (Cr)-Dissolved			100.1		%		80-120	16-APR-18
Cobalt (Co)-Dissolved			97.4		%		80-120	16-APR-18
Copper (Cu)-Dissolved			97.3		%		80-120	16-APR-18
Lead (Pb)-Dissolved			99.5		%		80-120	16-APR-18
Molybdenum (Mo)-Dissolved			106.2		%		80-120	16-APR-18
Nickel (Ni)-Dissolved			96.1		%		80-120	16-APR-18
Selenium (Se)-Dissolved			98.7		%		80-120	16-APR-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4015472								
WG2751699-2 LCS								
Silver (Ag)-Dissolved			95.0		%		80-120	16-APR-18
Sodium (Na)-Dissolved			99.0		%		80-120	16-APR-18
Thallium (Tl)-Dissolved			99.8		%		80-120	16-APR-18
Uranium (U)-Dissolved			100.1		%		80-120	16-APR-18
Vanadium (V)-Dissolved			98.8		%		80-120	16-APR-18
Zinc (Zn)-Dissolved			95.5		%		80-120	16-APR-18
WG2751699-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	16-APR-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	16-APR-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	16-APR-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	16-APR-18
Boron (B)-Dissolved			<10		ug/L		10	16-APR-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	16-APR-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	16-APR-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	16-APR-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	16-APR-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	16-APR-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	16-APR-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	16-APR-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	16-APR-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	16-APR-18
Sodium (Na)-Dissolved			<50		ug/L		50	16-APR-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	16-APR-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	16-APR-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	16-APR-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	16-APR-18
WG2751699-5 MS		**WG2751699-6**						
Antimony (Sb)-Dissolved			90.4		%		70-130	16-APR-18
Arsenic (As)-Dissolved			105.1		%		70-130	16-APR-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	16-APR-18
Beryllium (Be)-Dissolved			101.4		%		70-130	16-APR-18
Boron (B)-Dissolved			N/A	MS-B	%		-	16-APR-18
Cadmium (Cd)-Dissolved			97.4		%		70-130	16-APR-18
Chromium (Cr)-Dissolved			98.1		%		70-130	16-APR-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4015472								
WG2751699-5 MS		**WG2751699-6**						
Cobalt (Co)-Dissolved			95.7		%		70-130	16-APR-18
Copper (Cu)-Dissolved			90.9		%		70-130	16-APR-18
Lead (Pb)-Dissolved			89.6		%		70-130	16-APR-18
Molybdenum (Mo)-Dissolved			102.8		%		70-130	16-APR-18
Nickel (Ni)-Dissolved			90.9		%		70-130	16-APR-18
Selenium (Se)-Dissolved			107.1		%		70-130	16-APR-18
Silver (Ag)-Dissolved			89.0		%		70-130	16-APR-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	16-APR-18
Thallium (Tl)-Dissolved			92.5		%		70-130	16-APR-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	16-APR-18
Vanadium (V)-Dissolved			103.4		%		70-130	16-APR-18
Zinc (Zn)-Dissolved			N/A	MS-B	%		-	16-APR-18

Quality Control Report

Workorder: L2080020 Report Date: 17-APR-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2080020-COFC

COC Number 15 - 612164

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turn E&P TATs with your AM - surcharges will apply
Company:	CH2M HILL / JACOBS	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 1 pm - business days - no surcharges apply
Contact:	Jan Gowing	Quality Control (QC) Report with Report: YES NO	PRIORITY (Business days): 4 day [P4]; 3 day [P3]; 2 day [P2]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E1]; Same Day, Weekend or Statutory holiday [E0]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St South	Email 1 or Fax: Ed.Thaves@CH2M.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener ONT	Email 2: Tania.McCarthy@CH2M.com	
Postal Code:		Email 3:	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax:	
Contact:		Email 2:	

Project Information	Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	AFE/Cost Center:	PO#:
Job # 694757	Major/Minor Code:	Routing Code:
PO / AFE:	Requisitioner:	
LSD:	Location:	

ALS Lab Work Order # (lab use only): L2080020 RY 13/4 | ALS Contact: MATHY | Sampler: J. Gowing

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	ORegs 153/04 Groundwater Metals only	ORegs 153/04 Hydride-Forming Metals only	Number of Containers
1	OW11-11	13-04-18	0850	GW		X	5
2	OW07-33	"	0955	"		X	5
3	OW22S	"	1105	"		X	5
4 (6)	MW17-101D	"	1250	"	X		5
5 (7)	OW9-11	"	1355	"		X	5
6	DUP1	"	—	"		X	5

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Contact Tania McCarthy for Specific Sample instructions
Are samples for human drinking water use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			7.5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	04/13/18	0535					13-Apr-18	1535

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

* For regulated samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 25-JUN-18
Report Date: 20-APR-21 14:43 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2118212

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Comments: 20-APR-21:
L2118212-1 - results for Iron, Calcium and Magnesium included. Bismuth result cannot be reported.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2118212-1 MW18-120D-3.0 Sampled By: CLIENT on 21-JUN-18 @ 16:35 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Arsenic (As)	7.2		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Barium (Ba)	68.6		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Beryllium (Be)	<0.50		0.50	ug/g	27-JUN-18	27-JUN-18	R4099147
Boron (B)	12.2		5.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Cadmium (Cd)	1.19		0.50	ug/g	27-JUN-18	27-JUN-18	R4099147
Calcium (Ca)	158000		50	ug/g	27-JUN-18	27-JUN-18	R4099147
Chromium (Cr)	10.6		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Cobalt (Co)	8.2		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Copper (Cu)	17.2		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Iron (Fe)	20200		50	ug/g	27-JUN-18	27-JUN-18	R4099147
Lead (Pb)	39.4		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Magnesium (Mg)	89300		20	ug/g	27-JUN-18	27-JUN-18	R4099147
Molybdenum (Mo)	<1.0		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Nickel (Ni)	13.1		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Selenium (Se)	<1.0		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Silver (Ag)	<0.20		0.20	ug/g	27-JUN-18	27-JUN-18	R4099147
Thallium (Tl)	<0.50		0.50	ug/g	27-JUN-18	27-JUN-18	R4099147
Uranium (U)	<1.0		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Vanadium (V)	23.4		1.0	ug/g	27-JUN-18	27-JUN-18	R4099147
Zinc (Zn)	585		5.0	ug/g	27-JUN-18	27-JUN-18	R4099147

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4099147								
WG2807867-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			95.8		%		70-130	27-JUN-18
Arsenic (As)			101.7		%		70-130	27-JUN-18
Barium (Ba)			99.4		%		70-130	27-JUN-18
Beryllium (Be)			108.5		%		70-130	27-JUN-18
Boron (B)			3.5		mg/kg		0-8.2	27-JUN-18
Cadmium (Cd)			102.0		%		70-130	27-JUN-18
Calcium (Ca)			103.6		%		70-130	27-JUN-18
Chromium (Cr)			101.8		%		70-130	27-JUN-18
Cobalt (Co)			100.6		%		70-130	27-JUN-18
Copper (Cu)			101.1		%		70-130	27-JUN-18
Iron (Fe)			105.0		%		70-130	27-JUN-18
Lead (Pb)			95.2		%		70-130	27-JUN-18
Magnesium (Mg)			102.1		%		70-130	27-JUN-18
Molybdenum (Mo)			105.6		%		70-130	27-JUN-18
Nickel (Ni)			99.0		%		70-130	27-JUN-18
Selenium (Se)			0.28		mg/kg		0.11-0.51	27-JUN-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	27-JUN-18
Thallium (Tl)			0.119		mg/kg		0.077-0.18	27-JUN-18
Uranium (U)			106.4		%		70-130	27-JUN-18
Vanadium (V)			102.1		%		70-130	27-JUN-18
Zinc (Zn)			100.2		%		70-130	27-JUN-18
WG2807867-6 DUP		**WG2807867-5**						
Antimony (Sb)		0.14	0.13		ug/g	8.5	30	27-JUN-18
Arsenic (As)		7.06	6.45		ug/g	9.0	30	27-JUN-18
Barium (Ba)		47.4	41.2		ug/g	14	40	27-JUN-18
Beryllium (Be)		0.68	0.57		ug/g	18	30	27-JUN-18
Boron (B)		12.2	9.9		ug/g	21	30	27-JUN-18
Cadmium (Cd)		0.077	0.065		ug/g	16	30	27-JUN-18
Calcium (Ca)		63800	60400		ug/g	5.5	30	27-JUN-18
Chromium (Cr)		19.9	16.7		ug/g	17	30	27-JUN-18
Cobalt (Co)		13.3	12.0		ug/g	9.9	30	27-JUN-18
Copper (Cu)		35.6	33.0		ug/g	7.8	30	27-JUN-18
Iron (Fe)		29600	26500		ug/g	11	30	27-JUN-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4099147								
WG2807867-6 DUP		**WG2807867-5**						
Lead (Pb)		10.9	10.3		ug/g	5.7	40	27-JUN-18
Magnesium (Mg)		9990	9270		ug/g	7.4	30	27-JUN-18
Molybdenum (Mo)		0.40	0.35		ug/g	14	40	27-JUN-18
Nickel (Ni)		25.1	23.0		ug/g	8.9	30	27-JUN-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	27-JUN-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	27-JUN-18
Thallium (Tl)		0.130	0.111		ug/g	16	30	27-JUN-18
Uranium (U)		0.450	0.426		ug/g	5.4	30	27-JUN-18
Vanadium (V)		29.3	24.9		ug/g	16	30	27-JUN-18
Zinc (Zn)		56.7	52.0		ug/g	8.5	30	27-JUN-18
WG2807867-4 LCS								
Antimony (Sb)			102.3		%		80-120	27-JUN-18
Arsenic (As)			100.8		%		80-120	27-JUN-18
Barium (Ba)			95.5		%		80-120	27-JUN-18
Beryllium (Be)			98.2		%		80-120	27-JUN-18
Boron (B)			93.5		%		80-120	27-JUN-18
Cadmium (Cd)			99.0		%		80-120	27-JUN-18
Calcium (Ca)			98.4		%		80-120	27-JUN-18
Chromium (Cr)			100.4		%		80-120	27-JUN-18
Cobalt (Co)			97.8		%		80-120	27-JUN-18
Copper (Cu)			97.1		%		80-120	27-JUN-18
Iron (Fe)			97.2		%		80-120	27-JUN-18
Lead (Pb)			97.2		%		80-120	27-JUN-18
Magnesium (Mg)			103.3		%		80-120	27-JUN-18
Molybdenum (Mo)			103.9		%		80-120	27-JUN-18
Nickel (Ni)			96.8		%		80-120	27-JUN-18
Selenium (Se)			95.9		%		80-120	27-JUN-18
Silver (Ag)			95.8		%		80-120	27-JUN-18
Thallium (Tl)			98.6		%		80-120	27-JUN-18
Uranium (U)			98.1		%		80-120	27-JUN-18
Vanadium (V)			101.2		%		80-120	27-JUN-18
Zinc (Zn)			94.0		%		80-120	27-JUN-18
WG2807867-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	27-JUN-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4099147								
WG2807867-1 MB								
Arsenic (As)			<0.10		mg/kg		0.1	27-JUN-18
Barium (Ba)			<0.50		mg/kg		0.5	27-JUN-18
Beryllium (Be)			<0.10		mg/kg		0.1	27-JUN-18
Boron (B)			<5.0		mg/kg		5	27-JUN-18
Cadmium (Cd)			<0.020		mg/kg		0.02	27-JUN-18
Calcium (Ca)			<50		mg/kg		50	27-JUN-18
Chromium (Cr)			<0.50		mg/kg		0.5	27-JUN-18
Cobalt (Co)			<0.10		mg/kg		0.1	27-JUN-18
Copper (Cu)			<0.50		mg/kg		0.5	27-JUN-18
Iron (Fe)			<50		mg/kg		50	27-JUN-18
Lead (Pb)			<0.50		mg/kg		0.5	27-JUN-18
Magnesium (Mg)			<20		mg/kg		20	27-JUN-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	27-JUN-18
Nickel (Ni)			<0.50		mg/kg		0.5	27-JUN-18
Selenium (Se)			<0.20		mg/kg		0.2	27-JUN-18
Silver (Ag)			<0.10		mg/kg		0.1	27-JUN-18
Thallium (Tl)			<0.050		mg/kg		0.05	27-JUN-18
Uranium (U)			<0.050		mg/kg		0.05	27-JUN-18
Vanadium (V)			<0.20		mg/kg		0.2	27-JUN-18
Zinc (Zn)			<2.0		mg/kg		2	27-JUN-18

Quality Control Report

Workorder: L2118212 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2118212-COFC

COC Number: 15 -

Page of

Report To	Contact and company name below will appear on the final report
Company	CH2M Hill
Contact:	Tania McCarthy
Phone:	519 579 3500
	Company address below will appear on the final report
Street:	72 Victoria Street South, Suite 300
City/Province:	Kitchener
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill
Contact:	Accounts Payable

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	lucas.nikolic@ch2m.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2118212	ALS Contact: Mathy	Sampler:

Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply	
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY 1 Business day [E1] ☐
	3 day [P3] ☐	Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐	

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	Metals	PAH	F1-F4	BTEX	VOC	PCB	Number of Containers
	MW18-120D-3.0	21-JUN-18	16:30	Soil		X						

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐ No ☐
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐ No ☐
Cooling Initiated ☐			

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			1.3		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Nikolic	Date: 25-JUN-2018	Time: 10:20	Received by: AK	Date: 6-25-18	Time: 10:20	Received by:	Date: JUN 25/18	Time: 14:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 28-JUN-18
Report Date: 12-APR-21 15:01 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2120855

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Comments: 12-APR-21:
L2120855-1 - results for Bismuth, Iron, Calcium and Magnesium included.

23-NOV-17: F2-F4-UW results included.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2120855-1 MW18-123D-2.5 Sampled By: CLIENT on 27-JUN-18 @ 13:30 Matrix: SOIL							
Physical Tests							
Conductivity	0.330		0.0040	mS/cm		05-JUL-18	R4113658
% Moisture	20.8		0.10	%	04-JUL-18	05-JUL-18	R4112901
pH	7.72		0.10	pH units		03-JUL-18	R4110544
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	29-JUN-18	03-JUL-18	R4110089
Saturated Paste Extractables							
SAR	0.12		0.10	SAR		05-JUL-18	R4113375
Calcium (Ca)	22.3		1.0	mg/L		05-JUL-18	R4113375
Calcium (Ca)	22.3		1.0	mg/L		05-JUL-18	R4113375
Magnesium (Mg)	10.3		1.0	mg/L		05-JUL-18	R4113375
Sodium (Na)	2.6		1.0	mg/L		05-JUL-18	R4113375
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Arsenic (As)	8.5		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Barium (Ba)	84.7		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Beryllium (Be)	0.55		0.50	ug/g	04-JUL-18	05-JUL-18	R4114148
Bismuth (Bi)	<1.0		1.0	ug/g	04-JUL-18	12-APR-21	R4114148
Boron (B)	10.1		5.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Boron (B), Hot Water Ext.	0.78		0.10	ug/g	04-JUL-18	05-JUL-18	R4113368
Cadmium (Cd)	1.82		0.50	ug/g	04-JUL-18	05-JUL-18	R4114148
Calcium (Ca)	90500		50	ug/g	04-JUL-18	12-APR-21	R4114148
Chromium (Cr)	16.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Cobalt (Co)	6.1		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Copper (Cu)	24.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Iron (Fe)	19200		50	ug/g	04-JUL-18	12-APR-21	R4114148
Lead (Pb)	186		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Magnesium (Mg)	49800		20	ug/g	04-JUL-18	12-APR-21	R4114148
Mercury (Hg)	0.0903		0.0050	ug/g	04-JUL-18	05-JUL-18	R4113097
Molybdenum (Mo)	<1.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Nickel (Ni)	17.2		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Selenium (Se)	<1.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Silver (Ag)	<0.20		0.20	ug/g	04-JUL-18	05-JUL-18	R4114148
Thallium (Tl)	<0.50		0.50	ug/g	04-JUL-18	05-JUL-18	R4114148
Uranium (U)	<1.0		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Vanadium (V)	27.7		1.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Zinc (Zn)	543		5.0	ug/g	04-JUL-18	05-JUL-18	R4114148
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	29-JUN-18	03-JUL-18	R4109452
L2120855-2 MW18-123D-5 Sampled By: CLIENT on 27-JUN-18 @ 13:45 Matrix: SOIL							
Physical Tests							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2120855-2 MW18-123D-5 Sampled By: CLIENT on 27-JUN-18 @ 13:45 Matrix: SOIL							
Physical Tests							
% Moisture	4.67		0.10	%	04-JUL-18	05-JUL-18	R4112901
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
Benzene	<0.0068		0.0068	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromodichloromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromoform	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromomethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Carbon tetrachloride	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Chlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Dibromochloromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Chloroform	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dibromoethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,3-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,4-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Dichlorodifluoromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1-Dichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Methylene Chloride	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichloropropane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		05-JUL-18	
Ethylbenzene	<0.018		0.018	ug/g	28-JUN-18	04-JUL-18	R4111890
n-Hexane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Methyl Ethyl Ketone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
MTBE	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Styrene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Tetrachloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Toluene	<0.080		0.080	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,1-Trichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,2-Trichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Trichloroethylene	<0.010		0.010	ug/g	28-JUN-18	04-JUL-18	R4111890
Trichlorofluoromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Vinyl chloride	<0.020		0.020	ug/g	28-JUN-18	04-JUL-18	R4111890

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2120855-2 MW18-123D-5 Sampled By: CLIENT on 27-JUN-18 @ 13:45 Matrix: SOIL							
Volatile Organic Compounds							
o-Xylene	<0.020		0.020	ug/g	28-JUN-18	04-JUL-18	R4111890
m+p-Xylenes	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
Xylenes (Total)	<0.050		0.050	ug/g		05-JUL-18	
Surrogate: 4-Bromofluorobenzene	98.5		50-140	%	28-JUN-18	04-JUL-18	R4111890
Surrogate: 1,4-Difluorobenzene	101.9		50-140	%	28-JUN-18	04-JUL-18	R4111890
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Acenaphthylene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Anthracene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Benzo(a)anthracene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Benzo(a)pyrene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Benzo(b)fluoranthene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Benzo(k)fluoranthene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Chrysene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Fluoranthene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Fluorene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		06-JUL-18	
1-Methylnaphthalene	<0.030		0.030	ug/g	29-JUN-18	06-JUL-18	R4114136
2-Methylnaphthalene	<0.030		0.030	ug/g	29-JUN-18	06-JUL-18	R4114136
Naphthalene	<0.013		0.013	ug/g	29-JUN-18	06-JUL-18	R4114136
Phenanthrene	<0.046		0.046	ug/g	29-JUN-18	06-JUL-18	R4114136
Pyrene	<0.050		0.050	ug/g	29-JUN-18	06-JUL-18	R4114136
Surrogate: 2-Fluorobiphenyl	87.3		50-140	%	29-JUN-18	06-JUL-18	R4114136
Surrogate: p-Terphenyl d14	80.0		50-140	%	29-JUN-18	06-JUL-18	R4114136
L2120855-3 TB1 Sampled By: CLIENT on 28-JUN-18 @ 10:30 Matrix: SOIL							
Physical Tests							
% Moisture	<0.10		0.10	%	04-JUL-18	05-JUL-18	R4112901
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
Benzene	<0.0068		0.0068	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromodichloromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromoform	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Bromomethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Carbon tetrachloride	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Chlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Dibromochloromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Chloroform	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2120855-3 TB1 Sampled By: CLIENT on 28-JUN-18 @ 10:30 Matrix: SOIL							
Volatile Organic Compounds							
1,2-Dibromoethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,3-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,4-Dichlorobenzene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Dichlorodifluoromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1-Dichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Methylene Chloride	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,2-Dichloropropane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		05-JUL-18	
Ethylbenzene	<0.018		0.018	ug/g	28-JUN-18	04-JUL-18	R4111890
n-Hexane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Methyl Ethyl Ketone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	28-JUN-18	04-JUL-18	R4111890
MTBE	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Styrene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Tetrachloroethylene	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Toluene	<0.080		0.080	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,1-Trichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
1,1,2-Trichloroethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Trichloroethylene	<0.010		0.010	ug/g	28-JUN-18	04-JUL-18	R4111890
Trichlorofluoromethane	<0.050		0.050	ug/g	28-JUN-18	04-JUL-18	R4111890
Vinyl chloride	<0.020		0.020	ug/g	28-JUN-18	04-JUL-18	R4111890
o-Xylene	<0.020		0.020	ug/g	28-JUN-18	04-JUL-18	R4111890
m+p-Xylenes	<0.030		0.030	ug/g	28-JUN-18	04-JUL-18	R4111890
Xylenes (Total)	<0.050		0.050	ug/g		05-JUL-18	
Surrogate: 4-Bromofluorobenzene	109.1		50-140	%	28-JUN-18	04-JUL-18	R4111890
Surrogate: 1,4-Difluorobenzene	115.1		50-140	%	28-JUN-18	04-JUL-18	R4111890

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2120855 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R4113368								
WG2813821-4 DUP		**L2121117-6**						
Boron (B), Hot Water Ext.		0.64	0.63		ug/g	1.5	30	05-JUL-18
WG2813821-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			88.8		%		70-130	05-JUL-18
WG2813821-3 LCS								
Boron (B), Hot Water Ext.			107.8		%		70-130	05-JUL-18
WG2813821-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	05-JUL-18
CN-WAD-R511-WT	**Soil**							
Batch R4110089								
WG2810975-3 DUP		**L2121349-1**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	03-JUL-18
WG2810975-2 LCS								
Cyanide, Weak Acid Diss			89.3		%		80-120	03-JUL-18
WG2810975-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	03-JUL-18
WG2810975-4 MS		**L2121349-1**						
Cyanide, Weak Acid Diss			97.5		%		70-130	03-JUL-18
CR-CR6-IC-WT	**Soil**							
Batch R4109452								
WG2811072-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			86.3		%		70-130	03-JUL-18
WG2811072-2 LCS								
Chromium, Hexavalent			100.3		%		80-120	03-JUL-18
WG2811072-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	03-JUL-18
EC-WT	**Soil**							
Batch R4113658								
WG2813866-4 DUP		**WG2813866-3**						
Conductivity		1.57	1.66		mS/cm	5.5	20	05-JUL-18
WG2814469-1 LCS								
Conductivity			98.7		%		90-110	05-JUL-18
WG2813866-1 MB								
Conductivity			<0.0040		mS/cm		0.004	05-JUL-18
HG-200.2-CVAA-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R4113097								
WG2813764-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			102.1		%		70-130	05-JUL-18
WG2813764-6 DUP		**WG2813764-5**						
Mercury (Hg)		0.0362	0.0374		ug/g	3.1	40	05-JUL-18
WG2813764-3 LCS								
Mercury (Hg)			108.0		%		80-120	05-JUL-18
WG2813764-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	05-JUL-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4114148								
WG2813764-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			106.6		%		70-130	05-JUL-18
Arsenic (As)			104.2		%		70-130	05-JUL-18
Barium (Ba)			104.4		%		70-130	05-JUL-18
Beryllium (Be)			94.6		%		70-130	05-JUL-18
Bismuth (Bi)			106.1		%		70-130	05-JUL-18
Boron (B)			2.7		mg/kg		0-8.2	05-JUL-18
Cadmium (Cd)			102.6		%		70-130	05-JUL-18
Calcium (Ca)			92.9		%		70-130	05-JUL-18
Chromium (Cr)			99.0		%		70-130	05-JUL-18
Cobalt (Co)			99.9		%		70-130	05-JUL-18
Copper (Cu)			101.3		%		70-130	05-JUL-18
Iron (Fe)			100.8		%		70-130	05-JUL-18
Lead (Pb)			101.5		%		70-130	05-JUL-18
Magnesium (Mg)			104.0		%		70-130	05-JUL-18
Molybdenum (Mo)			93.6		%		70-130	05-JUL-18
Nickel (Ni)			98.9		%		70-130	05-JUL-18
Selenium (Se)			0.33		mg/kg		0.11-0.51	05-JUL-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	05-JUL-18
Thallium (Tl)			0.123		mg/kg		0.077-0.18	05-JUL-18
Uranium (U)			96.7		%		70-130	05-JUL-18
Vanadium (V)			100.1		%		70-130	05-JUL-18
Zinc (Zn)			96.3		%		70-130	05-JUL-18
WG2813764-6 DUP		**WG2813764-5**						
Antimony (Sb)		0.57	0.40	J	ug/g	0.16	0.2	05-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4114148								
WG2813764-6 DUP		**WG2813764-5**						
Arsenic (As)		3.26	3.10		ug/g	5.0	30	05-JUL-18
Barium (Ba)		107	101		ug/g	5.6	40	05-JUL-18
Beryllium (Be)		0.61	0.58		ug/g	4.9	30	05-JUL-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	05-JUL-18
Boron (B)		7.9	7.9		ug/g	0.4	30	05-JUL-18
Cadmium (Cd)		0.225	0.216		ug/g	4.2	30	05-JUL-18
Calcium (Ca)		22800	21500		ug/g	5.9	30	05-JUL-18
Chromium (Cr)		27.1	25.9		ug/g	4.4	30	05-JUL-18
Cobalt (Co)		7.50	7.25		ug/g	3.3	30	05-JUL-18
Copper (Cu)		22.3	20.4		ug/g	9.0	30	05-JUL-18
Iron (Fe)		19100	18700		ug/g	2.4	30	05-JUL-18
Lead (Pb)		19.8	17.9		ug/g	10	40	05-JUL-18
Magnesium (Mg)		6550	6390		ug/g	2.4	30	05-JUL-18
Molybdenum (Mo)		0.66	0.50		ug/g	28	40	05-JUL-18
Nickel (Ni)		16.5	15.3		ug/g	7.9	30	05-JUL-18
Selenium (Se)		0.26	0.24		ug/g	9.6	30	05-JUL-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	05-JUL-18
Thallium (Tl)		0.139	0.132		ug/g	5.8	30	05-JUL-18
Uranium (U)		0.562	0.555		ug/g	1.3	30	05-JUL-18
Vanadium (V)		33.9	33.0		ug/g	2.8	30	05-JUL-18
Zinc (Zn)		73.5	69.9		ug/g	5.0	30	05-JUL-18
WG2813764-4 LCS								
Antimony (Sb)			104.6		%		80-120	05-JUL-18
Arsenic (As)			105.8		%		80-120	05-JUL-18
Barium (Ba)			115.4		%		80-120	05-JUL-18
Beryllium (Be)			103.4		%		80-120	05-JUL-18
Bismuth (Bi)			99.99		%		80-120	05-JUL-18
Boron (B)			101.3		%		80-120	05-JUL-18
Cadmium (Cd)			100.8		%		80-120	05-JUL-18
Calcium (Ca)			106.4		%		80-120	05-JUL-18
Chromium (Cr)			102.2		%		80-120	05-JUL-18
Cobalt (Co)			100.6		%		80-120	05-JUL-18
Copper (Cu)			101.3		%		80-120	05-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4114148								
WG2813764-4 LCS								
Iron (Fe)			105.2		%		80-120	05-JUL-18
Lead (Pb)			100.7		%		80-120	05-JUL-18
Magnesium (Mg)			111.8		%		80-120	05-JUL-18
Molybdenum (Mo)			102.8		%		80-120	05-JUL-18
Nickel (Ni)			101.7		%		80-120	05-JUL-18
Selenium (Se)			102.1		%		80-120	05-JUL-18
Silver (Ag)			103.5		%		80-120	05-JUL-18
Thallium (Tl)			98.9		%		80-120	05-JUL-18
Uranium (U)			104.8		%		80-120	05-JUL-18
Vanadium (V)			106.7		%		80-120	05-JUL-18
Zinc (Zn)			93.9		%		80-120	05-JUL-18
WG2813764-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	05-JUL-18
Arsenic (As)			<0.10		mg/kg		0.1	05-JUL-18
Barium (Ba)			<0.50		mg/kg		0.5	05-JUL-18
Beryllium (Be)			<0.10		mg/kg		0.1	05-JUL-18
Bismuth (Bi)			<0.20		mg/kg		0.2	05-JUL-18
Boron (B)			<5.0		mg/kg		5	05-JUL-18
Cadmium (Cd)			<0.020		mg/kg		0.02	05-JUL-18
Calcium (Ca)			<50		mg/kg		50	05-JUL-18
Chromium (Cr)			<0.50		mg/kg		0.5	05-JUL-18
Cobalt (Co)			<0.10		mg/kg		0.1	05-JUL-18
Copper (Cu)			<0.50		mg/kg		0.5	05-JUL-18
Iron (Fe)			<50		mg/kg		50	05-JUL-18
Lead (Pb)			<0.50		mg/kg		0.5	05-JUL-18
Magnesium (Mg)			<20		mg/kg		20	05-JUL-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	05-JUL-18
Nickel (Ni)			<0.50		mg/kg		0.5	05-JUL-18
Selenium (Se)			<0.20		mg/kg		0.2	05-JUL-18
Silver (Ag)			<0.10		mg/kg		0.1	05-JUL-18
Thallium (Tl)			<0.050		mg/kg		0.05	05-JUL-18
Uranium (U)			<0.050		mg/kg		0.05	05-JUL-18
Vanadium (V)			<0.20		mg/kg		0.2	05-JUL-18
Zinc (Zn)			<2.0		mg/kg		2	05-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R4112901								
WG2813597-3 DUP		**L2121117-6**						
% Moisture		36.8	36.2		%	1.7	20	05-JUL-18
WG2813597-2 LCS								
% Moisture			99.7		%		90-110	05-JUL-18
WG2813597-1 MB								
% Moisture			<0.10		%		0.1	05-JUL-18
PAH-511-WT	**Soil**							
Batch R4114136								
WG2811030-3 DUP		**WG2811030-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	06-JUL-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	06-JUL-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	06-JUL-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	06-JUL-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	06-JUL-18
WG2811030-2 LCS								
1-Methylnaphthalene			91.9		%		50-140	06-JUL-18
2-Methylnaphthalene			91.6		%		50-140	06-JUL-18
Acenaphthene			91.8		%		50-140	06-JUL-18
Acenaphthylene			90.6		%		50-140	06-JUL-18
Anthracene			90.4		%		50-140	06-JUL-18
Benzo(a)anthracene			92.1		%		50-140	06-JUL-18
Benzo(a)pyrene			84.6		%		50-140	06-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4114136								
WG2811030-2 LCS								
Benzo(b)fluoranthene			81.4		%		50-140	06-JUL-18
Benzo(g,h,i)perylene			89.3		%		50-140	06-JUL-18
Benzo(k)fluoranthene			85.7		%		50-140	06-JUL-18
Chrysene			89.8		%		50-140	06-JUL-18
Dibenzo(ah)anthracene			89.4		%		50-140	06-JUL-18
Fluoranthene			78.6		%		50-140	06-JUL-18
Fluorene			90.5		%		50-140	06-JUL-18
Indeno(1,2,3-cd)pyrene			81.3		%		50-140	06-JUL-18
Naphthalene			91.2		%		50-140	06-JUL-18
Phenanthrene			91.7		%		50-140	06-JUL-18
Pyrene			77.0		%		50-140	06-JUL-18
WG2811030-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	06-JUL-18
2-Methylnaphthalene			<0.030		ug/g		0.03	06-JUL-18
Acenaphthene			<0.050		ug/g		0.05	06-JUL-18
Acenaphthylene			<0.050		ug/g		0.05	06-JUL-18
Anthracene			<0.050		ug/g		0.05	06-JUL-18
Benzo(a)anthracene			<0.050		ug/g		0.05	06-JUL-18
Benzo(a)pyrene			<0.050		ug/g		0.05	06-JUL-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	06-JUL-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	06-JUL-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	06-JUL-18
Chrysene			<0.050		ug/g		0.05	06-JUL-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	06-JUL-18
Fluoranthene			<0.050		ug/g		0.05	06-JUL-18
Fluorene			<0.050		ug/g		0.05	06-JUL-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	06-JUL-18
Naphthalene			<0.013		ug/g		0.013	06-JUL-18
Phenanthrene			<0.046		ug/g		0.046	06-JUL-18
Pyrene			<0.050		ug/g		0.05	06-JUL-18
Surrogate: 2-Fluorobiphenyl			90.7		%		50-140	06-JUL-18
Surrogate: p-Terphenyl d14			79.7		%		50-140	06-JUL-18
WG2811030-4 MS		**WG2811030-5**						
1-Methylnaphthalene			89.4		%		50-140	06-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4114136								
WG2811030-4 MS		**WG2811030-5**						
2-Methylnaphthalene			90.2		%		50-140	06-JUL-18
Acenaphthene			89.3		%		50-140	06-JUL-18
Acenaphthylene			86.4		%		50-140	06-JUL-18
Anthracene			89.7		%		50-140	06-JUL-18
Benzo(a)anthracene			91.7		%		50-140	06-JUL-18
Benzo(a)pyrene			87.1		%		50-140	06-JUL-18
Benzo(b)fluoranthene			87.8		%		50-140	06-JUL-18
Benzo(g,h,i)perylene			87.5		%		50-140	06-JUL-18
Benzo(k)fluoranthene			88.2		%		50-140	06-JUL-18
Chrysene			90.5		%		50-140	06-JUL-18
Dibenzo(ah)anthracene			91.4		%		50-140	06-JUL-18
Fluoranthene			78.3		%		50-140	06-JUL-18
Fluorene			84.6		%		50-140	06-JUL-18
Indeno(1,2,3-cd)pyrene			84.1		%		50-140	06-JUL-18
Naphthalene			89.5		%		50-140	06-JUL-18
Phenanthrene			91.6		%		50-140	06-JUL-18
Pyrene			76.5		%		50-140	06-JUL-18
PH-WT	**Soil**							
Batch R4110544								
WG2810995-1 DUP		**L2121132-7**						
pH		7.02	7.08	J	pH units	0.06	0.3	03-JUL-18
WG2812340-1 LCS								
pH			6.97		pH units		6.9-7.1	03-JUL-18
SAR-R511-WT	**Soil**							
Batch R4113375								
WG2813866-4 DUP		**WG2813866-3**						
Calcium (Ca)		7.5	7.6		mg/L	1.3	30	05-JUL-18
Sodium (Na)		400	387		mg/L	3.3	30	05-JUL-18
Magnesium (Mg)		1.2	1.3		mg/L	7.2	30	05-JUL-18
WG2813866-2 IRM		**WT SAR2**						
Calcium (Ca)			74.5		%		70-130	05-JUL-18
Sodium (Na)			97.2		%		70-130	05-JUL-18
Magnesium (Mg)			82.3		%		70-130	05-JUL-18
WG2813866-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R4113375								
WG2813866-1 MB								
Calcium (Ca)			<1.0		mg/L		1	05-JUL-18
Sodium (Na)			<1.0		mg/L		1	05-JUL-18
Magnesium (Mg)			<1.0		mg/L		1	05-JUL-18
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-4 DUP		**WG2809817-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	04-JUL-18
Benzene		0.0097	0.0090		ug/g	6.9	40	04-JUL-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
cis-1,2-Dichloroethylene		0.072	0.069		ug/g	5.5	40	04-JUL-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	04-JUL-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	04-JUL-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-4 DUP		**WG2809817-3**						
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	04-JUL-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	04-JUL-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	04-JUL-18
o-Xylene		0.026	0.025		ug/g	3.7	40	04-JUL-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	04-JUL-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	04-JUL-18
Trichloroethylene		0.089	0.086		ug/g	2.6	40	04-JUL-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	04-JUL-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	04-JUL-18
WG2809817-2 LCS								
1,1,1,2-Tetrachloroethane			104.1		%		60-130	04-JUL-18
1,1,2,2-Tetrachloroethane			87.4		%		60-130	04-JUL-18
1,1,1-Trichloroethane			109.5		%		60-130	04-JUL-18
1,1,2-Trichloroethane			94.5		%		60-130	04-JUL-18
1,1-Dichloroethane			102.9		%		60-130	04-JUL-18
1,1-Dichloroethylene			98.3		%		60-130	04-JUL-18
1,2-Dibromoethane			93.3		%		70-130	04-JUL-18
1,2-Dichlorobenzene			108.1		%		70-130	04-JUL-18
1,2-Dichloroethane			92.4		%		60-130	04-JUL-18
1,2-Dichloropropane			100.2		%		70-130	04-JUL-18
1,3-Dichlorobenzene			112.3		%		70-130	04-JUL-18
1,4-Dichlorobenzene			114.2		%		70-130	04-JUL-18
Acetone			89.5		%		60-140	04-JUL-18
Benzene			109.0		%		70-130	04-JUL-18
Bromodichloromethane			98.1		%		50-140	04-JUL-18
Bromoform			91.0		%		70-130	04-JUL-18
Bromomethane			89.4		%		50-140	04-JUL-18
Carbon tetrachloride			111.7		%		70-130	04-JUL-18
Chlorobenzene			106.9		%		70-130	04-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-2 LCS								
Chloroform			105.2		%		70-130	04-JUL-18
cis-1,2-Dichloroethylene			105.9		%		70-130	04-JUL-18
cis-1,3-Dichloropropene			102.1		%		70-130	04-JUL-18
Dibromochloromethane			100.8		%		60-130	04-JUL-18
Dichlorodifluoromethane			57.0		%		50-140	04-JUL-18
Ethylbenzene			100.7		%		70-130	04-JUL-18
n-Hexane			121.4		%		70-130	04-JUL-18
Methylene Chloride			104.6		%		70-130	04-JUL-18
MTBE			106.5		%		70-130	04-JUL-18
m+p-Xylenes			106.5		%		70-130	04-JUL-18
Methyl Ethyl Ketone			85.2		%		60-140	04-JUL-18
Methyl Isobutyl Ketone			78.2		%		60-140	04-JUL-18
o-Xylene			98.7		%		70-130	04-JUL-18
Styrene			95.1		%		70-130	04-JUL-18
Tetrachloroethylene			115.4		%		60-130	04-JUL-18
Toluene			102.5		%		70-130	04-JUL-18
trans-1,2-Dichloroethylene			109.0		%		60-130	04-JUL-18
trans-1,3-Dichloropropene			89.9		%		70-130	04-JUL-18
Trichloroethylene			116.7		%		60-130	04-JUL-18
Trichlorofluoromethane			106.8		%		50-140	04-JUL-18
Vinyl chloride			75.3		%		60-140	04-JUL-18
WG2809817-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	04-JUL-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	04-JUL-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	04-JUL-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	04-JUL-18
1,1-Dichloroethane			<0.050		ug/g		0.05	04-JUL-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	04-JUL-18
1,2-Dibromoethane			<0.050		ug/g		0.05	04-JUL-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	04-JUL-18
1,2-Dichloroethane			<0.050		ug/g		0.05	04-JUL-18
1,2-Dichloropropane			<0.050		ug/g		0.05	04-JUL-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	04-JUL-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	04-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-1 MB								
Acetone			<0.50		ug/g		0.5	04-JUL-18
Benzene			<0.0068		ug/g		0.0068	04-JUL-18
Bromodichloromethane			<0.050		ug/g		0.05	04-JUL-18
Bromoform			<0.050		ug/g		0.05	04-JUL-18
Bromomethane			<0.050		ug/g		0.05	04-JUL-18
Carbon tetrachloride			<0.050		ug/g		0.05	04-JUL-18
Chlorobenzene			<0.050		ug/g		0.05	04-JUL-18
Chloroform			<0.050		ug/g		0.05	04-JUL-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	04-JUL-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	04-JUL-18
Dibromochloromethane			<0.050		ug/g		0.05	04-JUL-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	04-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	04-JUL-18
n-Hexane			<0.050		ug/g		0.05	04-JUL-18
Methylene Chloride			<0.050		ug/g		0.05	04-JUL-18
MTBE			<0.050		ug/g		0.05	04-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	04-JUL-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	04-JUL-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	04-JUL-18
o-Xylene			<0.020		ug/g		0.02	04-JUL-18
Styrene			<0.050		ug/g		0.05	04-JUL-18
Tetrachloroethylene			<0.050		ug/g		0.05	04-JUL-18
Toluene			<0.080		ug/g		0.08	04-JUL-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	04-JUL-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	04-JUL-18
Trichloroethylene			<0.010		ug/g		0.01	04-JUL-18
Trichlorofluoromethane			<0.050		ug/g		0.05	04-JUL-18
Vinyl chloride			<0.020		ug/g		0.02	04-JUL-18
Surrogate: 1,4-Difluorobenzene			105.2		%		50-140	04-JUL-18
Surrogate: 4-Bromofluorobenzene			102.1		%		50-140	04-JUL-18
WG2809817-5 MS		**L2120607-1**						
1,1,1,2-Tetrachloroethane			110.3		%		50-140	04-JUL-18
1,1,2,2-Tetrachloroethane			97.6		%		50-140	04-JUL-18
1,1,1-Trichloroethane			113.6		%		50-140	04-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-5 MS		**L2120607-1**						
1,1,2-Trichloroethane			107.6		%		50-140	04-JUL-18
1,1-Dichloroethane			110.4		%		50-140	04-JUL-18
1,1-Dichloroethylene			101.7		%		50-140	04-JUL-18
1,2-Dibromoethane			104.4		%		50-140	04-JUL-18
1,2-Dichlorobenzene			105.1		%		50-140	04-JUL-18
1,2-Dichloroethane			103.1		%		50-140	04-JUL-18
1,2-Dichloropropane			108.5		%		50-140	04-JUL-18
1,3-Dichlorobenzene			105.1		%		50-140	04-JUL-18
1,4-Dichlorobenzene			107.3		%		50-140	04-JUL-18
Acetone			97.6		%		50-140	04-JUL-18
Benzene			114.7		%		50-140	04-JUL-18
Bromodichloromethane			105.5		%		50-140	04-JUL-18
Bromoform			99.1		%		50-140	04-JUL-18
Bromomethane			91.7		%		50-140	04-JUL-18
Carbon tetrachloride			112.3		%		50-140	04-JUL-18
Chlorobenzene			111.0		%		50-140	04-JUL-18
Chloroform			113.2		%		50-140	04-JUL-18
cis-1,2-Dichloroethylene			111.3		%		50-140	04-JUL-18
cis-1,3-Dichloropropene			102.9		%		50-140	04-JUL-18
Dibromochloromethane			110.8		%		50-140	04-JUL-18
Dichlorodifluoromethane			55.0		%		50-140	04-JUL-18
Ethylbenzene			101.0		%		50-140	04-JUL-18
n-Hexane			100.6		%		50-140	04-JUL-18
Methylene Chloride			113.1		%		50-140	04-JUL-18
MTBE			114.6		%		50-140	04-JUL-18
m+p-Xylenes			104.5		%		50-140	04-JUL-18
Methyl Ethyl Ketone			102.0		%		50-140	04-JUL-18
Methyl Isobutyl Ketone			91.3		%		50-140	04-JUL-18
o-Xylene			99.6		%		50-140	04-JUL-18
Styrene			93.9		%		50-140	04-JUL-18
Tetrachloroethylene			112.0		%		50-140	04-JUL-18
Toluene			107.3		%		50-140	04-JUL-18
trans-1,2-Dichloroethylene			112.0		%		50-140	04-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4111890								
WG2809817-5 MS		**L2120607-1**						
trans-1,3-Dichloropropene			98.2		%		50-140	04-JUL-18
Trichloroethylene			116.4		%		50-140	04-JUL-18
Trichlorofluoromethane			108.5		%		50-140	04-JUL-18
Vinyl chloride			77.7		%		50-140	04-JUL-18

Quality Control Report

Workorder: L2120855 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2120855-COFC

COC Number: 15 -

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Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill
Contact:	Tania McCarthy
Phone	519 578 3500
	Company address below will appear on the final report
Street	72 Victoria Street South, Suite 300
City/Province	Kitchener
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill
Contact:	Accounts Payable

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Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
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Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	
Job #:	644757
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code	Routing Code:
Requisitioner	
Location:	

ALS Lab Work Order # (lab use only): L2120855

ALS Contact: Mathy Sampler:

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days)		Emergency	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	Metals	PAH	F1-F4	BTEX	VOC	PCB	MeOH						Number of Containers
	MW18-1232-2.5	27-JUN-18	13:30	Soil	X													
	MW18-1732-5	27-JUN-18	13:45	Soil			X			X		X						
	TB1	28-JUN-18	10:30	Soil						X								

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			15.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Richards	Date: 27-JUN-2018	Time: 15:30	Received by: PK	Date: 6-28-18	Time: 10:30	Received by:	Date: JUNE 28/18	Time: 15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 06-JUL-18
Report Date: 20-APR-21 13:11 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2125177

Project P.O. #: NOT SUBMITTED
Job Reference: 694757.01.CC.02
C of C Numbers:
Legal Site Desc:

Comments: APR-20-21:
L2125177-2, 3, 4, 8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 27 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-1 TP18-310-4 Sampled By: J. GOWING on 05-JUL-18 @ 09:10 Matrix: SOIL							
Physical Tests							
% Moisture	6.41		0.10	%	10-JUL-18	11-JUL-18	R4121946
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	06-JUL-18	11-JUL-18	R4122122
F2 (C10-C16)	<10		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F3 (C16-C34)	82		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4 (C34-C50)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
Total Hydrocarbons (C6-C50)	82		72	ug/g		11-JUL-18	
Chrom. to baseline at nC50	YES				09-JUL-18	10-JUL-18	R4121247
Surrogate: 2-Bromobenzotrifluoride	96.2		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	98.3		60-140	%	06-JUL-18	11-JUL-18	R4122122
L2125177-2 TP18-310-9 Sampled By: J. GOWING on 05-JUL-18 @ 10:05 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	5.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	25.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	6.8		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	2.67		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Calcium (Ca)	89600		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	12.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	5.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	40.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	27800		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	124		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	27000		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	17.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	22.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	5530	DLHC	40	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-3 TP18-309-5 Sampled By: J. GOWING on 05-JUL-18 @ 11:20 Matrix: SOIL							
Physical Tests							
% Moisture	5.88		0.10	%	10-JUL-18	11-JUL-18	R4121946
Metals							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-3 TP18-309-5 Sampled By: J. GOWING on 05-JUL-18 @ 11:20 Matrix: SOIL							
Metals							
Antimony (Sb)	1.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	5.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	24.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	7.4		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	8.78		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Calcium (Ca)	107000		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	11.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	6.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	35.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	31600		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	165		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	36100		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	1.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	13.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	22.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	9890	DLHC	40	ug/g	11-JUL-18	11-JUL-18	R4123446
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	06-JUL-18	11-JUL-18	R4122122
F2 (C10-C16)	<10		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F3 (C16-C34)	530		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4 (C34-C50)	879		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4G-SG (GHH-Silica)	2140		250	ug/g	10-JUL-18	10-JUL-18	R4122497
Total Hydrocarbons (C6-C50)	1410		72	ug/g		11-JUL-18	
Chrom. to baseline at nC50	NO				09-JUL-18	10-JUL-18	R4121247
Surrogate: 2-Bromobenzotrifluoride	97.6		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	99.7		60-140	%	06-JUL-18	11-JUL-18	R4122122
L2125177-4 TP18-309-9.5 Sampled By: J. GOWING on 05-JUL-18 @ 11:50 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	6.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	38.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	10.6		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-4 TP18-309-9.5 Sampled By: J. GOWING on 05-JUL-18 @ 11:50 Matrix: SOIL							
Metals							
Cadmium (Cd)	7.00		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Calcium (Ca)	82900		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	14.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	6.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	58.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	42800		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	144		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	28700		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	16.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	28.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	20700	DLHC	800	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-5 TP18-316-1 Sampled By: J. GOWING on 05-JUL-18 @ 13:00 Matrix: SOIL							
Physical Tests							
% Moisture	10.2		0.10	%	10-JUL-18	11-JUL-18	R4121946
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	13-JUL-18	13-JUL-18	R4124156
Aroclor 1248	<0.010		0.010	ug/g	13-JUL-18	13-JUL-18	R4124156
Aroclor 1254	<0.010		0.010	ug/g	13-JUL-18	13-JUL-18	R4124156
Aroclor 1260	<0.010		0.010	ug/g	13-JUL-18	13-JUL-18	R4124156
Total PCBs	<0.020		0.020	ug/g	13-JUL-18	13-JUL-18	R4124156
Surrogate: d14-Terphenyl	114.3		60-140	%	13-JUL-18	13-JUL-18	R4124156
L2125177-6 TP18-316-2 Sampled By: J. GOWING on 05-JUL-18 @ 13:05 Matrix: SOIL							
Physical Tests							
% Moisture	7.64		0.10	%	10-JUL-18	11-JUL-18	R4121933
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	06-JUL-18	11-JUL-18	R4122122
F2 (C10-C16)	12		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F2-Naphth	12		10	ug/g		13-JUL-18	
F3 (C16-C34)	115		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F3-PAH	112		50	ug/g		13-JUL-18	
F4 (C34-C50)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
Total Hydrocarbons (C6-C50)	127		72	ug/g		13-JUL-18	
Chrom. to baseline at nC50	YES				09-JUL-18	10-JUL-18	R4121247

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-6 TP18-316-2 Sampled By: J. GOWING on 05-JUL-18 @ 13:05 Matrix: SOIL							
Hydrocarbons							
Surrogate: 2-Bromobenzotrifluoride	97.3		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	109.7		60-140	%	06-JUL-18	11-JUL-18	R4122122
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	0.071		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	0.334		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	0.270		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	0.351		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	0.142		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	0.121		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	0.292		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	0.662		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	0.140		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.089		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.042		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.047		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.041		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.361		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	0.549		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	83.0		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	88.7		50-140	%	09-JUL-18	13-JUL-18	R4124100
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1248	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1254	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1260	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Total PCBs	<0.020		0.020	ug/g	12-JUL-18	12-JUL-18	R4123114
Surrogate: d14-Terphenyl	107.9		60-140	%	12-JUL-18	12-JUL-18	R4123114
L2125177-8 TP18-319-2 Sampled By: J. GOWING on 05-JUL-18 @ 14:45 Matrix: SOIL							
Metals							
Antimony (Sb)	3.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	10.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	54.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	0.59		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	0.73		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-8 TP18-319-2 Sampled By: J. GOWING on 05-JUL-18 @ 14:45 Matrix: SOIL							
Metals							
Calcium (Ca)	10600		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	29.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	7.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	113		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	47100		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	139		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	6500		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	3.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	26.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	23.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	1680	DLHC	40	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-9 TP18-319-3 Sampled By: J. GOWING on 05-JUL-18 @ 14:50 Matrix: SOIL							
Physical Tests							
% Moisture	16.7		0.10	%	10-JUL-18	11-JUL-18	R4121933
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.127		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.060		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.067		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.041		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.064		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	85.6		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	88.7		50-140	%	09-JUL-18	13-JUL-18	R4124100

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-9 TP18-319-3 Sampled By: J. GOWING on 05-JUL-18 @ 14:50 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
L2125177-10 TP18-319-6 Sampled By: J. GOWING on 05-JUL-18 @ 15:10 Matrix: SOIL							
Physical Tests							
% Moisture	11.2		0.10	%	10-JUL-18	11-JUL-18	R4121933
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.108		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.053		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.055		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.030		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.061		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	84.7		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	91.1		50-140	%	09-JUL-18	13-JUL-18	R4124100
L2125177-11 TP18-315-1 Sampled By: J. GOWING on 05-JUL-18 @ 15:50 Matrix: SOIL							
Physical Tests							
% Moisture	7.20		0.10	%	10-JUL-18	11-JUL-18	R4121933
Volatile Organic Compounds							
Benzene	0.0185		0.0068	ug/g	06-JUL-18	11-JUL-18	R4122122
Ethylbenzene	0.028		0.018	ug/g	06-JUL-18	11-JUL-18	R4122122
Toluene	0.099		0.080	ug/g	06-JUL-18	11-JUL-18	R4122122
o-Xylene	0.074		0.020	ug/g	06-JUL-18	11-JUL-18	R4122122
m+p-Xylenes	0.086		0.030	ug/g	06-JUL-18	11-JUL-18	R4122122
Xylenes (Total)	0.160		0.050	ug/g		11-JUL-18	
Surrogate: 4-Bromofluorobenzene	106.2		50-140	%	06-JUL-18	11-JUL-18	R4122122
Surrogate: 1,4-Difluorobenzene	106.5		50-140	%	06-JUL-18	11-JUL-18	R4122122
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	06-JUL-18	11-JUL-18	R4122122

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-11 TP18-315-1 Sampled By: J. GOWING on 05-JUL-18 @ 15:50 Matrix: SOIL							
Hydrocarbons							
F1-BTEX	<5.0		5.0	ug/g		11-JUL-18	
F2 (C10-C16)	12		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F3 (C16-C34)	197		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4 (C34-C50)	92		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4G-SG (GHH-Silica)	310		250	ug/g	10-JUL-18	10-JUL-18	R4122497
Total Hydrocarbons (C6-C50)	301		72	ug/g		11-JUL-18	
Chrom. to baseline at nC50	NO				09-JUL-18	10-JUL-18	R4121247
Surrogate: 2-Bromobenzotrifluoride	97.0		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	100.1		60-140	%	06-JUL-18	11-JUL-18	R4122122
L2125177-12 TP18-315-2 Sampled By: J. GOWING on 05-JUL-18 @ 16:00 Matrix: SOIL							
Physical Tests							
% Moisture	7.55		0.10	%	10-JUL-18	11-JUL-18	R4121933
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	0.108		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	0.108		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	0.865		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	0.749		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	0.928		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	0.370		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	0.300		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	0.685		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	0.105		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	1.43		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	0.376		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	<0.030		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.032		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.041		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.325		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	1.28		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	81.5		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	85.8		50-140	%	09-JUL-18	13-JUL-18	R4124100
L2125177-13 TP18-315-5 Sampled By: J. GOWING on 05-JUL-18 @ 16:20 Matrix: SOIL							
Physical Tests							
% Moisture	8.78		0.10	%	10-JUL-18	11-JUL-18	R4121933
Polycyclic Aromatic Hydrocarbons							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-13 TP18-315-5 Sampled By: J. GOWING on 05-JUL-18 @ 16:20 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.390		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	0.112		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	0.833		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	2.42		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	1.98		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	2.62		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	0.939		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	0.864		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	2.08		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	0.266		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	5.64		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	0.370		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	1.00		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.644		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.286		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.358		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.672		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	5.09		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	4.39		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	85.0		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	92.2		50-140	%	09-JUL-18	13-JUL-18	R4124100
L2125177-14 TP18-311-2 Sampled By: J. GOWING on 06-JUL-18 @ 08:38 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	3.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	19.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	1.7		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Calcium (Ca)	114000		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	8.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	3.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	15.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	11900		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	20.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	34400		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	6.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-14 TP18-311-2 Sampled By: J. GOWING on 06-JUL-18 @ 08:38 Matrix: SOIL							
Metals							
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	22.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	103		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-15 TP18-311-6.5 Sampled By: J. GOWING on 06-JUL-18 @ 08:50 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	3.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	27.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	2.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	<5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Calcium (Ca)	58200		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	8.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	3.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	22.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	11100		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	47.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	16500		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	6.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	17.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	152		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-16 TP18-314-2 Sampled By: J. GOWING on 06-JUL-18 @ 09:00 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Arsenic (As)	2.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Barium (Ba)	18.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123446
Boron (B)	<5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-16 TP18-314-2 Sampled By: J. GOWING on 06-JUL-18 @ 09:00 Matrix: SOIL							
Metals							
Calcium (Ca)	115000		50	ug/g	11-JUL-18	20-APR-21	R4123446
Chromium (Cr)	7.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Cobalt (Co)	3.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Copper (Cu)	13.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Iron (Fe)	11700		50	ug/g	11-JUL-18	20-APR-21	R4123446
Lead (Pb)	8.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Magnesium (Mg)	25800		20	ug/g	11-JUL-18	20-APR-21	R4123446
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Nickel (Ni)	6.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123446
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123446
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Vanadium (V)	20.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123446
Zinc (Zn)	68.4		5.0	ug/g	11-JUL-18	11-JUL-18	R4123446
L2125177-17 TP18-314-6 Sampled By: J. GOWING on 06-JUL-18 @ 09:30 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	4.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	20.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	5.2		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	102000		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	8.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	4.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	19.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	13000		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	42.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	32700		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	9.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	19.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	438		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
TP18-313-2							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-18 TP18-313-2 Sampled By: J. GOWING on 06-JUL-18 @ 10:00 Matrix: SOIL							
Metals							
Antimony (Sb)	1.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	7.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	116		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	7.6		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	1.84		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	41500		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	14.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	6.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	27.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	22000		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	155		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	23300		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	1.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	15.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	28.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	517		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
L2125177-19 TP18-313-6 Sampled By: J. GOWING on 06-JUL-18 @ 10:20 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	7.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	49.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	9.7		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	1.63		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	75400		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	13.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	5.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	25.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	18500		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	116		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	40200		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	13.8		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-19 TP18-313-6 Sampled By: J. GOWING on 06-JUL-18 @ 10:20 Matrix: SOIL							
Metals							
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	25.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	666		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
L2125177-20 TP18-312-3 Sampled By: J. GOWING on 06-JUL-18 @ 10:50 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	7.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	71.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	7.8		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	1.36		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	64000		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	15.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	5.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	18.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	19600		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	123		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	41400		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	14.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	28.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	442		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
L2125177-21 TP18-312-6 Sampled By: J. GOWING on 06-JUL-18 @ 11:05 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	6.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	44.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	5.5		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-21 TP18-312-6 Sampled By: J. GOWING on 06-JUL-18 @ 11:05 Matrix: SOIL							
Metals							
Cadmium (Cd)	0.98		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	66900		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	13.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	5.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	18.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	17900		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	105		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	34000		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	13.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	23.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	727		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
L2125177-22 TP18-318-2 Sampled By: J. GOWING on 06-JUL-18 @ 11:28 Matrix: SOIL							
Physical Tests							
% Moisture	6.98		0.10	%	10-JUL-18	11-JUL-18	R4121933
Metals							
Antimony (Sb)	1.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	9.9		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	48.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	5.7		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	<5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	13600		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	14.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	5.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	36.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	34900		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	86.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	7000		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	14.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-22 TP18-318-2 Sampled By: J. GOWING on 06-JUL-18 @ 11:28 Matrix: SOIL							
Metals							
Vanadium (V)	22.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	209		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Volatile Organic Compounds							
Benzene	0.0070		0.0068	ug/g	09-JUL-18	11-JUL-18	R4122232
Ethylbenzene	<0.018		0.018	ug/g	09-JUL-18	11-JUL-18	R4122232
Toluene	<0.080		0.080	ug/g	09-JUL-18	11-JUL-18	R4122232
o-Xylene	0.021		0.020	ug/g	09-JUL-18	11-JUL-18	R4122232
m+p-Xylenes	0.033		0.030	ug/g	09-JUL-18	11-JUL-18	R4122232
Xylenes (Total)	0.054		0.050	ug/g		11-JUL-18	
Surrogate: 4-Bromofluorobenzene	107.8		50-140	%	09-JUL-18	11-JUL-18	R4122232
Surrogate: 1,4-Difluorobenzene	113.1		50-140	%	09-JUL-18	11-JUL-18	R4122232
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	09-JUL-18	11-JUL-18	R4122232
F1-BTEX	<5.0		5.0	ug/g		13-JUL-18	
F2 (C10-C16)	11		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F2-Naphth	11		10	ug/g		13-JUL-18	
F3 (C16-C34)	59		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F3-PAH	59		50	ug/g		13-JUL-18	
F4 (C34-C50)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
Total Hydrocarbons (C6-C50)	<72		72	ug/g		13-JUL-18	
Chrom. to baseline at nC50	YES				09-JUL-18	10-JUL-18	R4121247
Surrogate: 2-Bromobenzotrifluoride	97.2		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	100.0		60-140	%	09-JUL-18	11-JUL-18	R4122232
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	0.072		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	0.059		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	0.112		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	0.081		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	0.115		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.115		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.051		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.064		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.058		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.093		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-22 TP18-318-2 Sampled By: J. GOWING on 06-JUL-18 @ 11:28 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Pyrene	0.096		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	82.9		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	88.5		50-140	%	09-JUL-18	13-JUL-18	R4124100
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1248	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1254	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1260	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Total PCBs	<0.020		0.020	ug/g	12-JUL-18	12-JUL-18	R4123114
Surrogate: d14-Terphenyl	104.6		60-140	%	12-JUL-18	12-JUL-18	R4123114
L2125177-23 TP18-317-5 Sampled By: J. GOWING on 06-JUL-18 @ 12:30 Matrix: SOIL							
Physical Tests							
% Moisture	12.2		0.10	%	10-JUL-18	11-JUL-18	R4121933
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	09-JUL-18	11-JUL-18	R4122232
Ethylbenzene	<0.018		0.018	ug/g	09-JUL-18	11-JUL-18	R4122232
Toluene	<0.080		0.080	ug/g	09-JUL-18	11-JUL-18	R4122232
o-Xylene	<0.020		0.020	ug/g	09-JUL-18	11-JUL-18	R4122232
m+p-Xylenes	<0.030		0.030	ug/g	09-JUL-18	11-JUL-18	R4122232
Xylenes (Total)	<0.050		0.050	ug/g		11-JUL-18	
Surrogate: 4-Bromofluorobenzene	103.3		50-140	%	09-JUL-18	11-JUL-18	R4122232
Surrogate: 1,4-Difluorobenzene	104.4		50-140	%	09-JUL-18	11-JUL-18	R4122232
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	09-JUL-18	11-JUL-18	R4122232
F1-BTEX	<5.0		5.0	ug/g		11-JUL-18	
F2 (C10-C16)	<10		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F3 (C16-C34)	61		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F4 (C34-C50)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
Total Hydrocarbons (C6-C50)	<72		72	ug/g		11-JUL-18	
Chrom. to baseline at nC50	YES				09-JUL-18	10-JUL-18	R4121247
Surrogate: 2-Bromobenzotrifluoride	96.2		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	101.9		60-140	%	09-JUL-18	11-JUL-18	R4122232
L2125177-24 TP18-DUP1 Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	2.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	14.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-24 TP18-DUP1 Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Metals							
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	<5.0		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	102000		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	6.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	3.3		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	12.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	10200		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	20.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	20800		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	6.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	17.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	223		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
L2125177-25 TP18-DUP2 Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Physical Tests							
% Moisture	6.73		0.10	%	10-JUL-18	11-JUL-18	R4121933
Volatile Organic Compounds							
Benzene	0.0071		0.0068	ug/g	09-JUL-18	11-JUL-18	R4122232
Ethylbenzene	<0.018		0.018	ug/g	09-JUL-18	11-JUL-18	R4122232
Toluene	<0.080		0.080	ug/g	09-JUL-18	11-JUL-18	R4122232
o-Xylene	0.025		0.020	ug/g	09-JUL-18	11-JUL-18	R4122232
m+p-Xylenes	0.035		0.030	ug/g	09-JUL-18	11-JUL-18	R4122232
Xylenes (Total)	0.060		0.050	ug/g		11-JUL-18	
Surrogate: 4-Bromofluorobenzene	105.1		50-140	%	09-JUL-18	11-JUL-18	R4122232
Surrogate: 1,4-Difluorobenzene	108.8		50-140	%	09-JUL-18	11-JUL-18	R4122232
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	09-JUL-18	11-JUL-18	R4122232
F1-BTEX	<5.0		5.0	ug/g		13-JUL-18	
F2 (C10-C16)	<10		10	ug/g	09-JUL-18	10-JUL-18	R4121247
F2-Naphth	<10		10	ug/g		13-JUL-18	
F3 (C16-C34)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
F3-PAH	<50		50	ug/g		13-JUL-18	
F4 (C34-C50)	<50		50	ug/g	09-JUL-18	10-JUL-18	R4121247
Total Hydrocarbons (C6-C50)	<72		72	ug/g		13-JUL-18	
Chrom. to baseline at nC50	YES				09-JUL-18	10-JUL-18	R4121247

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-25 TP18-DUP2 Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Hydrocarbons							
Surrogate: 2-Bromobenzotrifluoride	96.4		60-140	%	09-JUL-18	10-JUL-18	R4121247
Surrogate: 3,4-Dichlorotoluene	91.9		60-140	%	09-JUL-18	11-JUL-18	R4122232
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Acenaphthylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)anthracene	0.065		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(a)pyrene	0.056		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(b)fluoranthene	0.092		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Benzo(k)fluoranthene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Chrysene	0.077		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluoranthene	0.100		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Fluorene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
1+2-Methylnaphthalenes	0.121		0.042	ug/g		13-JUL-18	
1-Methylnaphthalene	0.054		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
2-Methylnaphthalene	0.068		0.030	ug/g	09-JUL-18	13-JUL-18	R4124100
Naphthalene	0.062		0.013	ug/g	09-JUL-18	13-JUL-18	R4124100
Phenanthrene	0.089		0.046	ug/g	09-JUL-18	13-JUL-18	R4124100
Pyrene	0.082		0.050	ug/g	09-JUL-18	13-JUL-18	R4124100
Surrogate: 2-Fluorobiphenyl	83.6		50-140	%	09-JUL-18	13-JUL-18	R4124100
Surrogate: p-Terphenyl d14	84.9		50-140	%	09-JUL-18	13-JUL-18	R4124100
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1248	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1254	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Aroclor 1260	<0.010		0.010	ug/g	12-JUL-18	12-JUL-18	R4123114
Total PCBs	<0.020		0.020	ug/g	12-JUL-18	12-JUL-18	R4123114
Surrogate: d14-Terphenyl	106.5		60-140	%	12-JUL-18	12-JUL-18	R4123114
L2125177-26 TRIP BLANK Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Physical Tests							
% Moisture	<0.10		0.10	%	10-JUL-18	11-JUL-18	R4121933
Volatile Organic Compounds							
Benzene	<0.0068		0.0068	ug/g	09-JUL-18	11-JUL-18	R4122232
Ethylbenzene	<0.018		0.018	ug/g	09-JUL-18	11-JUL-18	R4122232
Toluene	<0.080		0.080	ug/g	09-JUL-18	11-JUL-18	R4122232
o-Xylene	<0.020		0.020	ug/g	09-JUL-18	11-JUL-18	R4122232
m+p-Xylenes	<0.030		0.030	ug/g	09-JUL-18	11-JUL-18	R4122232

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2125177-26 TRIP BLANK Sampled By: J. GOWING on 06-JUL-18 Matrix: SOIL							
Volatile Organic Compounds							
Xylenes (Total)	<0.050		0.050	ug/g		11-JUL-18	
Surrogate: 4-Bromofluorobenzene	105.2		50-140	%	09-JUL-18	11-JUL-18	R4122232
Surrogate: 1,4-Difluorobenzene	109.0		50-140	%	09-JUL-18	11-JUL-18	R4122232
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	09-JUL-18	11-JUL-18	R4122232
F1-BTEX	<5.0		5.0	ug/g		11-JUL-18	
Surrogate: 3,4-Dichlorotoluene	121.1		60-140	%	09-JUL-18	11-JUL-18	R4122232
L2125177-27 TP18-310-5 Sampled By: J. GOWING on 05-JUL-18 @ 09:20 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Arsenic (As)	6.5		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Barium (Ba)	39.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Beryllium (Be)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Bismuth (Bi)	<1.0		1.0	ug/g	11-JUL-18	20-APR-21	R4123456
Boron (B)	7.3		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cadmium (Cd)	1.42		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Calcium (Ca)	68300		50	ug/g	11-JUL-18	20-APR-21	R4123456
Chromium (Cr)	21.6		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Cobalt (Co)	5.2		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Copper (Cu)	41.1		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Iron (Fe)	24400		50	ug/g	11-JUL-18	20-APR-21	R4123456
Lead (Pb)	196		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Magnesium (Mg)	21500		20	ug/g	11-JUL-18	20-APR-21	R4123456
Molybdenum (Mo)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Nickel (Ni)	13.4		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Selenium (Se)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Silver (Ag)	<0.20		0.20	ug/g	11-JUL-18	11-JUL-18	R4123456
Thallium (Tl)	<0.50		0.50	ug/g	11-JUL-18	11-JUL-18	R4123456
Uranium (U)	<1.0		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Vanadium (V)	29.7		1.0	ug/g	11-JUL-18	11-JUL-18	R4123456
Zinc (Zn)	1670		5.0	ug/g	11-JUL-18	11-JUL-18	R4123456

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT	Soil	PCB-O.Reg 153/04 (July 2011)	SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2125177 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4122122								
WG2816134-4 DUP		**WG2816134-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	11-JUL-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	11-JUL-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	11-JUL-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	11-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	11-JUL-18
WG2816134-2 LCS								
Benzene			115.7		%		70-130	11-JUL-18
Ethylbenzene			113.8		%		70-130	11-JUL-18
m+p-Xylenes			114.4		%		70-130	11-JUL-18
o-Xylene			114.4		%		70-130	11-JUL-18
Toluene			117.0		%		70-130	11-JUL-18
WG2816134-1 MB								
Benzene			<0.0068		ug/g		0.0068	11-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	11-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	11-JUL-18
o-Xylene			<0.020		ug/g		0.02	11-JUL-18
Toluene			<0.080		ug/g		0.08	11-JUL-18
Surrogate: 1,4-Difluorobenzene			109.2		%		50-140	11-JUL-18
Surrogate: 4-Bromofluorobenzene			108.4		%		50-140	11-JUL-18
WG2816134-5 MS		**WG2816134-3**						
Benzene			114.1		%		60-140	11-JUL-18
Ethylbenzene			110.6		%		60-140	11-JUL-18
m+p-Xylenes			109.3		%		60-140	11-JUL-18
o-Xylene			110.9		%		60-140	11-JUL-18
Toluene			113.9		%		60-140	11-JUL-18
Batch R4122232								
WG2817375-4 DUP		**WG2817375-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	11-JUL-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	11-JUL-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	11-JUL-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	11-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	11-JUL-18
WG2817375-2 LCS								
Benzene			110.7		%		70-130	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4122232								
WG2817375-2 LCS								
Ethylbenzene			104.1		%		70-130	11-JUL-18
m+p-Xylenes			107.0		%		70-130	11-JUL-18
o-Xylene			105.4		%		70-130	11-JUL-18
Toluene			107.0		%		70-130	11-JUL-18
WG2817375-1 MB								
Benzene			<0.0068		ug/g		0.0068	11-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	11-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	11-JUL-18
o-Xylene			<0.020		ug/g		0.02	11-JUL-18
Toluene			<0.080		ug/g		0.08	11-JUL-18
Surrogate: 1,4-Difluorobenzene			109.5		%		50-140	11-JUL-18
Surrogate: 4-Bromofluorobenzene			107.6		%		50-140	11-JUL-18
WG2817375-8 MS		**L2125177-23**						
Benzene			109.6		%		60-140	11-JUL-18
Ethylbenzene			107.9		%		60-140	11-JUL-18
m+p-Xylenes			109.4		%		60-140	11-JUL-18
o-Xylene			107.0		%		60-140	11-JUL-18
Toluene			110.1		%		60-140	11-JUL-18
F1-HS-511-WT	**Soil**							
Batch R4122122								
WG2816134-4 DUP		**WG2816134-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	11-JUL-18
WG2816134-2 LCS								
F1 (C6-C10)			101.6		%		80-120	11-JUL-18
WG2816134-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	11-JUL-18
Surrogate: 3,4-Dichlorotoluene			106.1		%		60-140	11-JUL-18
WG2816134-6 MS		**L2124720-2**						
F1 (C6-C10)			103.2		%		60-140	11-JUL-18
Batch R4122232								
WG2817375-4 DUP		**WG2817375-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	11-JUL-18
WG2817375-2 LCS								
F1 (C6-C10)			109.1		%		80-120	11-JUL-18
WG2817375-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4122232								
WG2817375-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	11-JUL-18
Surrogate: 3,4-Dichlorotoluene			117.7		%		60-140	11-JUL-18
WG2817375-7 MS		**L2125177-22**						
F1 (C6-C10)			99.3		%		60-140	11-JUL-18
F2-F4-511-WT	**Soil**							
Batch R4121247								
WG2817566-3 DUP		**WG2817566-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	10-JUL-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	10-JUL-18
F4 (C34-C50)		<50	82	RPD-NA	ug/g	N/A	30	10-JUL-18
WG2817566-2 LCS								
F2 (C10-C16)			109.9		%		80-120	10-JUL-18
F3 (C16-C34)			108.6		%		80-120	10-JUL-18
F4 (C34-C50)			106.5		%		80-120	10-JUL-18
WG2817566-1 MB								
F2 (C10-C16)			<10		ug/g		10	10-JUL-18
F3 (C16-C34)			<50		ug/g		50	10-JUL-18
F4 (C34-C50)			<50		ug/g		50	10-JUL-18
Surrogate: 2-Bromobenzotrifluoride			94.8		%		60-140	10-JUL-18
WG2817566-4 MS		**WG2817566-5**						
F2 (C10-C16)			103.6		%		60-140	10-JUL-18
F3 (C16-C34)			105.4		%		60-140	10-JUL-18
F4 (C34-C50)			98.1		%		60-140	10-JUL-18
F4G-ADD-511-WT	**Soil**							
Batch R4122497								
WG2819599-2 LCS								
F4G-SG (GHH-Silica)			63.3		%		60-140	10-JUL-18
WG2819599-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	10-JUL-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4123446								
WG2819030-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			94.3		%		70-130	11-JUL-18
Arsenic (As)			103.4		%		70-130	11-JUL-18
Barium (Ba)			108.4		%		70-130	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123446								
WG2819030-2 CRM		**WT-CANMET-TILL1**						
Beryllium (Be)			98.1		%		70-130	11-JUL-18
Bismuth (Bi)			96.4		%		70-130	11-JUL-18
Boron (B)			2.9		mg/kg		0-8.2	11-JUL-18
Cadmium (Cd)			105.4		%		70-130	11-JUL-18
Calcium (Ca)			92.6		%		70-130	11-JUL-18
Chromium (Cr)			95.9		%		70-130	11-JUL-18
Cobalt (Co)			98.4		%		70-130	11-JUL-18
Copper (Cu)			102.0		%		70-130	11-JUL-18
Iron (Fe)			99.4		%		70-130	11-JUL-18
Lead (Pb)			99.0		%		70-130	11-JUL-18
Magnesium (Mg)			106.3		%		70-130	11-JUL-18
Molybdenum (Mo)			97.4		%		70-130	11-JUL-18
Nickel (Ni)			98.4		%		70-130	11-JUL-18
Selenium (Se)			0.32		mg/kg		0.11-0.51	11-JUL-18
Silver (Ag)			0.21		mg/kg		0.13-0.33	11-JUL-18
Thallium (Tl)			0.116		mg/kg		0.077-0.18	11-JUL-18
Uranium (U)			91.5		%		70-130	11-JUL-18
Vanadium (V)			97.3		%		70-130	11-JUL-18
Zinc (Zn)			98.5		%		70-130	11-JUL-18
WG2819030-6 DUP		**WG2819030-5**						
Antimony (Sb)		0.55	0.56		ug/g	1.9	30	11-JUL-18
Arsenic (As)		4.03	4.38		ug/g	8.3	30	11-JUL-18
Barium (Ba)		32.2	33.2		ug/g	2.9	40	11-JUL-18
Beryllium (Be)		0.23	0.22		ug/g	3.5	30	11-JUL-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	11-JUL-18
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	11-JUL-18
Cadmium (Cd)		0.177	0.175		ug/g	0.8	30	11-JUL-18
Calcium (Ca)		37400	35800		ug/g	4.4	30	11-JUL-18
Chromium (Cr)		13.4	14.0		ug/g	4.3	30	11-JUL-18
Cobalt (Co)		3.92	4.19		ug/g	6.7	30	11-JUL-18
Copper (Cu)		28.2	31.0		ug/g	9.2	30	11-JUL-18
Iron (Fe)		41300	42900		ug/g	3.9	30	11-JUL-18
Lead (Pb)		30.7	27.4		ug/g	12	40	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123446								
WG2819030-6 DUP		**WG2819030-5**						
Magnesium (Mg)		9530	10200		ug/g	6.8	30	11-JUL-18
Molybdenum (Mo)		0.42	0.41		ug/g	0.5	40	11-JUL-18
Nickel (Ni)		9.15	9.79		ug/g	6.8	30	11-JUL-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	11-JUL-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	11-JUL-18
Thallium (Tl)		0.052	<0.050	RPD-NA	ug/g	N/A	30	11-JUL-18
Uranium (U)		0.292	0.296		ug/g	1.4	30	11-JUL-18
Vanadium (V)		19.5	20.1		ug/g	3.0	30	11-JUL-18
Zinc (Zn)		58.0	61.2		ug/g	5.3	30	11-JUL-18
WG2819030-4 LCS								
Antimony (Sb)			101.5		%		80-120	11-JUL-18
Arsenic (As)			101.6		%		80-120	11-JUL-18
Barium (Ba)			98.6		%		80-120	11-JUL-18
Beryllium (Be)			97.6		%		80-120	11-JUL-18
Bismuth (Bi)			93.7		%		80-120	11-JUL-18
Boron (B)			94.5		%		80-120	11-JUL-18
Cadmium (Cd)			103.4		%		80-120	11-JUL-18
Calcium (Ca)			93.8		%		80-120	11-JUL-18
Chromium (Cr)			97.1		%		80-120	11-JUL-18
Cobalt (Co)			96.4		%		80-120	11-JUL-18
Copper (Cu)			97.1		%		80-120	11-JUL-18
Iron (Fe)			94.3		%		80-120	11-JUL-18
Lead (Pb)			93.5		%		80-120	11-JUL-18
Magnesium (Mg)			112.0		%		80-120	11-JUL-18
Molybdenum (Mo)			95.5		%		80-120	11-JUL-18
Nickel (Ni)			98.1		%		80-120	11-JUL-18
Selenium (Se)			99.6		%		80-120	11-JUL-18
Silver (Ag)			87.1		%		80-120	11-JUL-18
Thallium (Tl)			101.9		%		80-120	11-JUL-18
Uranium (U)			94.1		%		80-120	11-JUL-18
Vanadium (V)			100.1		%		80-120	11-JUL-18
Zinc (Zn)			95.2		%		80-120	11-JUL-18
WG2819030-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123446								
WG2819030-1 MB								
Arsenic (As)			<0.10		mg/kg		0.1	11-JUL-18
Barium (Ba)			<0.50		mg/kg		0.5	11-JUL-18
Beryllium (Be)			<0.10		mg/kg		0.1	11-JUL-18
Bismuth (Bi)			<0.20		mg/kg		0.2	11-JUL-18
Boron (B)			<5.0		mg/kg		5	11-JUL-18
Cadmium (Cd)			<0.020		mg/kg		0.02	11-JUL-18
Calcium (Ca)			<50		mg/kg		50	11-JUL-18
Chromium (Cr)			<0.50		mg/kg		0.5	11-JUL-18
Cobalt (Co)			<0.10		mg/kg		0.1	11-JUL-18
Copper (Cu)			<0.50		mg/kg		0.5	11-JUL-18
Iron (Fe)			<50		mg/kg		50	11-JUL-18
Lead (Pb)			<0.50		mg/kg		0.5	11-JUL-18
Magnesium (Mg)			<20		mg/kg		20	11-JUL-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	11-JUL-18
Nickel (Ni)			<0.50		mg/kg		0.5	11-JUL-18
Selenium (Se)			<0.20		mg/kg		0.2	11-JUL-18
Silver (Ag)			<0.10		mg/kg		0.1	11-JUL-18
Thallium (Tl)			<0.050		mg/kg		0.05	11-JUL-18
Uranium (U)			<0.050		mg/kg		0.05	11-JUL-18
Vanadium (V)			<0.20		mg/kg		0.2	11-JUL-18
Zinc (Zn)			<2.0		mg/kg		2	11-JUL-18
Batch R4123456								
WG2819031-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			101.8		%		70-130	11-JUL-18
Arsenic (As)			116.0		%		70-130	11-JUL-18
Barium (Ba)			117.3		%		70-130	11-JUL-18
Beryllium (Be)			101.5		%		70-130	11-JUL-18
Bismuth (Bi)			103.2		%		70-130	11-JUL-18
Boron (B)			3.4		mg/kg		0-8.2	11-JUL-18
Cadmium (Cd)			115.4		%		70-130	11-JUL-18
Calcium (Ca)			109.5		%		70-130	11-JUL-18
Chromium (Cr)			108.0		%		70-130	11-JUL-18
Cobalt (Co)			109.1		%		70-130	11-JUL-18
Copper (Cu)			111.9		%		70-130	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123456								
WG2819031-2 CRM		**WT-CANMET-TILL1**						
Iron (Fe)			105.1		%		70-130	11-JUL-18
Lead (Pb)			106.3		%		70-130	11-JUL-18
Magnesium (Mg)			119.2		%		70-130	11-JUL-18
Molybdenum (Mo)			111.8		%		70-130	11-JUL-18
Nickel (Ni)			109.7		%		70-130	11-JUL-18
Selenium (Se)			0.33		mg/kg		0.11-0.51	11-JUL-18
Silver (Ag)			0.22		mg/kg		0.13-0.33	11-JUL-18
Thallium (Tl)			0.131		mg/kg		0.077-0.18	11-JUL-18
Uranium (U)			101.7		%		70-130	11-JUL-18
Vanadium (V)			111.0		%		70-130	11-JUL-18
Zinc (Zn)			114.6		%		70-130	11-JUL-18
WG2819031-4 DUP		**L2125177-20**						
Antimony (Sb)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	11-JUL-18
Arsenic (As)		7.1	6.2		ug/g	14	30	11-JUL-18
Barium (Ba)		71.4	51.7		ug/g	32	40	11-JUL-18
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	11-JUL-18
Bismuth (Bi)		N/A	0.23		ug/g	7.7	30	11-JUL-18
Boron (B)		7.8	6.0		ug/g	26	30	11-JUL-18
Cadmium (Cd)		1.36	1.07		ug/g	24	30	11-JUL-18
Calcium (Ca)		64000	58600		ug/g	8.8	30	11-JUL-18
Chromium (Cr)		15.2	12.6		ug/g	18	30	11-JUL-18
Cobalt (Co)		5.5	4.8		ug/g	13	30	11-JUL-18
Copper (Cu)		18.4	16.1		ug/g	14	30	11-JUL-18
Iron (Fe)		19600	16900		ug/g	15	30	11-JUL-18
Lead (Pb)		123	106		ug/g	15	40	11-JUL-18
Magnesium (Mg)		41400	38100		ug/g	8.4	30	11-JUL-18
Molybdenum (Mo)		<1.0	<1.0	RPD-NA	ug/g	N/A	40	11-JUL-18
Nickel (Ni)		14.1	12.2		ug/g	14	30	11-JUL-18
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	11-JUL-18
Silver (Ag)		<0.20	<0.20	RPD-NA	ug/g	N/A	40	11-JUL-18
Thallium (Tl)		<0.50	<0.50	RPD-NA	ug/g	N/A	30	11-JUL-18
Uranium (U)		<1.0	<1.0	RPD-NA	ug/g	N/A	30	11-JUL-18
Vanadium (V)		28.0	23.4		ug/g	18	30	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123456								
WG2819031-4 DUP		**L2125177-20**						
Zinc (Zn)		442	377		ug/g	16	30	11-JUL-18
WG2819031-3 LCS								
Antimony (Sb)			115.4		%		80-120	11-JUL-18
Arsenic (As)			112.8		%		80-120	11-JUL-18
Barium (Ba)			111.7		%		80-120	11-JUL-18
Beryllium (Be)			102.0		%		80-120	11-JUL-18
Bismuth (Bi)			104.6		%		80-120	11-JUL-18
Boron (B)			97.9		%		80-120	11-JUL-18
Cadmium (Cd)			110.1		%		80-120	11-JUL-18
Calcium (Ca)			102.7		%		80-120	11-JUL-18
Chromium (Cr)			115.1		%		80-120	11-JUL-18
Cobalt (Co)			112.0		%		80-120	11-JUL-18
Copper (Cu)			111.3		%		80-120	11-JUL-18
Iron (Fe)			114.1		%		80-120	11-JUL-18
Lead (Pb)			107.7		%		80-120	11-JUL-18
Molybdenum (Mo)			103.4		%		80-120	11-JUL-18
Nickel (Ni)			111.3		%		80-120	11-JUL-18
Selenium (Se)			108.2		%		80-120	11-JUL-18
Silver (Ag)			104.0		%		80-120	11-JUL-18
Thallium (Tl)			108.9		%		80-120	11-JUL-18
Uranium (U)			103.8		%		80-120	11-JUL-18
Vanadium (V)			117.6		%		80-120	11-JUL-18
Zinc (Zn)			110.3		%		80-120	11-JUL-18
WG2819031-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	11-JUL-18
Arsenic (As)			<0.10		mg/kg		0.1	11-JUL-18
Barium (Ba)			<0.50		mg/kg		0.5	11-JUL-18
Beryllium (Be)			<0.10		mg/kg		0.1	11-JUL-18
Bismuth (Bi)			<0.20		mg/kg		0.2	11-JUL-18
Boron (B)			<5.0		mg/kg		5	11-JUL-18
Cadmium (Cd)			<0.020		mg/kg		0.02	11-JUL-18
Calcium (Ca)			<50		mg/kg		50	11-JUL-18
Chromium (Cr)			<0.50		mg/kg		0.5	11-JUL-18
Cobalt (Co)			<0.10		mg/kg		0.1	11-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4123456								
WG2819031-1 MB								
Copper (Cu)			<0.50		mg/kg		0.5	11-JUL-18
Iron (Fe)			<50		mg/kg		50	11-JUL-18
Lead (Pb)			<0.50		mg/kg		0.5	11-JUL-18
Magnesium (Mg)			<20		mg/kg		20	11-JUL-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	11-JUL-18
Nickel (Ni)			<0.50		mg/kg		0.5	11-JUL-18
Selenium (Se)			<0.20		mg/kg		0.2	11-JUL-18
Silver (Ag)			<0.10		mg/kg		0.1	11-JUL-18
Thallium (Tl)			<0.050		mg/kg		0.05	11-JUL-18
Uranium (U)			<0.050		mg/kg		0.05	11-JUL-18
Vanadium (V)			<0.20		mg/kg		0.2	11-JUL-18
Zinc (Zn)			<2.0		mg/kg		2	11-JUL-18
MOISTURE-WT	**Soil**							
Batch R4121933								
WG2818266-3 DUP		**L2125177-6**						
% Moisture		7.64	7.30		%	4.5	20	11-JUL-18
WG2818266-2 LCS								
% Moisture			99.9		%		90-110	11-JUL-18
WG2818266-1 MB								
% Moisture			<0.10		%		0.1	11-JUL-18
Batch R4121946								
WG2818251-3 DUP		**L2123891-10**						
% Moisture		20.1	21.0		%	4.0	20	11-JUL-18
WG2818251-2 LCS								
% Moisture			100.0		%		90-110	11-JUL-18
WG2818251-1 MB								
% Moisture			<0.10		%		0.1	11-JUL-18
PAH-511-WT	**Soil**							
Batch R4124100								
WG2817443-3 DUP		**WG2817443-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-JUL-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	13-JUL-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4124100								
WG2817443-3 DUP		**WG2817443-5**						
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	13-JUL-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	13-JUL-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	13-JUL-18
WG2817443-2 LCS								
1-Methylnaphthalene			95.4		%		50-140	13-JUL-18
2-Methylnaphthalene			94.9		%		50-140	13-JUL-18
Acenaphthene			94.9		%		50-140	13-JUL-18
Acenaphthylene			94.8		%		50-140	13-JUL-18
Anthracene			100.8		%		50-140	13-JUL-18
Benzo(a)anthracene			103.0		%		50-140	13-JUL-18
Benzo(a)pyrene			90.3		%		50-140	13-JUL-18
Benzo(b)fluoranthene			92.2		%		50-140	13-JUL-18
Benzo(g,h,i)perylene			78.8		%		50-140	13-JUL-18
Benzo(k)fluoranthene			85.8		%		50-140	13-JUL-18
Chrysene			93.6		%		50-140	13-JUL-18
Dibenzo(ah)anthracene			77.7		%		50-140	13-JUL-18
Fluoranthene			92.6		%		50-140	13-JUL-18
Fluorene			88.4		%		50-140	13-JUL-18
Indeno(1,2,3-cd)pyrene			74.2		%		50-140	13-JUL-18
Naphthalene			94.4		%		50-140	13-JUL-18
Phenanthrene			98.0		%		50-140	13-JUL-18
Pyrene			92.5		%		50-140	13-JUL-18
WG2817443-1 MB								
							0.03	

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4124100								
WG2817443-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	13-JUL-18
2-Methylnaphthalene			<0.030		ug/g		0.03	13-JUL-18
Acenaphthene			<0.050		ug/g		0.05	13-JUL-18
Acenaphthylene			<0.050		ug/g		0.05	13-JUL-18
Anthracene			<0.050		ug/g		0.05	13-JUL-18
Benzo(a)anthracene			<0.050		ug/g		0.05	13-JUL-18
Benzo(a)pyrene			<0.050		ug/g		0.05	13-JUL-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	13-JUL-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	13-JUL-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	13-JUL-18
Chrysene			<0.050		ug/g		0.05	13-JUL-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	13-JUL-18
Fluoranthene			<0.050		ug/g		0.05	13-JUL-18
Fluorene			<0.050		ug/g		0.05	13-JUL-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	13-JUL-18
Naphthalene			<0.013		ug/g		0.013	13-JUL-18
Phenanthrene			<0.046		ug/g		0.046	13-JUL-18
Pyrene			<0.050		ug/g		0.05	13-JUL-18
Surrogate: 2-Fluorobiphenyl			82.1		%		50-140	13-JUL-18
Surrogate: p-Terphenyl d14			82.0		%		50-140	13-JUL-18
WG2817443-4 MS		**WG2817443-5**						
1-Methylnaphthalene			91.7		%		50-140	13-JUL-18
2-Methylnaphthalene			90.1		%		50-140	13-JUL-18
Acenaphthene			91.5		%		50-140	13-JUL-18
Acenaphthylene			90.7		%		50-140	13-JUL-18
Anthracene			95.0		%		50-140	13-JUL-18
Benzo(a)anthracene			98.5		%		50-140	13-JUL-18
Benzo(a)pyrene			90.1		%		50-140	13-JUL-18
Benzo(b)fluoranthene			84.3		%		50-140	13-JUL-18
Benzo(g,h,i)perylene			77.7		%		50-140	13-JUL-18
Benzo(k)fluoranthene			93.9		%		50-140	13-JUL-18
Chrysene			89.9		%		50-140	13-JUL-18
Dibenzo(ah)anthracene			75.2		%		50-140	13-JUL-18
Fluoranthene			88.1		%		50-140	13-JUL-18

Quality Control Report

Workorder: L2125177 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4124100								
WG2817443-4 MS		**WG2817443-5**						
Fluorene			86.0		%		50-140	13-JUL-18
Indeno(1,2,3-cd)pyrene			75.3		%		50-140	13-JUL-18
Naphthalene			91.2		%		50-140	13-JUL-18
Phenanthrene			93.7		%		50-140	13-JUL-18
Pyrene			88.0		%		50-140	13-JUL-18
PCB-511-WT	**Soil**							
Batch R4123114								
WG2817443-3 DUP		**WG2817443-5**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	12-JUL-18
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	12-JUL-18
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	12-JUL-18
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	12-JUL-18
WG2817443-2 LCS								
Aroclor 1242			90.8		%		60-140	12-JUL-18
Aroclor 1248			79.3		%		60-140	12-JUL-18
Aroclor 1254			87.6		%		60-140	12-JUL-18
Aroclor 1260			93.1		%		60-140	12-JUL-18
WG2817443-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	12-JUL-18
Aroclor 1248			<0.010		ug/g		0.01	12-JUL-18
Aroclor 1254			<0.010		ug/g		0.01	12-JUL-18
Aroclor 1260			<0.010		ug/g		0.01	12-JUL-18
Surrogate: d14-Terphenyl			94.7		%		60-140	12-JUL-18
WG2817443-4 MS		**WG2817443-5**						
Aroclor 1242			89.5		%		60-140	12-JUL-18
Aroclor 1254			90.3		%		60-140	12-JUL-18
Aroclor 1260			110.1		%		60-140	12-JUL-18
Batch R4124156								
WG2817999-5 DUP		**WG2817999-1**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-JUL-18
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-JUL-18
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-JUL-18
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	13-JUL-18
WG2817999-3 LCS								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R4124156								
WG2817999-3 LCS								
Aroclor 1242			89.2		%		60-140	13-JUL-18
Aroclor 1248			82.3		%		60-140	13-JUL-18
Aroclor 1254			88.9		%		60-140	13-JUL-18
Aroclor 1260			96.6		%		60-140	13-JUL-18
WG2817999-2 MB								
Aroclor 1242			<0.010		ug/g		0.01	13-JUL-18
Aroclor 1248			<0.010		ug/g		0.01	13-JUL-18
Aroclor 1254			<0.010		ug/g		0.01	13-JUL-18
Aroclor 1260			<0.010		ug/g		0.01	13-JUL-18
Surrogate: d14-Terphenyl			107.9		%		60-140	13-JUL-18
WG2817999-4 MS		**WG2817999-1**						
Aroclor 1242			94.9		%		60-140	13-JUL-18
Aroclor 1254			94.7		%		60-140	13-JUL-18
Aroclor 1260			112.2		%		60-140	13-JUL-18

Quality Control Report

Workorder: L2125177 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

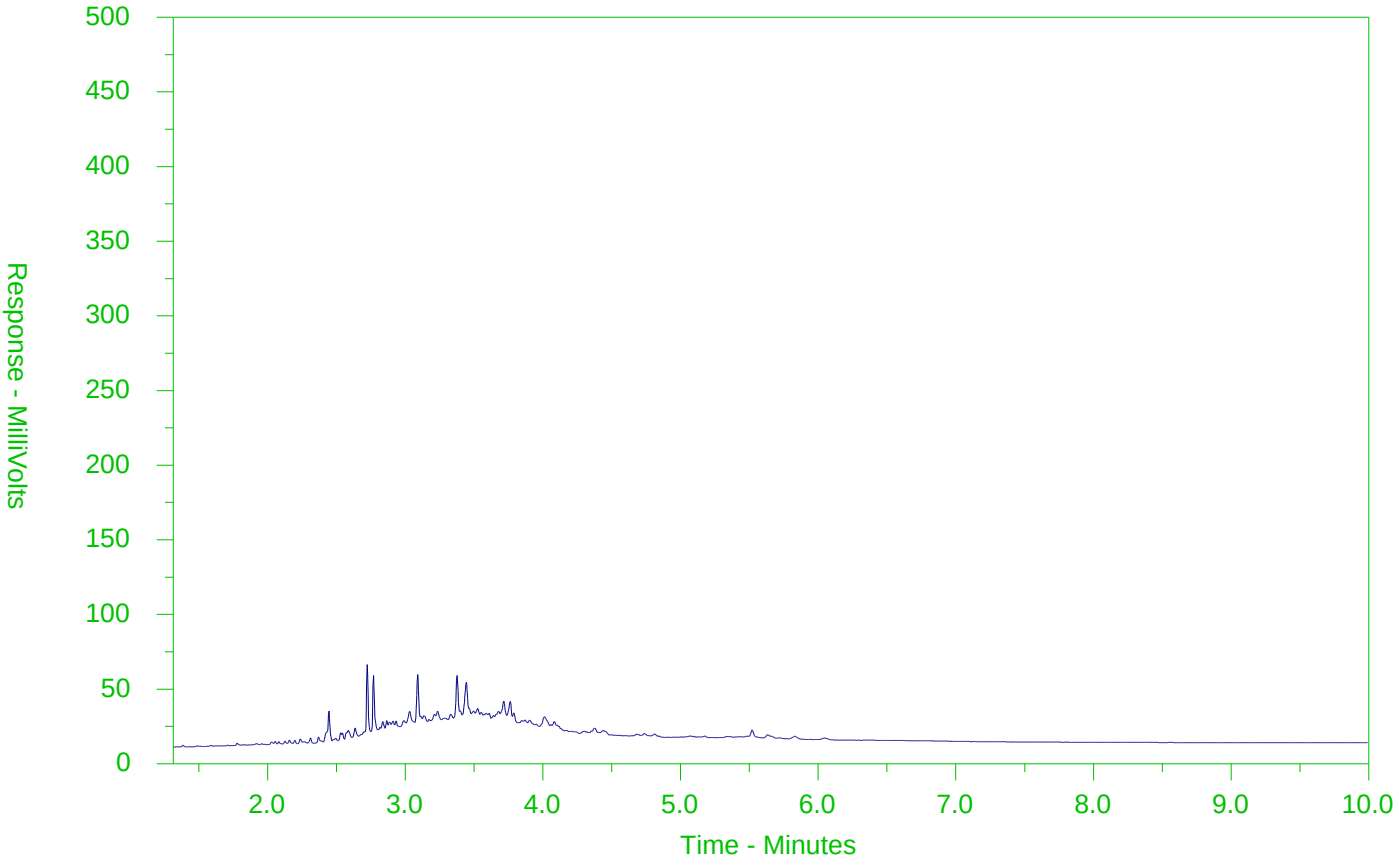
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-1
Client Sample ID: TP18-310-4



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

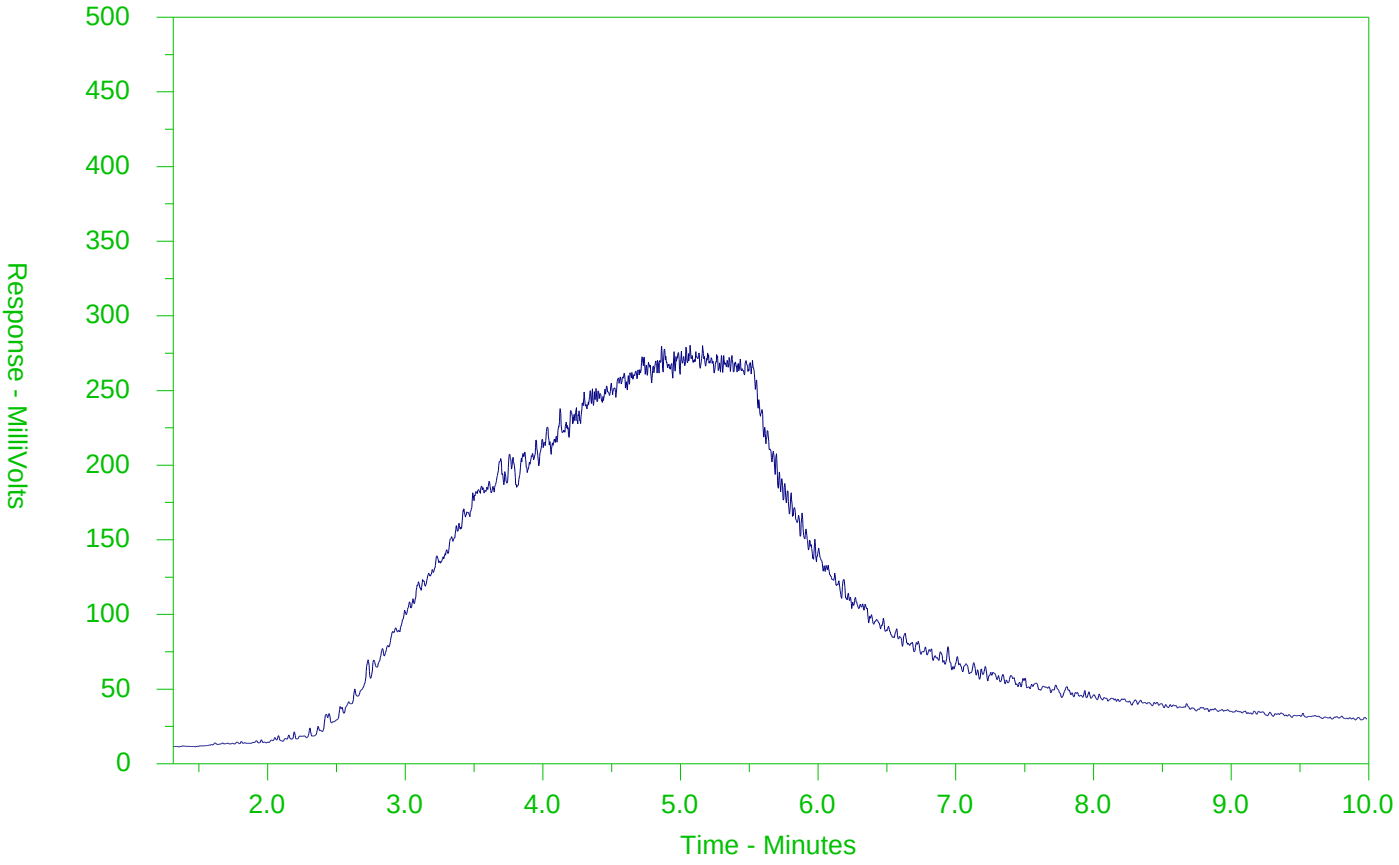
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-3
Client Sample ID: TP18-309-5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

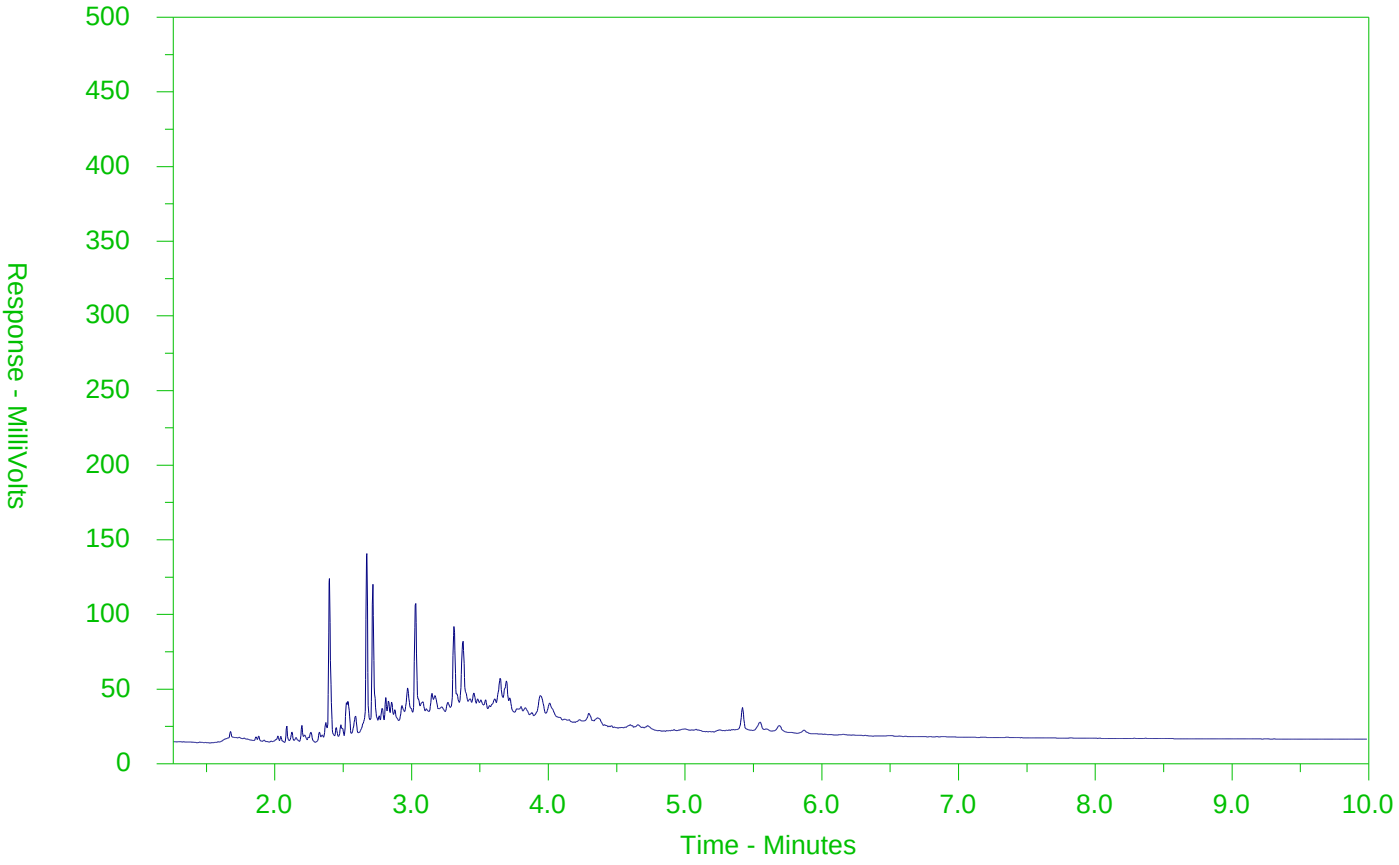
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-6
Client Sample ID: TP18-316-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

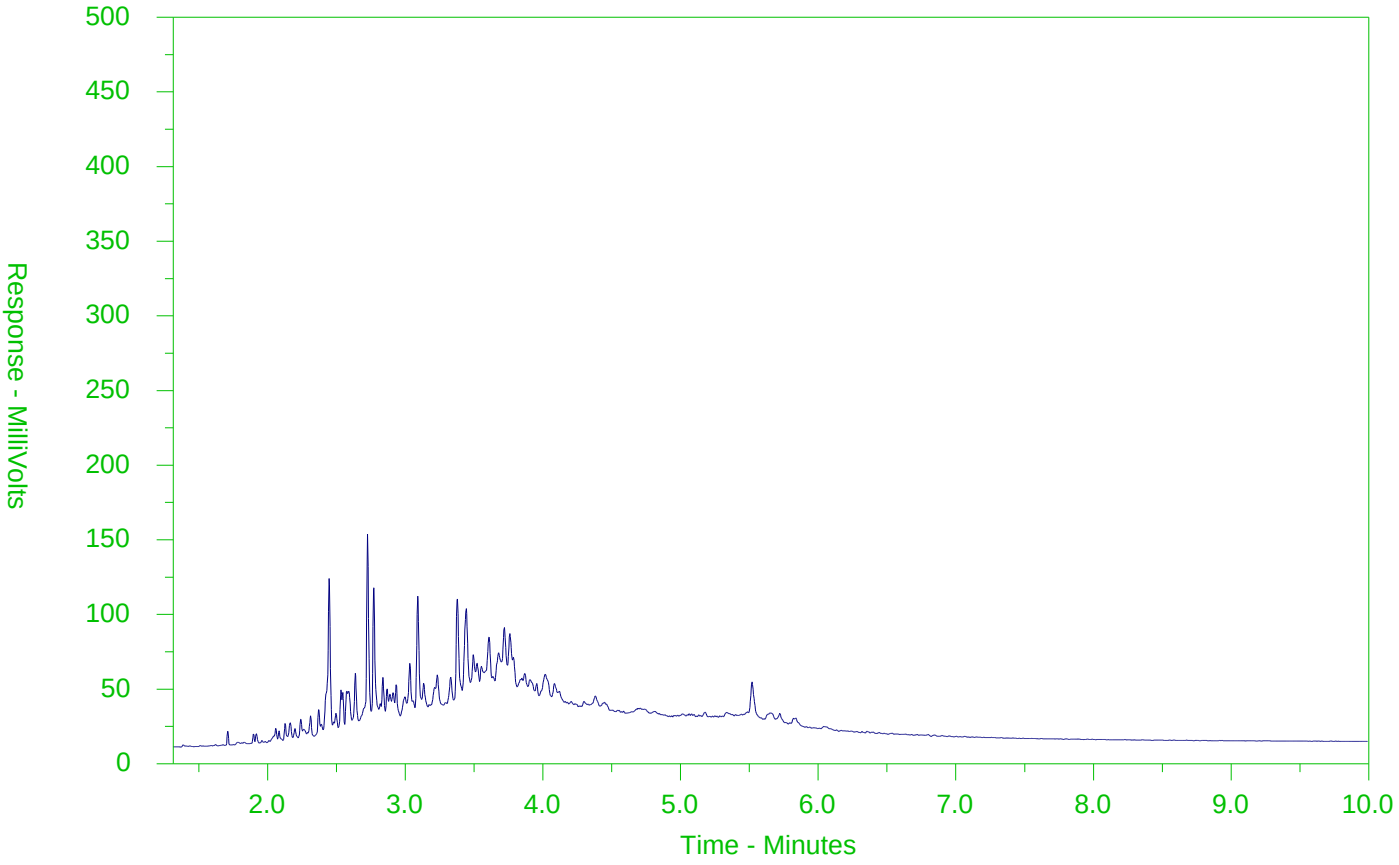
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-11
Client Sample ID: TP18-315-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

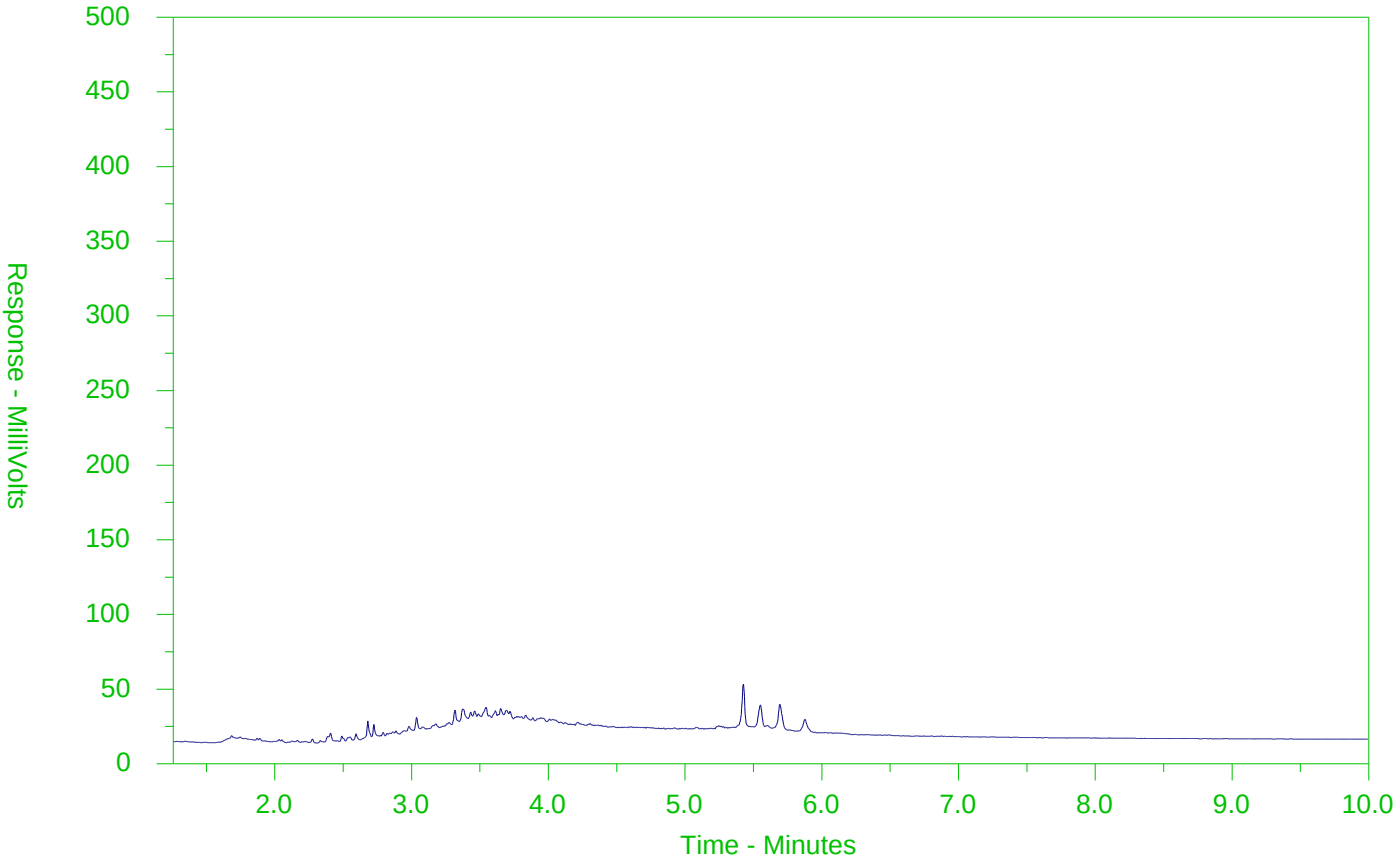
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-22
Client Sample ID: TP18-318-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

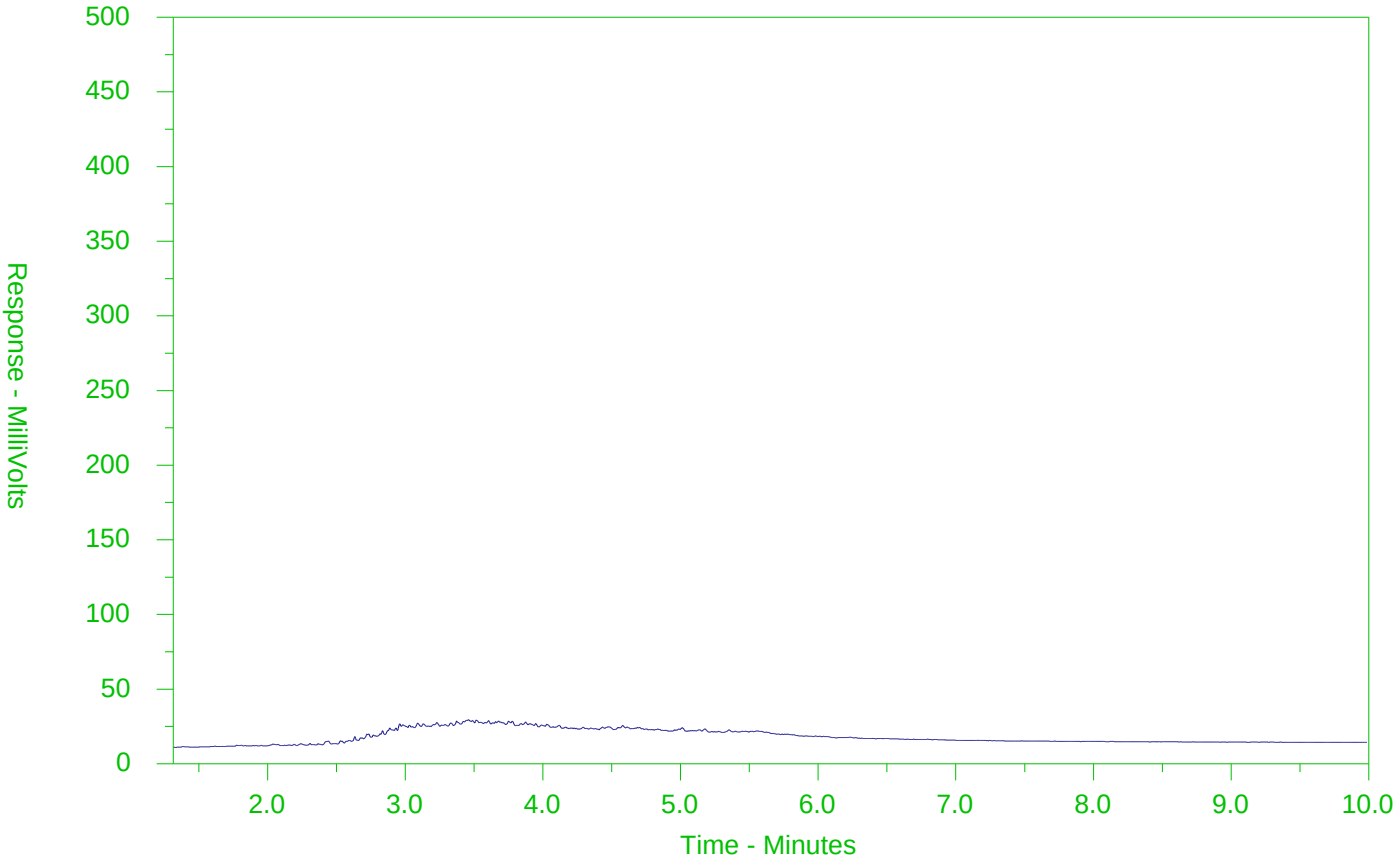
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-23
Client Sample ID: TP18-317-5



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

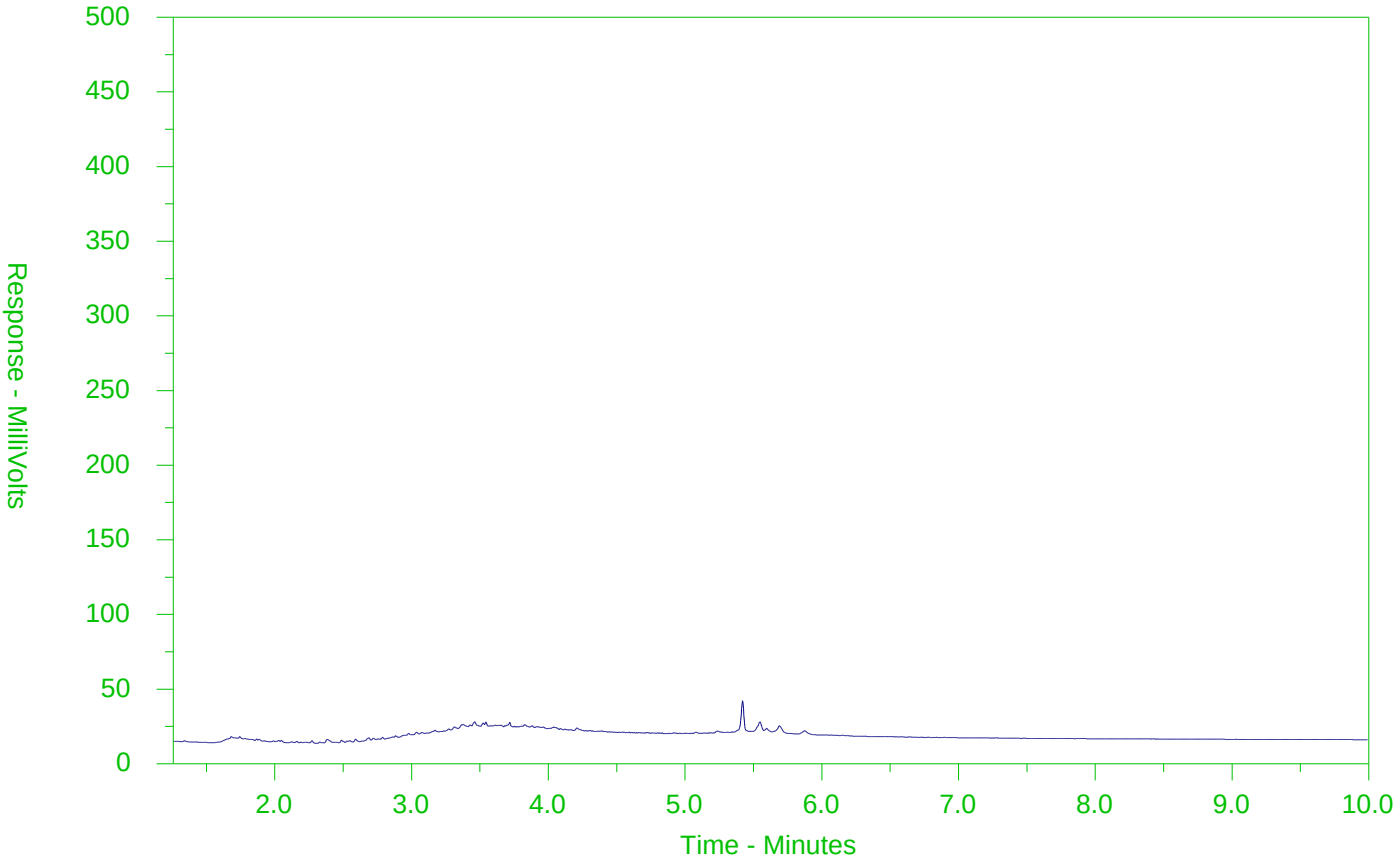
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2125177-25
Client Sample ID: TP18-DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2125177-COFC

COC Number: 15 -

Page 1 of 3

Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill
Contact:	Tania McCarthy
Phone:	519 579 3500
ED,	Company address below will appear on the final report
Street:	72 Victoria Street South, Suite 300
City/Province:	Kitchener
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill
Contact:	Accounts Payable

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Tania.McCarthy@CH2M.com
Email 2	Jon.Gowing@CH2M.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	694757.01.CC.02
Job #:	
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2105177 (06B)

ALS Contact: Mathy

Sampler: J. Gowing

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days): 4 day [P4] ☐ 3 day [P3] ☐ 2 day [P2] ☐

Emergency: 1 Business day [E1] ☐ Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	Metals	PAH	F1-F4	BTEX	VOC	PCB	Number of Containers
1	TP18-310-4	05-07-18	0910	Soil		X		X				4
2	TP18-310-9		1005	"		X						1
3	TP18-309-5		1120	"		X		X				4
4	TP18-309-9.5		1150	"		X						1
5	TP18-316-1		1300	"							X	1
6	TP18-316-2		1305	"			X	X			X	5
7	TP18-316-3 (Hold)		1310	"			X	X			X	5
8	TP18-319-2		1445	"		X	X					1
9	TP18-319-3		1450	"			X					1
10	TP18-319-6		1510	"			X					1
11	TP18-315-1		1550	"			X	X	X			3
12	-2		1600	"			X					1

Drinking Water (DW) Samples* (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Contact Tania McCarthy for Specific Sample Instructions.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	9.4

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 7/6/18	Time: 1445	Received by:	Date:	Time:	Received by:	Date: JUL 8/18	Time: 14:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

*. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2125177-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill
Contact:	Tania McCarthy
Phone:	519 579 3500
ED:	Company address below will appear on the final report
Street:	72 Victoria Street South, Suite 300
City/Province:	Kitchener
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill
Contact:	Accounts Payable
Project Information	
ALS Account # / Quote #:	
Job #:	C194757 - 01.CC.02
PO / AFE:	
LSD:	
ALS Lab WO# Order # (lab use only)	L2125177 COB

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	SAME AS 1ST COC
Email 3	
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	
Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact: Mathy	Sampler: J. Bowling

Select Service Level: Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days)		Emergency	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	Metals	PAH	F1-F4	BTEX	VOC	PCB	Number of Containers
13	TP18-315-5	05-07-18	1620	Soil			X					1
14	TP18-311-2	06-07-18	0838	"		X						1
15	TP18-311-6.5		0850	"		X						1
16	TP18-314-2		0900	"		X						1
17	TP18-314-6		0930	"		X						1
18	TP18-313-2		1000	"		X						1
19	TP19-313-6		1020	"		X						1
20	TP18-312-3		1050	"		X						1
21	TP19-312-6		1105	"		X						1
22	TP18-318-2		1128	"		X	X	X	X		X	6
23	TP18-317-5		1230	"				X	X			4
24	TP18-DUP1	↓	—	"		X						1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☐ NO

Are samples for human drinking water use?
☐ YES ☐ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.4		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 7/6/18	Time: 1440	Received by:	Date:	Time:	Received by:	Date: JULY 6/18	Time: 14:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2125177-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report	Report For	Turn-around Time (TAT) Requested
Company:	CH2M Hill	Select Report Format: ☑ PDF ☑ EXCEL ☐ DD (DIGITAL)	Please confirm all E&P TATs with your AM - surcharges will apply
Contact:	Tania McCarthy	Quality Control (QC) Report with Report: ☑ YES ☐ NO	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Phone:	519 579 3500	☐ Compare Results to Criteria on Report - provide details below if box checked	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Company address below will appear on the final report		Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Street:	72 Victoria Street South, Suite 300	Email 1 or Fax: tc	Date and Time Required for all E&P TATs:
City/Province:	Kitchener	Email 2: Same as 1st COC	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3: tc	
Invoice To:	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M Hill	Email 1 or Fax:	
Contact:	Accounts Payable	Email 2:	
	Project Information	Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	694757.01.66.02	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2125177 COB	ALS Contact: Mathy	Sampler: J. Hoare

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals & Inorganics	Metals	PAH	F1-F4	BTEX	VOC	PCB	F1 BTEX						Number of Containers
25	TP18 - DUP2	06-07-18	—	Soil			X	X*	X		X							5
26	TRIP BLANK	—	—	"								X						1

MEAN
MAX
MIN
INIT

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact ☒ Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.4		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	7/6/18	1445					JULY 6/18	14:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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1 If drinking water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 23-JUL-18
Report Date: 20-APR-21 13:03 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2134047

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-624784
Legal Site Desc:

Comments: 20-APR-21:
L2134047- 3, 4, 5 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2134047-1 BH18-205-1						
Sampled By: CLIENT on 20-JUL-18 @ 09:40						
Matrix: SOIL						
Physical Tests						
% Moisture	2.13		0.10	%	27-JUL-18	
Volatile Organic Compounds						
Acetone	<0.50		0.50	ug/g	26-JUL-18	16
Benzene	<0.0068		0.0068	ug/g	26-JUL-18	0.21
Bromodichloromethane	<0.050		0.050	ug/g	26-JUL-18	1.5
Bromoform	<0.050		0.050	ug/g	26-JUL-18	0.27
Bromomethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	26-JUL-18	0.05
Chlorobenzene	<0.050		0.050	ug/g	26-JUL-18	2.4
Dibromochloromethane	<0.050		0.050	ug/g	26-JUL-18	2.3
Chloroform	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dibromoethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	1.2
1,3-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	4.8
1,4-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	0.083
Dichlorodifluoromethane	<0.050		0.050	ug/g	26-JUL-18	16
1,1-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.47
1,2-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	1.9
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.084
Methylene Chloride	<0.050		0.050	ug/g	26-JUL-18	0.1
1,2-Dichloropropane	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	27-JUL-18	0.05
Ethylbenzene	<0.018		0.018	ug/g	26-JUL-18	1.1
n-Hexane	0.081		0.050	ug/g	26-JUL-18	2.8
Methyl Ethyl Ketone	<0.50		0.50	ug/g	26-JUL-18	16
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	26-JUL-18	1.7
MTBE	<0.050		0.050	ug/g	26-JUL-18	0.75
Styrene	<0.050		0.050	ug/g	26-JUL-18	0.7
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.058
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.28
Toluene	<0.080		0.080	ug/g	26-JUL-18	2.3
1,1,1-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.38
1,1,2-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Trichloroethylene	0.561		0.010	ug/g	26-JUL-18	*0.061
Trichlorofluoromethane	<0.050		0.050	ug/g	26-JUL-18	4
Vinyl chloride	<0.020		0.020	ug/g	26-JUL-18	0.02
o-Xylene	<0.020		0.020	ug/g	26-JUL-18	
m+p-Xylenes	<0.030		0.030	ug/g	26-JUL-18	
Xylenes (Total)	<0.050		0.050	ug/g	27-JUL-18	3.1
Surrogate: 4-Bromofluorobenzene	120.1		50-140	%	26-JUL-18	
Surrogate: 1,4-Difluorobenzene	119.9		50-140	%	26-JUL-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2134047-2 BH18-205-2						
Sampled By: CLIENT on 20-JUL-18 @ 09:50						
Matrix: SOIL						
Physical Tests						
% Moisture	1.28		0.10	%	27-JUL-18	
Volatile Organic Compounds						
Acetone	<0.50		0.50	ug/g	26-JUL-18	16
Benzene	<0.0068		0.0068	ug/g	26-JUL-18	0.21
Bromodichloromethane	<0.050		0.050	ug/g	26-JUL-18	1.5
Bromoform	<0.050		0.050	ug/g	26-JUL-18	0.27
Bromomethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	26-JUL-18	0.05
Chlorobenzene	<0.050		0.050	ug/g	26-JUL-18	2.4
Dibromochloromethane	<0.050		0.050	ug/g	26-JUL-18	2.3
Chloroform	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dibromoethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	1.2
1,3-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	4.8
1,4-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	0.083
Dichlorodifluoromethane	<0.050		0.050	ug/g	26-JUL-18	16
1,1-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.47
1,2-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	1.9
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.084
Methylene Chloride	<0.050		0.050	ug/g	26-JUL-18	0.1
1,2-Dichloropropane	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	27-JUL-18	0.05
Ethylbenzene	<0.018		0.018	ug/g	26-JUL-18	1.1
n-Hexane	<0.050		0.050	ug/g	26-JUL-18	2.8
Methyl Ethyl Ketone	<0.50		0.50	ug/g	26-JUL-18	16
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	26-JUL-18	1.7
MTBE	<0.050		0.050	ug/g	26-JUL-18	0.75
Styrene	<0.050		0.050	ug/g	26-JUL-18	0.7
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.058
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.28
Toluene	<0.080		0.080	ug/g	26-JUL-18	2.3
1,1,1-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.38
1,1,2-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Trichloroethylene	0.091		0.010	ug/g	26-JUL-18	*0.061
Trichlorofluoromethane	<0.050		0.050	ug/g	26-JUL-18	4
Vinyl chloride	<0.020		0.020	ug/g	26-JUL-18	0.02
o-Xylene	<0.020		0.020	ug/g	26-JUL-18	
m+p-Xylenes	<0.030		0.030	ug/g	26-JUL-18	
Xylenes (Total)	<0.050		0.050	ug/g	27-JUL-18	3.1
Surrogate: 4-Bromofluorobenzene	118.7		50-140	%	26-JUL-18	
Surrogate: 1,4-Difluorobenzene	118.8		50-140	%	26-JUL-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2134047-2 BH18-205-2						
Sampled By: CLIENT on 20-JUL-18 @ 09:50						
Matrix: SOIL						#1
Hydrocarbons						
F1 (C6-C10)	<5.0		5.0	ug/g	26-JUL-18	55
F1-BTEX	<5.0		5.0	ug/g	30-JUL-18	55
F2 (C10-C16)	<10		10	ug/g	27-JUL-18	98
F3 (C16-C34)	51		50	ug/g	27-JUL-18	300
F4 (C34-C50)	<50		50	ug/g	27-JUL-18	2800
Total Hydrocarbons (C6-C50)	<72		72	ug/g	30-JUL-18	
Chrom. to baseline at nC50	YES			No Unit	27-JUL-18	
Surrogate: 2-Bromobenzotrifluoride	94.6		60-140	%	27-JUL-18	
Surrogate: 3,4-Dichlorotoluene	85.0		60-140	%	26-JUL-18	
L2134047-3 BH18-207-1						
Sampled By: CLIENT on 20-JUL-18 @ 10:40						
Matrix: SOIL						#1
Metals						
Antimony (Sb)	2.3		1.0	ug/g	27-JUL-18	7.5
Arsenic (As)	7.8		1.0	ug/g	27-JUL-18	18
Barium (Ba)	26.9		1.0	ug/g	27-JUL-18	390
Beryllium (Be)	<0.50		0.50	ug/g	27-JUL-18	4
Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21	
Boron (B)	14.0		5.0	ug/g	27-JUL-18	120
Cadmium (Cd)	3.21		0.50	ug/g	27-JUL-18	*1.2
Calcium (Ca)	183000		50	ug/g	19-APR-21	
Chromium (Cr)	13.0		1.0	ug/g	27-JUL-18	160
Cobalt (Co)	2.5		1.0	ug/g	27-JUL-18	22
Copper (Cu)	31.8		1.0	ug/g	27-JUL-18	140
Iron (Fe)	19400		50	ug/g	19-APR-21	
Lead (Pb)	207		1.0	ug/g	27-JUL-18	*120
Magnesium (Mg)	82900		20	ug/g	19-APR-21	
Molybdenum (Mo)	1.8		1.0	ug/g	27-JUL-18	6.9
Nickel (Ni)	9.3		1.0	ug/g	27-JUL-18	100
Selenium (Se)	<1.0		1.0	ug/g	27-JUL-18	2.4
Silver (Ag)	<0.20		0.20	ug/g	27-JUL-18	20
Thallium (Tl)	<0.50		0.50	ug/g	27-JUL-18	1
Uranium (U)	<1.0		1.0	ug/g	27-JUL-18	23
Vanadium (V)	14.6		1.0	ug/g	27-JUL-18	86
Zinc (Zn)	7840	DLHC	40	ug/g	27-JUL-18	*340
L2134047-4 BH18-207-2						
Sampled By: CLIENT on 20-JUL-18 @ 11:00						
Matrix: SOIL						#1
Physical Tests						
% Moisture	4.30		0.10	%	27-JUL-18	
Metals						
Antimony (Sb)	2.4		1.0	ug/g	27-JUL-18	7.5
Arsenic (As)	3.2		1.0	ug/g	27-JUL-18	18
Barium (Ba)	9.4		1.0	ug/g	27-JUL-18	390

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2134047-4	BH18-207-2						
Sampled By:	CLIENT on 20-JUL-18 @ 11:00						
Matrix:	SOIL						#1
Metals							
	Beryllium (Be)	<0.50		0.50	ug/g	27-JUL-18	4
	Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21	
	Boron (B)	7.9		5.0	ug/g	27-JUL-18	120
	Cadmium (Cd)	3.98		0.50	ug/g	27-JUL-18	*1.2
	Calcium (Ca)	174000		50	ug/g	19-APR-21	
	Chromium (Cr)	9.1		1.0	ug/g	27-JUL-18	160
	Cobalt (Co)	1.1		1.0	ug/g	27-JUL-18	22
	Copper (Cu)	44.3		1.0	ug/g	27-JUL-18	140
	Iron (Fe)	31400		50	ug/g	19-APR-21	
	Lead (Pb)	48.5		1.0	ug/g	27-JUL-18	120
	Magnesium (Mg)	95100		20	ug/g	19-APR-21	
	Molybdenum (Mo)	<1.0		1.0	ug/g	27-JUL-18	6.9
	Nickel (Ni)	3.1		1.0	ug/g	27-JUL-18	100
	Selenium (Se)	<1.0		1.0	ug/g	27-JUL-18	2.4
	Silver (Ag)	<0.20		0.20	ug/g	27-JUL-18	20
	Thallium (Tl)	<0.50		0.50	ug/g	27-JUL-18	1
	Uranium (U)	<1.0		1.0	ug/g	27-JUL-18	23
	Vanadium (V)	14.4		1.0	ug/g	27-JUL-18	86
	Zinc (Zn)	37500	DLHC	800	ug/g	27-JUL-18	*340
Hydrocarbons							
	F1 (C6-C10)	<5.0		5.0	ug/g	26-JUL-18	55
	F2 (C10-C16)	<10		10	ug/g	27-JUL-18	98
	F3 (C16-C34)	<50		50	ug/g	27-JUL-18	300
	F4 (C34-C50)	<50		50	ug/g	27-JUL-18	2800
	Total Hydrocarbons (C6-C50)	<72		72	ug/g	30-JUL-18	
	Chrom. to baseline at nC50	YES			No Unit	27-JUL-18	
	Surrogate: 2-Bromobenzotrifluoride	92.6		60-140	%	27-JUL-18	
	Surrogate: 3,4-Dichlorotoluene	88.3		60-140	%	26-JUL-18	
L2134047-5	DUP1 JUL 20						
Sampled By:	CLIENT on 20-JUL-18						
Matrix:	SOIL						#1
Metals							
	Antimony (Sb)	2.6		1.0	ug/g	27-JUL-18	7.5
	Arsenic (As)	5.8		1.0	ug/g	27-JUL-18	18
	Barium (Ba)	26.1		1.0	ug/g	27-JUL-18	390
	Beryllium (Be)	<0.50		0.50	ug/g	27-JUL-18	4
	Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21	
	Boron (B)	14.5		5.0	ug/g	27-JUL-18	120
	Cadmium (Cd)	2.80		0.50	ug/g	27-JUL-18	*1.2
	Calcium (Ca)	181000		50	ug/g	19-APR-21	
	Chromium (Cr)	11.5		1.0	ug/g	27-JUL-18	160
	Cobalt (Co)	2.1		1.0	ug/g	27-JUL-18	22
	Copper (Cu)	34.0		1.0	ug/g	27-JUL-18	140
	Iron (Fe)	21500		50	ug/g	19-APR-21	
	Lead (Pb)	147		1.0	ug/g	27-JUL-18	*120

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2134047-5 DUP1 JUL 20						
Sampled By: CLIENT on 20-JUL-18						
Matrix: SOIL						#1
Metals						
Magnesium (Mg)	82900		20	ug/g	19-APR-21	
Molybdenum (Mo)	1.4		1.0	ug/g	27-JUL-18	6.9
Nickel (Ni)	7.0		1.0	ug/g	27-JUL-18	100
Selenium (Se)	<1.0		1.0	ug/g	27-JUL-18	2.4
Silver (Ag)	<0.20		0.20	ug/g	27-JUL-18	20
Thallium (Tl)	<0.50		0.50	ug/g	27-JUL-18	1
Uranium (U)	<1.0		1.0	ug/g	27-JUL-18	23
Vanadium (V)	15.2		1.0	ug/g	27-JUL-18	86
Zinc (Zn)	11000	DLHC	40	ug/g	27-JUL-18	*340
L2134047-6 TRIP BLANK 1						
Sampled By: CLIENT on 20-JUL-18 @ 17:00						
Matrix: SOIL						#1
Physical Tests						
% Moisture	<0.10		0.10	%	27-JUL-18	
Volatile Organic Compounds						
Acetone	<0.50		0.50	ug/g	26-JUL-18	16
Benzene	<0.0068		0.0068	ug/g	26-JUL-18	0.21
Bromodichloromethane	<0.050		0.050	ug/g	26-JUL-18	1.5
Bromoform	<0.050		0.050	ug/g	26-JUL-18	0.27
Bromomethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	26-JUL-18	0.05
Chlorobenzene	<0.050		0.050	ug/g	26-JUL-18	2.4
Dibromochloromethane	<0.050		0.050	ug/g	26-JUL-18	2.3
Chloroform	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dibromoethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	1.2
1,3-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	4.8
1,4-Dichlorobenzene	<0.050		0.050	ug/g	26-JUL-18	0.083
Dichlorodifluoromethane	<0.050		0.050	ug/g	26-JUL-18	16
1,1-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.47
1,2-Dichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	1.9
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.084
Methylene Chloride	<0.050		0.050	ug/g	26-JUL-18	0.1
1,2-Dichloropropane	<0.050		0.050	ug/g	26-JUL-18	0.05
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	26-JUL-18	
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	27-JUL-18	0.05
Ethylbenzene	<0.018		0.018	ug/g	26-JUL-18	1.1
n-Hexane	<0.050		0.050	ug/g	26-JUL-18	2.8
Methyl Ethyl Ketone	<0.50		0.50	ug/g	26-JUL-18	16
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	26-JUL-18	1.7
MTBE	<0.050		0.050	ug/g	26-JUL-18	0.75
Styrene	<0.050		0.050	ug/g	26-JUL-18	

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* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2134047-6 TRIP BLANK 1						
Sampled By: CLIENT on 20-JUL-18 @ 17:00						
Matrix: SOIL						#1
Volatile Organic Compounds						
						0.7
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.058
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	26-JUL-18	0.28
Toluene	<0.080		0.080	ug/g	26-JUL-18	2.3
1,1,1-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.38
1,1,2-Trichloroethane	<0.050		0.050	ug/g	26-JUL-18	0.05
Trichloroethylene	<0.010		0.010	ug/g	26-JUL-18	0.061
Trichlorofluoromethane	<0.050		0.050	ug/g	26-JUL-18	4
Vinyl chloride	<0.020		0.020	ug/g	26-JUL-18	0.02
o-Xylene	<0.020		0.020	ug/g	26-JUL-18	
m+p-Xylenes	<0.030		0.030	ug/g	26-JUL-18	
Xylenes (Total)	<0.050		0.050	ug/g	27-JUL-18	3.1
Surrogate: 4-Bromofluorobenzene	121.2		50-140	%	26-JUL-18	
Surrogate: 1,4-Difluorobenzene	120.6		50-140	%	26-JUL-18	
Hydrocarbons						
F1 (C6-C10)	<5.0		5.0	ug/g	26-JUL-18	55
Surrogate: 3,4-Dichlorotoluene	85.4		60-140	%	26-JUL-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Soil-Res/Park/Inst. Property Use (Coarse)

#1: T6-Soil-Res/Park/Inst. Property Use (Coarse)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-624784

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2134047 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4141348								
WG2830795-4 DUP		**WG2830795-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	26-JUL-18
WG2830795-2 LCS								
F1 (C6-C10)			101.6		%		80-120	26-JUL-18
WG2830795-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	26-JUL-18
Surrogate: 3,4-Dichlorotoluene			79.4		%		60-140	26-JUL-18
WG2830795-6 MS		**L2134137-2**						
F1 (C6-C10)			108.9		%		60-140	26-JUL-18
F2-F4-511-WT	**Soil**							
Batch R4144532								
WG2832836-5 DUP		**WG2832836-1**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	30-JUL-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	30-JUL-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	30-JUL-18
WG2832836-3 LCS								
F2 (C10-C16)			101.0		%		80-120	27-JUL-18
F3 (C16-C34)			104.6		%		80-120	27-JUL-18
F4 (C34-C50)			101.4		%		80-120	27-JUL-18
WG2832836-2 MB								
F2 (C10-C16)			<10		ug/g		10	27-JUL-18
F3 (C16-C34)			<50		ug/g		50	27-JUL-18
F4 (C34-C50)			<50		ug/g		50	27-JUL-18
Surrogate: 2-Bromobenzotrifluoride			94.5		%		60-140	27-JUL-18
WG2832836-4 MS		**WG2832836-1**						
F2 (C10-C16)			103.3		%		60-140	30-JUL-18
F3 (C16-C34)			105.5		%		60-140	30-JUL-18
F4 (C34-C50)			101.0		%		60-140	30-JUL-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4147807								
WG2833495-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			98.8		%		70-130	27-JUL-18
Arsenic (As)			110.1		%		70-130	27-JUL-18
Barium (Ba)			117.4		%		70-130	27-JUL-18
Beryllium (Be)			102.5		%		70-130	27-JUL-18
Bismuth (Bi)			99.7		%		70-130	27-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4147807								
WG2833495-2 CRM		**WT-CANMET-TILL1**						
Boron (B)			2.7		mg/kg		0-8.2	27-JUL-18
Cadmium (Cd)			104.3		%		70-130	27-JUL-18
Calcium (Ca)			99.0		%		70-130	27-JUL-18
Chromium (Cr)			104.6		%		70-130	27-JUL-18
Cobalt (Co)			105.8		%		70-130	27-JUL-18
Copper (Cu)			107.2		%		70-130	27-JUL-18
Iron (Fe)			105.8		%		70-130	27-JUL-18
Lead (Pb)			100.5		%		70-130	27-JUL-18
Magnesium (Mg)			104.2		%		70-130	27-JUL-18
Molybdenum (Mo)			107.3		%		70-130	27-JUL-18
Nickel (Ni)			104.6		%		70-130	27-JUL-18
Selenium (Se)			0.35		mg/kg		0.11-0.51	27-JUL-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	27-JUL-18
Thallium (Tl)			0.119		mg/kg		0.077-0.18	27-JUL-18
Uranium (U)			93.5		%		70-130	27-JUL-18
Vanadium (V)			105.0		%		70-130	27-JUL-18
Zinc (Zn)			105.6		%		70-130	27-JUL-18
WG2833495-6 DUP		**WG2833495-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	27-JUL-18
Arsenic (As)		1.45	1.50		ug/g	3.3	30	27-JUL-18
Barium (Ba)		19.7	20.4		ug/g	3.7	40	27-JUL-18
Beryllium (Be)		0.19	0.20		ug/g	6.3	30	27-JUL-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	27-JUL-18
Boron (B)		5.1	5.4		ug/g	5.7	30	27-JUL-18
Cadmium (Cd)		0.076	0.082		ug/g	8.1	30	27-JUL-18
Calcium (Ca)		128000	123000		ug/g	3.8	30	27-JUL-18
Chromium (Cr)		7.63	7.89		ug/g	3.3	30	27-JUL-18
Cobalt (Co)		2.59	2.56		ug/g	1.4	30	27-JUL-18
Copper (Cu)		6.19	6.10		ug/g	1.4	30	27-JUL-18
Iron (Fe)		8240	8340		ug/g	1.1	30	27-JUL-18
Lead (Pb)		5.70	5.60		ug/g	1.7	40	27-JUL-18
Magnesium (Mg)		39000	39300		ug/g	0.8	30	27-JUL-18
Molybdenum (Mo)		0.18	0.17		ug/g	5.8	40	27-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4147807								
WG2833495-6 DUP		**WG2833495-5**						
Nickel (Ni)		5.33	5.19		ug/g	2.7	30	27-JUL-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	27-JUL-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	27-JUL-18
Thallium (Tl)		<0.050	<0.050	RPD-NA	ug/g	N/A	30	27-JUL-18
Uranium (U)		0.337	0.348		ug/g	3.0	30	27-JUL-18
Vanadium (V)		14.6	15.4		ug/g	5.6	30	27-JUL-18
Zinc (Zn)		31.1	31.1		ug/g	0.1	30	27-JUL-18
WG2833495-4 LCS								
Antimony (Sb)			99.3		%		80-120	27-JUL-18
Arsenic (As)			107.2		%		80-120	27-JUL-18
Barium (Ba)			109.4		%		80-120	27-JUL-18
Beryllium (Be)			99.8		%		80-120	27-JUL-18
Bismuth (Bi)			101.2		%		80-120	27-JUL-18
Boron (B)			90.3		%		80-120	27-JUL-18
Cadmium (Cd)			99.1		%		80-120	27-JUL-18
Calcium (Ca)			101.1		%		80-120	27-JUL-18
Chromium (Cr)			104.7		%		80-120	27-JUL-18
Cobalt (Co)			103.5		%		80-120	27-JUL-18
Copper (Cu)			103.2		%		80-120	27-JUL-18
Iron (Fe)			105.4		%		80-120	27-JUL-18
Lead (Pb)			98.9		%		80-120	27-JUL-18
Magnesium (Mg)			110.6		%		80-120	27-JUL-18
Molybdenum (Mo)			99.9		%		80-120	27-JUL-18
Nickel (Ni)			104.0		%		80-120	27-JUL-18
Selenium (Se)			105.5		%		80-120	27-JUL-18
Silver (Ag)			98.5		%		80-120	27-JUL-18
Thallium (Tl)			102.0		%		80-120	27-JUL-18
Uranium (U)			92.6		%		80-120	27-JUL-18
Vanadium (V)			107.9		%		80-120	27-JUL-18
Zinc (Zn)			98.2		%		80-120	27-JUL-18
WG2833495-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	27-JUL-18
Arsenic (As)			<0.10		mg/kg		0.1	27-JUL-18
Barium (Ba)			<0.50		mg/kg		0.5	27-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4147807								
WG2833495-1 MB								
Beryllium (Be)			<0.10		mg/kg		0.1	27-JUL-18
Bismuth (Bi)			<0.20		mg/kg		0.2	27-JUL-18
Boron (B)			<5.0		mg/kg		5	27-JUL-18
Cadmium (Cd)			<0.020		mg/kg		0.02	27-JUL-18
Calcium (Ca)			<50		mg/kg		50	27-JUL-18
Chromium (Cr)			<0.50		mg/kg		0.5	27-JUL-18
Cobalt (Co)			<0.10		mg/kg		0.1	27-JUL-18
Copper (Cu)			<0.50		mg/kg		0.5	27-JUL-18
Iron (Fe)			<50		mg/kg		50	27-JUL-18
Lead (Pb)			<0.50		mg/kg		0.5	27-JUL-18
Magnesium (Mg)			<20		mg/kg		20	27-JUL-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	27-JUL-18
Nickel (Ni)			<0.50		mg/kg		0.5	27-JUL-18
Selenium (Se)			<0.20		mg/kg		0.2	27-JUL-18
Silver (Ag)			<0.10		mg/kg		0.1	27-JUL-18
Thallium (Tl)			<0.050		mg/kg		0.05	27-JUL-18
Uranium (U)			<0.050		mg/kg		0.05	27-JUL-18
Vanadium (V)			<0.20		mg/kg		0.2	27-JUL-18
Zinc (Zn)			<2.0		mg/kg		2	27-JUL-18
MOISTURE-WT	**Soil**							
Batch R4144188								
WG2833388-3 DUP		**L2134060-5**						
% Moisture		14.8	13.8		%	7.2	20	27-JUL-18
WG2833388-2 LCS								
% Moisture			99.9		%		90-110	27-JUL-18
WG2833388-1 MB								
% Moisture			<0.10		%		0.1	27-JUL-18
Batch R4144892								
WG2833286-3 DUP		**L2133598-12**						
% Moisture		17.4	17.9		%	2.5	20	27-JUL-18
WG2833286-2 LCS								
% Moisture			99.9		%		90-110	27-JUL-18
WG2833286-1 MB								
% Moisture			<0.10		%		0.1	27-JUL-18
VOC-511-HS-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4141348								
WG2830795-4 DUP		**WG2830795-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-JUL-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	26-JUL-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-JUL-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	26-JUL-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-JUL-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-JUL-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-JUL-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-JUL-18
Styrene		<0.050	<0.050		ug/g			26-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4141348								
WG2830795-4 DUP		**WG2830795-3**						
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	26-JUL-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-JUL-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-JUL-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-JUL-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-JUL-18
WG2830795-2 LCS								
1,1,1,2-Tetrachloroethane			101.5		%		60-130	26-JUL-18
1,1,2,2-Tetrachloroethane			103.8		%		60-130	26-JUL-18
1,1,1-Trichloroethane			98.6		%		60-130	26-JUL-18
1,1,2-Trichloroethane			105.4		%		60-130	26-JUL-18
1,1-Dichloroethane			102.4		%		60-130	26-JUL-18
1,1-Dichloroethylene			92.3		%		60-130	26-JUL-18
1,2-Dibromoethane			102.7		%		70-130	26-JUL-18
1,2-Dichlorobenzene			105.5		%		70-130	26-JUL-18
1,2-Dichloroethane			102.7		%		60-130	26-JUL-18
1,2-Dichloropropane			100.1		%		70-130	26-JUL-18
1,3-Dichlorobenzene			101.9		%		70-130	26-JUL-18
1,4-Dichlorobenzene			101.8		%		70-130	26-JUL-18
Acetone			96.6		%		60-140	26-JUL-18
Benzene			102.4		%		70-130	26-JUL-18
Bromodichloromethane			101.5		%		50-140	26-JUL-18
Bromoform			102.0		%		70-130	26-JUL-18
Bromomethane			77.2		%		50-140	26-JUL-18
Carbon tetrachloride			97.7		%		70-130	26-JUL-18
Chlorobenzene			105.8		%		70-130	26-JUL-18
Chloroform			101.8		%		70-130	26-JUL-18
cis-1,2-Dichloroethylene			102.7		%		70-130	26-JUL-18
cis-1,3-Dichloropropene			104.8		%		70-130	26-JUL-18
Dibromochloromethane			100.5		%		60-130	26-JUL-18
Dichlorodifluoromethane			95.6		%		50-140	26-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4141348								
WG2830795-2 LCS								
Ethylbenzene			103.4		%		70-130	26-JUL-18
n-Hexane			100.7		%		70-130	26-JUL-18
Methylene Chloride			99.98		%		70-130	26-JUL-18
MTBE			103.9		%		70-130	26-JUL-18
m+p-Xylenes			105.8		%		70-130	26-JUL-18
Methyl Ethyl Ketone			100.7		%		60-140	26-JUL-18
Methyl Isobutyl Ketone			94.9		%		60-140	26-JUL-18
o-Xylene			102.0		%		70-130	26-JUL-18
Styrene			102.3		%		70-130	26-JUL-18
Tetrachloroethylene			97.4		%		60-130	26-JUL-18
Toluene			103.8		%		70-130	26-JUL-18
trans-1,2-Dichloroethylene			96.9		%		60-130	26-JUL-18
trans-1,3-Dichloropropene			102.8		%		70-130	26-JUL-18
Trichloroethylene			105.5		%		60-130	26-JUL-18
Trichlorofluoromethane			99.9		%		50-140	26-JUL-18
Vinyl chloride			88.4		%		60-140	26-JUL-18
WG2830795-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	26-JUL-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	26-JUL-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	26-JUL-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	26-JUL-18
1,1-Dichloroethane			<0.050		ug/g		0.05	26-JUL-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	26-JUL-18
1,2-Dibromoethane			<0.050		ug/g		0.05	26-JUL-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	26-JUL-18
1,2-Dichloroethane			<0.050		ug/g		0.05	26-JUL-18
1,2-Dichloropropane			<0.050		ug/g		0.05	26-JUL-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	26-JUL-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	26-JUL-18
Acetone			<0.50		ug/g		0.5	26-JUL-18
Benzene			<0.0068		ug/g		0.0068	26-JUL-18
Bromodichloromethane			<0.050		ug/g		0.05	26-JUL-18
Bromoform			<0.050		ug/g		0.05	26-JUL-18
Bromomethane			<0.050		ug/g		0.05	26-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4141348								
WG2830795-1 MB								
Carbon tetrachloride			<0.050		ug/g		0.05	26-JUL-18
Chlorobenzene			<0.050		ug/g		0.05	26-JUL-18
Chloroform			<0.050		ug/g		0.05	26-JUL-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	26-JUL-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	26-JUL-18
Dibromochloromethane			<0.050		ug/g		0.05	26-JUL-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	26-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	26-JUL-18
n-Hexane			<0.050		ug/g		0.05	26-JUL-18
Methylene Chloride			<0.050		ug/g		0.05	26-JUL-18
MTBE			<0.050		ug/g		0.05	26-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	26-JUL-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	26-JUL-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	26-JUL-18
o-Xylene			<0.020		ug/g		0.02	26-JUL-18
Styrene			<0.050		ug/g		0.05	26-JUL-18
Tetrachloroethylene			<0.050		ug/g		0.05	26-JUL-18
Toluene			<0.080		ug/g		0.08	26-JUL-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	26-JUL-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	26-JUL-18
Trichloroethylene			<0.010		ug/g		0.01	26-JUL-18
Trichlorofluoromethane			<0.050		ug/g		0.05	26-JUL-18
Vinyl chloride			<0.020		ug/g		0.02	26-JUL-18
Surrogate: 1,4-Difluorobenzene			107.4		%		50-140	26-JUL-18
Surrogate: 4-Bromofluorobenzene			108.8		%		50-140	26-JUL-18
WG2830795-5 MS		**L2134137-1**						
1,1,1,2-Tetrachloroethane			109.6		%		50-140	26-JUL-18
1,1,2,2-Tetrachloroethane			117.0		%		50-140	26-JUL-18
1,1,1-Trichloroethane			107.6		%		50-140	26-JUL-18
1,1,2-Trichloroethane			116.2		%		50-140	26-JUL-18
1,1-Dichloroethane			114.0		%		50-140	26-JUL-18
1,1-Dichloroethylene			101.4		%		50-140	26-JUL-18
1,2-Dibromoethane			115.2		%		50-140	26-JUL-18
1,2-Dichlorobenzene			111.5		%		50-140	26-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4141348								
WG2830795-5 MS		**L2134137-1**						
1,2-Dichloroethane			118.2		%		50-140	26-JUL-18
1,2-Dichloropropane			113.3		%		50-140	26-JUL-18
1,3-Dichlorobenzene			109.0		%		50-140	26-JUL-18
1,4-Dichlorobenzene			108.5		%		50-140	26-JUL-18
Acetone			119.8		%		50-140	26-JUL-18
Benzene			111.3		%		50-140	26-JUL-18
Bromodichloromethane			114.1		%		50-140	26-JUL-18
Bromoform			115.1		%		50-140	26-JUL-18
Bromomethane			84.3		%		50-140	26-JUL-18
Carbon tetrachloride			106.3		%		50-140	26-JUL-18
Chlorobenzene			111.1		%		50-140	26-JUL-18
Chloroform			112.4		%		50-140	26-JUL-18
cis-1,2-Dichloroethylene			110.0		%		50-140	26-JUL-18
cis-1,3-Dichloropropene			111.5		%		50-140	26-JUL-18
Dibromochloromethane			113.1		%		50-140	26-JUL-18
Dichlorodifluoromethane			115.4		%		50-140	26-JUL-18
Ethylbenzene			106.1		%		50-140	26-JUL-18
n-Hexane			111.1		%		50-140	26-JUL-18
Methylene Chloride			111.0		%		50-140	26-JUL-18
MTBE			112.1		%		50-140	26-JUL-18
m+p-Xylenes			107.6		%		50-140	26-JUL-18
Methyl Ethyl Ketone			115.6		%		50-140	26-JUL-18
Methyl Isobutyl Ketone			113.3		%		50-140	26-JUL-18
o-Xylene			105.4		%		50-140	26-JUL-18
Styrene			105.8		%		50-140	26-JUL-18
Tetrachloroethylene			97.2		%		50-140	26-JUL-18
Toluene			108.0		%		50-140	26-JUL-18
trans-1,2-Dichloroethylene			102.8		%		50-140	26-JUL-18
trans-1,3-Dichloropropene			109.4		%		50-140	26-JUL-18
Trichloroethylene			109.5		%		50-140	26-JUL-18
Trichlorofluoromethane			110.6		%		50-140	26-JUL-18
Vinyl chloride			98.0		%		50-140	26-JUL-18

Quality Control Report

Workorder: L2134047 Report Date: 20-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

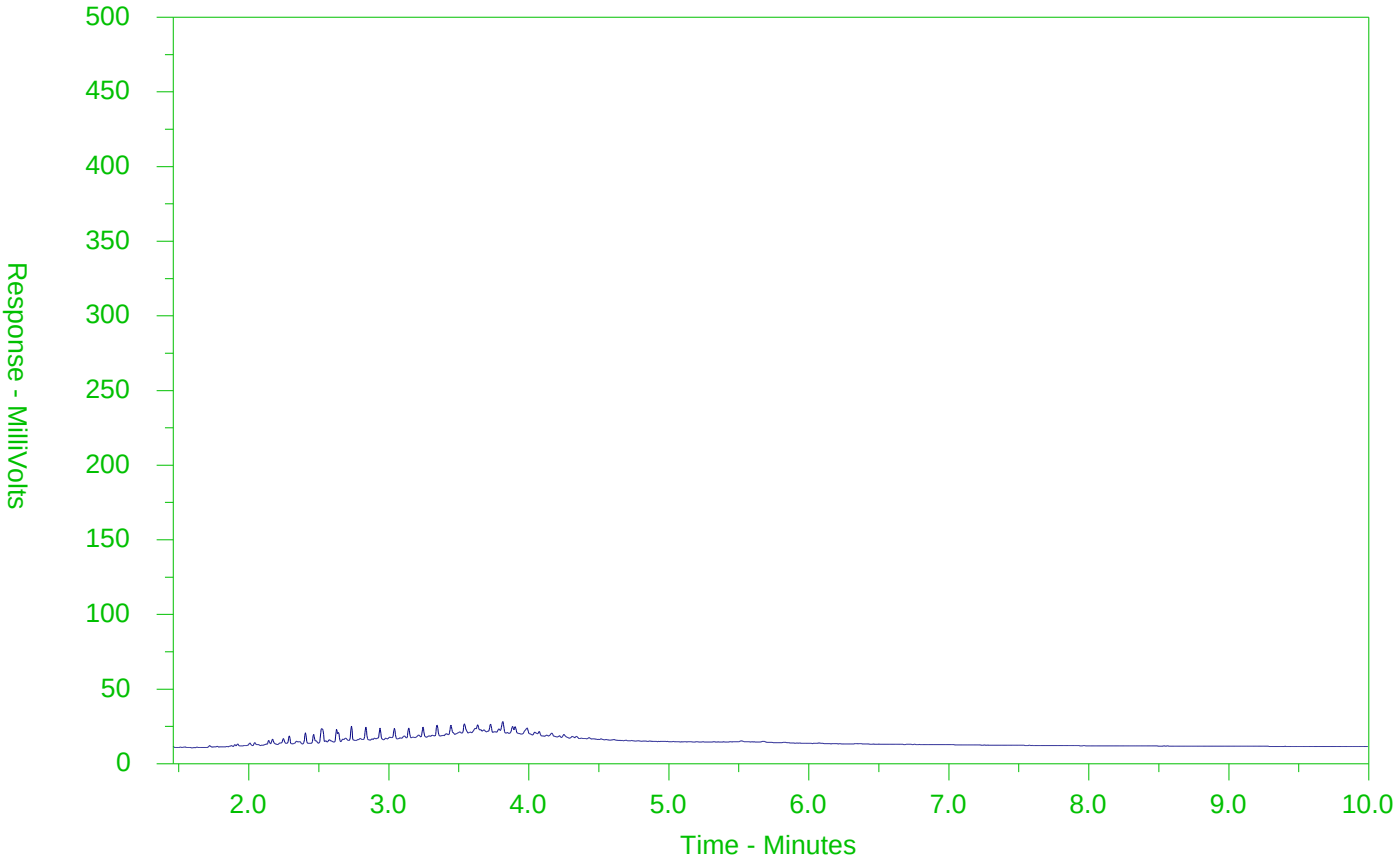
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2134047-2
Client Sample ID: BH18-205-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

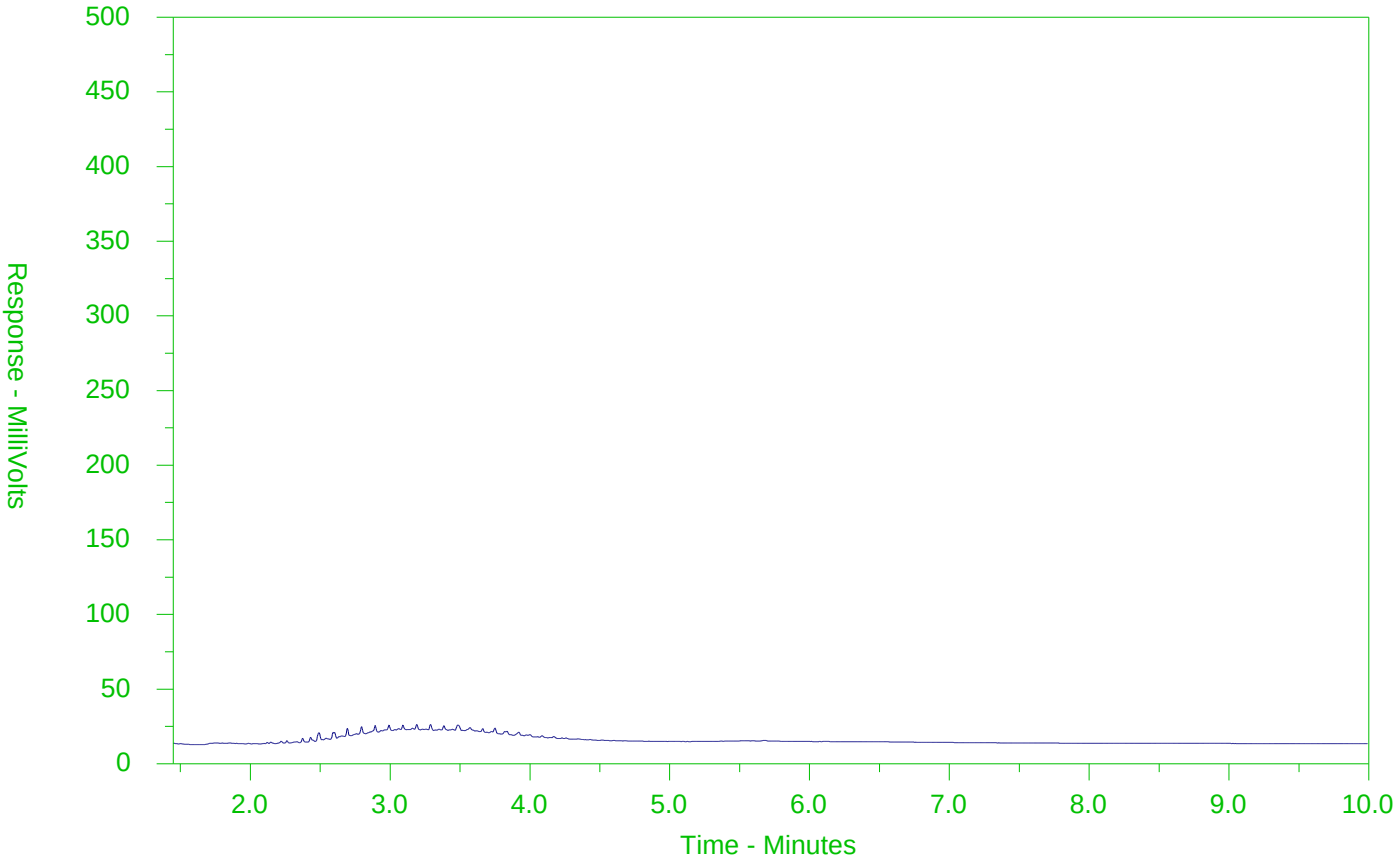
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2134047-4
Client Sample ID: BH18-207-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2134047-COFC

COC Number 17 - 624784

Page 01

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M - JACOBS	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	TANIA MCCARTHY	Quality Control (QC) Report with Report YES NO	4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] (Business Days)
Phone:	519 579 3500	Compare Results to Criteria on Report - provide details below if box checked	1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] (Emergency)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 VICTORIA ST S, SUITE 300	Email 1 or Fax: Tania.McCarthy@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	KITCHENER, ON	Email 2: Lucas.Ribeiro@ch2m.com	
Postal Code:	N2G 4Y9	Email 3	
Invoice To	Same as Report To YES NO	Invoice Distribution	
	Copy of Invoice with Report YES NO	Select Invoice Distribution EMAIL MAIL FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner	
LSD:		Location	
ALS Lab Work Order # (lab use only):	LQ134047 MJ	ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC	PHC	Metals ONLY	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	BH18-205-1	20-JUL-2018	09:40	SOIL	X					
2	BH18-205-2	20-JUL-2018	09:50	SOIL	X	X				
3	BH18-207-1	20-JUL-2018	10:40	SOIL			X			
4	BH18-207-2	20-JUL-2018	11:00	SOIL		X	X			
5	DUP 1 JUL 20	20-JUL-2018	00:00	SOIL			X			
6	TRIP BLANK 1	20-JUL-2018	17:00	BLANK						

Drinking Water (DW) Samples (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [ ] NO	Compare to O.Reg 153/04
Are samples for human consumption/use? [ ] YES [ ] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	X	Ice Cubes	Custody seal intact	Yes	X
Cooling Initiated					No

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
1.6					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Ribeiro	Date: 20-JUL-2018	Time: 17:15	Received by:	Date: July 23 2018	Time: 9:00AM	Received by:	Date: July 23/18	Time: 14:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 26-JUL-18
Report Date: 12-APR-21 15:10 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2136825

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-615353
Legal Site Desc:

Comments: 12-APR-21:
L2136825-4, 5, 9, 11 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2136825-1	BH18-204-1									
Sampled By:	CLIENT on 23-JUL-18 @ 09:20									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
% Moisture		4.65		0.10	%	02-AUG-18				
Volatile Organic Compounds										
Acetone		<0.50		0.50	ug/g	31-JUL-18	16	28	16	28
Benzene		<0.0068		0.0068	ug/g	31-JUL-18	0.32	0.4	0.21	0.17
Bromodichloromethane		<0.050		0.050	ug/g	31-JUL-18	1.5	1.9	1.5	1.9
Bromoform		<0.050		0.050	ug/g	31-JUL-18	0.61	1.7	0.27	0.26
Bromomethane		<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
Carbon tetrachloride		<0.050		0.050	ug/g	31-JUL-18	0.21	0.71	0.05	0.12
Chlorobenzene		<0.050		0.050	ug/g	31-JUL-18	2.4	2.7	2.4	2.7
Dibromochloromethane		<0.050		0.050	ug/g	31-JUL-18	2.3	2.9	2.3	2.9
Chloroform		<0.050		0.050	ug/g	31-JUL-18	0.47	0.18	0.05	0.17
1,2-Dibromoethane		<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene		<0.050		0.050	ug/g	31-JUL-18	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene		<0.050		0.050	ug/g	31-JUL-18	9.6	12	4.8	6
1,4-Dichlorobenzene		<0.050		0.050	ug/g	31-JUL-18	0.2	0.57	0.083	0.097
Dichlorodifluoromethane		<0.050		0.050	ug/g	31-JUL-18	16	25	16	25
1,1-Dichloroethane		<0.050		0.050	ug/g	31-JUL-18	0.47	0.6	0.47	0.6
1,2-Dichloroethane		<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
1,1-Dichloroethylene		<0.050		0.050	ug/g	31-JUL-18	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene		<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene		<0.050		0.050	ug/g	31-JUL-18	1.3	2.5	0.084	0.75
Methylene Chloride		<0.050		0.050	ug/g	31-JUL-18	1.6	2	0.1	0.96
1,2-Dichloropropane		<0.050		0.050	ug/g	31-JUL-18	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene		<0.030		0.030	ug/g	31-JUL-18				
trans-1,3-Dichloropropene		<0.030		0.030	ug/g	31-JUL-18				
1,3-Dichloropropene (cis & trans)		<0.042		0.042	ug/g	02-AUG-18	0.059	0.081	0.05	0.081
Ethylbenzene		<0.018		0.018	ug/g	31-JUL-18	1.1	1.6	1.1	1.6
n-Hexane		<0.15	DLS	0.15	ug/g	31-JUL-18	46	88	2.8	34
Methyl Ethyl Ketone		<0.50		0.50	ug/g	31-JUL-18	70	88	16	44
Methyl Isobutyl Ketone		<0.50		0.50	ug/g	31-JUL-18	31	210	1.7	4.3
MTBE		<0.050		0.050	ug/g	31-JUL-18	1.6	2.3	0.75	1.4
Styrene		<0.050		0.050	ug/g	31-JUL-18	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane		<0.050		0.050	ug/g	31-JUL-18	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane		<0.050		0.050	ug/g	31-JUL-18	0.05	0.094	0.05	0.05
Tetrachloroethylene		<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	0.28	2.3
Toluene		<0.080		0.080	ug/g	31-JUL-18	6.4	9	2.3	6
1,1,1-Trichloroethane		<0.050		0.050	ug/g	31-JUL-18	6.1	12	0.38	3.4
1,1,2-Trichloroethane		<0.050		0.050	ug/g	31-JUL-18	0.05	0.11	0.05	0.05
Trichloroethylene		0.111		0.010	ug/g	31-JUL-18	0.55	0.61	*0.061	0.52
Trichlorofluoromethane		<0.050		0.050	ug/g	31-JUL-18	4	5.8	4	5.8
Vinyl chloride		<0.020		0.020	ug/g	31-JUL-18	0.032	0.25	0.02	0.022
o-Xylene		<0.020		0.020	ug/g	31-JUL-18				
m+p-Xylenes		<0.030		0.030	ug/g	31-JUL-18				
Xylenes (Total)		<0.050		0.050	ug/g	02-AUG-18	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene		106.6		50-140	%	31-JUL-18				
Surrogate: 1,4-Difluorobenzene		113.8		50-140	%	31-JUL-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2136825-2	DUP1 JUL23									
Sampled By:	CLIENT on 23-JUL-18									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	5.38		0.10	%	02-AUG-18				
Volatile Organic Compounds										
	Acetone	<0.50		0.50	ug/g	31-JUL-18	16	28	16	28
	Benzene	0.0084		0.0068	ug/g	31-JUL-18	0.32	0.4	0.21	0.17
	Bromodichloromethane	<0.050		0.050	ug/g	31-JUL-18	1.5	1.9	1.5	1.9
	Bromoform	<0.050		0.050	ug/g	31-JUL-18	0.61	1.7	0.27	0.26
	Bromomethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
	Carbon tetrachloride	<0.050		0.050	ug/g	31-JUL-18	0.21	0.71	0.05	0.12
	Chlorobenzene	<0.050		0.050	ug/g	31-JUL-18	2.4	2.7	2.4	2.7
	Dibromochloromethane	<0.050		0.050	ug/g	31-JUL-18	2.3	2.9	2.3	2.9
	Chloroform	<0.050		0.050	ug/g	31-JUL-18	0.47	0.18	0.05	0.17
	1,2-Dibromoethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
	1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	1.2	1.7	1.2	1.7
	1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	9.6	12	4.8	6
	1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	0.2	0.57	0.083	0.097
	Dichlorodifluoromethane	<0.050		0.050	ug/g	31-JUL-18	16	25	16	25
	1,1-Dichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.47	0.6	0.47	0.6
	1,2-Dichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
	1,1-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	0.064	0.48	0.05	0.05
	cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	1.9	2.5
	trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.3	2.5	0.084	0.75
	Methylene Chloride	<0.050		0.050	ug/g	31-JUL-18	1.6	2	0.1	0.96
	1,2-Dichloropropane	<0.050		0.050	ug/g	31-JUL-18	0.16	0.68	0.05	0.085
	cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-JUL-18				
	trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-JUL-18				
	1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	02-AUG-18	0.059	0.081	0.05	0.081
	Ethylbenzene	<0.018		0.018	ug/g	31-JUL-18	1.1	1.6	1.1	1.6
	n-Hexane	<0.15	DLS	0.15	ug/g	31-JUL-18	46	88	2.8	34
	Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-JUL-18	70	88	16	44
	Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-JUL-18	31	210	1.7	4.3
	MTBE	<0.050		0.050	ug/g	31-JUL-18	1.6	2.3	0.75	1.4
	Styrene	<0.050		0.050	ug/g	31-JUL-18	34	43	0.7	2.2
	1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-JUL-18	0.087	0.11	0.058	0.05
	1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.094	0.05	0.05
	Tetrachloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	0.28	2.3
	Toluene	<0.080		0.080	ug/g	31-JUL-18	6.4	9	2.3	6
	1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-JUL-18	6.1	12	0.38	3.4
	1,1,2-Trichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.11	0.05	0.05
	Trichloroethylene	0.068		0.010	ug/g	31-JUL-18	0.55	0.61	*0.061	0.52
	Trichlorofluoromethane	<0.050		0.050	ug/g	31-JUL-18	4	5.8	4	5.8
	Vinyl chloride	<0.020		0.020	ug/g	31-JUL-18	0.032	0.25	0.02	0.022
	o-Xylene	<0.020		0.020	ug/g	31-JUL-18				
	m+p-Xylenes	<0.030		0.030	ug/g	31-JUL-18				
	Xylenes (Total)	<0.050		0.050	ug/g	02-AUG-18	26	30	3.1	25
	Surrogate: 4-Bromofluorobenzene	99.5		50-140	%	31-JUL-18				
	Surrogate: 1,4-Difluorobenzene	104.3		50-140	%	31-JUL-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-3 BH18-204-2 Sampled By: CLIENT on 23-JUL-18 @ 09:30 Matrix: SOIL									
Physical Tests									
% Moisture	8.09		0.10	%	02-AUG-18				
Volatile Organic Compounds									
Acetone	<0.50		0.50	ug/g	31-JUL-18	16	28	16	28
Benzene	0.0077		0.0068	ug/g	31-JUL-18	0.32	0.4	0.21	0.17
Bromodichloromethane	<0.050		0.050	ug/g	31-JUL-18	1.5	1.9	1.5	1.9
Bromoform	<0.050		0.050	ug/g	31-JUL-18	0.61	1.7	0.27	0.26
Bromomethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
Carbon tetrachloride	<0.050		0.050	ug/g	31-JUL-18	0.21	0.71	0.05	0.12
Chlorobenzene	<0.050		0.050	ug/g	31-JUL-18	2.4	2.7	2.4	2.7
Dibromochloromethane	<0.050		0.050	ug/g	31-JUL-18	2.3	2.9	2.3	2.9
Chloroform	<0.050		0.050	ug/g	31-JUL-18	0.47	0.18	0.05	0.17
1,2-Dibromoethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
1,2-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	1.2	1.7	1.2	1.7
1,3-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	9.6	12	4.8	6
1,4-Dichlorobenzene	<0.050		0.050	ug/g	31-JUL-18	0.2	0.57	0.083	0.097
Dichlorodifluoromethane	<0.050		0.050	ug/g	31-JUL-18	16	25	16	25
1,1-Dichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.47	0.6	0.47	0.6
1,2-Dichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.05	0.05	0.05
1,1-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	0.064	0.48	0.05	0.05
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	1.9	2.5
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.3	2.5	0.084	0.75
Methylene Chloride	<0.050		0.050	ug/g	31-JUL-18	1.6	2	0.1	0.96
1,2-Dichloropropane	<0.050		0.050	ug/g	31-JUL-18	0.16	0.68	0.05	0.085
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	31-JUL-18				
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	31-JUL-18				
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g	02-AUG-18	0.059	0.081	0.05	0.081
Ethylbenzene	<0.018		0.018	ug/g	31-JUL-18	1.1	1.6	1.1	1.6
n-Hexane	<0.15	DLS	0.15	ug/g	31-JUL-18	46	88	2.8	34
Methyl Ethyl Ketone	<0.50		0.50	ug/g	31-JUL-18	70	88	16	44
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	31-JUL-18	31	210	1.7	4.3
MTBE	<0.050		0.050	ug/g	31-JUL-18	1.6	2.3	0.75	1.4
Styrene	<0.050		0.050	ug/g	31-JUL-18	34	43	0.7	2.2
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	31-JUL-18	0.087	0.11	0.058	0.05
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.094	0.05	0.05
Tetrachloroethylene	<0.050		0.050	ug/g	31-JUL-18	1.9	2.5	0.28	2.3
Toluene	<0.080		0.080	ug/g	31-JUL-18	6.4	9	2.3	6
1,1,1-Trichloroethane	<0.050		0.050	ug/g	31-JUL-18	6.1	12	0.38	3.4
1,1,2-Trichloroethane	<0.050		0.050	ug/g	31-JUL-18	0.05	0.11	0.05	0.05
Trichloroethylene	0.041		0.010	ug/g	31-JUL-18	0.55	0.61	0.061	0.52
Trichlorofluoromethane	<0.050		0.050	ug/g	31-JUL-18	4	5.8	4	5.8
Vinyl chloride	<0.020		0.020	ug/g	31-JUL-18	0.032	0.25	0.02	0.022
o-Xylene	<0.020		0.020	ug/g	31-JUL-18				
m+p-Xylenes	<0.030		0.030	ug/g	31-JUL-18				
Xylenes (Total)	<0.050		0.050	ug/g	02-AUG-18	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	99.3		50-140	%	31-JUL-18				
Surrogate: 1,4-Difluorobenzene	102.0		50-140	%	31-JUL-18				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-4 MW18-129D-1									
Sampled By: CLIENT on 23-JUL-18 @ 10:40									
Matrix: SOIL									
Physical Tests									
Conductivity	0.170		0.0040	mS/cm	02-AUG-18	1.4	1.4	0.7	0.7
% Moisture	5.13		0.10	%	02-AUG-18				
pH	7.94		0.10	pH units	01-AUG-18				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	01-AUG-18	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.28		0.10	SAR	02-AUG-18	12	12	5	5
Calcium (Ca)	6.7		1.0	mg/L	02-AUG-18				
Magnesium (Mg)	2.0		1.0	mg/L	02-AUG-18				
Sodium (Na)	3.2		1.0	mg/L	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	02-AUG-18	40	50	7.5	7.5
Arsenic (As)	7.8		1.0	ug/g	02-AUG-18	18	18	18	18
Barium (Ba)	31.4		1.0	ug/g	02-AUG-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	02-AUG-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	11.8		5.0	ug/g	02-AUG-18	120	120	120	120
Boron (B), Hot Water Ext.	0.26		0.10	ug/g	02-AUG-18	2	2	1.5	1.5
Cadmium (Cd)	1.00		0.50	ug/g	02-AUG-18	1.9	1.9	1.2	1.2
Calcium (Ca)	157000		50	ug/g	12-APR-21				
Chromium (Cr)	12.6		1.0	ug/g	02-AUG-18	160	160	160	160
Cobalt (Co)	4.8		1.0	ug/g	02-AUG-18	80	100	22	22
Copper (Cu)	27.0		1.0	ug/g	02-AUG-18	230	300	140	180
Iron (Fe)	16700		50	ug/g	12-APR-21				
Lead (Pb)	103		1.0	ug/g	02-AUG-18	120	120	120	120
Magnesium (Mg)	86300		20	ug/g	12-APR-21				
Mercury (Hg)	0.0521		0.0050	ug/g	02-AUG-18	3.9	20	0.27	1.8
Molybdenum (Mo)	1.0		1.0	ug/g	02-AUG-18	40	40	6.9	6.9
Nickel (Ni)	14.1		1.0	ug/g	02-AUG-18	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	02-AUG-18	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	02-AUG-18	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	02-AUG-18	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	02-AUG-18	33	33	23	23
Vanadium (V)	21.3		1.0	ug/g	02-AUG-18	86	86	86	86
Zinc (Zn)	410		5.0	ug/g	02-AUG-18	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	0.21		0.20	ug/g	01-AUG-18	8	10	8	10
L2136825-5 DUP2 JUL23									
Sampled By: CLIENT on 23-JUL-18 @ 00:01									
Matrix: SOIL									
Physical Tests									
Conductivity	0.175		0.0040	mS/cm	02-AUG-18	1.4	1.4	0.7	0.7
% Moisture	4.01		0.10	%	02-AUG-18				
pH	7.98		0.10	pH units	01-AUG-18				
Cyanides									

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-5 DUP2 JUL23									
Sampled By: CLIENT on 23-JUL-18 @ 00:01									
Matrix: SOIL									
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	01-AUG-18	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.30		0.10	SAR	02-AUG-18	12	12	5	5
Calcium (Ca)	6.9		1.0	mg/L	02-AUG-18				
Magnesium (Mg)	2.3		1.0	mg/L	02-AUG-18				
Sodium (Na)	3.5		1.0	mg/L	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	02-AUG-18	40	50	7.5	7.5
Arsenic (As)	7.2		1.0	ug/g	02-AUG-18	18	18	18	18
Barium (Ba)	27.4		1.0	ug/g	02-AUG-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	02-AUG-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	9.4		5.0	ug/g	02-AUG-18	120	120	120	120
Boron (B), Hot Water Ext.	0.24		0.10	ug/g	02-AUG-18	2	2	1.5	1.5
Cadmium (Cd)	0.96		0.50	ug/g	02-AUG-18	1.9	1.9	1.2	1.2
Calcium (Ca)	136000		50	ug/g	12-APR-21				
Chromium (Cr)	12.3		1.0	ug/g	02-AUG-18	160	160	160	160
Cobalt (Co)	4.5		1.0	ug/g	02-AUG-18	80	100	22	22
Copper (Cu)	23.4		1.0	ug/g	02-AUG-18	230	300	140	180
Iron (Fe)	15500		50	ug/g	12-APR-21				
Lead (Pb)	97.7		1.0	ug/g	02-AUG-18	120	120	120	120
Magnesium (Mg)	82500		20	ug/g	12-APR-21				
Mercury (Hg)	0.0454		0.0050	ug/g	02-AUG-18	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	02-AUG-18	40	40	6.9	6.9
Nickel (Ni)	13.0		1.0	ug/g	02-AUG-18	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	02-AUG-18	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	02-AUG-18	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	02-AUG-18	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	02-AUG-18	33	33	23	23
Vanadium (V)	20.0		1.0	ug/g	02-AUG-18	86	86	86	86
Zinc (Zn)	372		5.0	ug/g	02-AUG-18	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	0.32		0.20	ug/g	01-AUG-18	8	10	8	10
L2136825-6 MW18-129D-2									
Sampled By: CLIENT on 23-JUL-18 @ 11:00									
Matrix: SOIL									
Physical Tests									
% Moisture	2.44		0.10	%	02-AUG-18				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	03-AUG-18	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.3	0.3	0.3	0.3

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#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-6 MW18-129D-2									
Sampled By: CLIENT on 23-JUL-18 @ 11:00									
Matrix: SOIL									
Polycyclic Aromatic Hydrocarbons									
Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	03-AUG-18	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	03-AUG-18	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
Naphthalene	<0.013		0.013	ug/g	03-AUG-18	9.6	28	0.6	0.75
Phenanthrene	<0.046		0.046	ug/g	03-AUG-18	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	03-AUG-18	96	96	78	78
Surrogate: 2-Fluorobiphenyl	104.2		50-140	%	03-AUG-18				
Surrogate: p-Terphenyl d14	106.8		50-140	%	03-AUG-18				
L2136825-7 DUP3 JUL23									
Sampled By: CLIENT on 23-JUL-18 @ 00:02									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	2.06		0.10	%	02-AUG-18				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	03-AUG-18	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	03-AUG-18	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	03-AUG-18	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
Naphthalene	<0.013		0.013	ug/g	03-AUG-18	9.6	28	0.6	0.75
Phenanthrene	<0.046		0.046	ug/g	03-AUG-18	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	03-AUG-18	96	96	78	78
Surrogate: 2-Fluorobiphenyl	104.5		50-140	%	03-AUG-18				
Surrogate: p-Terphenyl d14	105.7		50-140	%	03-AUG-18				

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-8 MW18-129D-3									
Sampled By: CLIENT on 23-JUL-18 @ 11:30									
Matrix: SOIL									
Physical Tests									
% Moisture	2.27		0.10	%	02-AUG-18				
Hydrocarbons									
F1 (C6-C10)	6.0		5.0	ug/g	30-JUL-18	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	01-AUG-18	230	250	98	150
F3 (C16-C34)	58		50	ug/g	01-AUG-18	1700	2500	300	1300
F4 (C34-C50)	<50		50	ug/g	01-AUG-18	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	<72		72	ug/g	02-AUG-18				
Chrom. to baseline at nC50	YES			No Unit	01-AUG-18				
Surrogate: 2-Bromobenzotrifluoride	93.4		60-140	%	01-AUG-18				
Surrogate: 3,4-Dichlorotoluene	110.0		60-140	%	30-JUL-18				
L2136825-9 BH18-206-1									
Sampled By: CLIENT on 23-JUL-18 @ 15:10									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
Conductivity	0.130		0.0040	mS/cm	02-AUG-18	1.4	1.4	0.7	0.7
% Moisture	4.43		0.10	%	02-AUG-18				
pH	8.46		0.10	pH units	01-AUG-18				
Cyanides									
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	01-AUG-18	0.051	0.051	0.051	0.051
Saturated Paste Extractables									
SAR	0.77		0.10	SAR	02-AUG-18	12	12	5	5
Calcium (Ca)	4.9		1.0	mg/L	02-AUG-18				
Magnesium (Mg)	1.0		1.0	mg/L	02-AUG-18				
Sodium (Na)	7.2		1.0	mg/L	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	02-AUG-18	40	50	7.5	7.5
Arsenic (As)	7.2		1.0	ug/g	02-AUG-18	18	18	18	18
Barium (Ba)	35.7		1.0	ug/g	02-AUG-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	02-AUG-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	7.6		5.0	ug/g	02-AUG-18	120	120	120	120
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	02-AUG-18	2	2	1.5	1.5
Cadmium (Cd)	1.43		0.50	ug/g	02-AUG-18	1.9	1.9	*1.2	*1.2
Calcium (Ca)	141000		50	ug/g	12-APR-21				
Chromium (Cr)	8.9		1.0	ug/g	02-AUG-18	160	160	160	160
Cobalt (Co)	4.6		1.0	ug/g	02-AUG-18	80	100	22	22
Copper (Cu)	22.8		1.0	ug/g	02-AUG-18	230	300	140	180
Iron (Fe)	16700		50	ug/g	12-APR-21				
Lead (Pb)	113		1.0	ug/g	02-AUG-18	120	120	120	120
Magnesium (Mg)	52500		20	ug/g	12-APR-21				
Mercury (Hg)	0.0210		0.0050	ug/g	02-AUG-18	3.9	20	0.27	1.8
Molybdenum (Mo)	<1.0		1.0	ug/g	02-AUG-18	40	40	6.9	6.9
Nickel (Ni)	12.3		1.0	ug/g	02-AUG-18	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	02-AUG-18	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	02-AUG-18	40	50	20	25

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-9 BH18-206-1									
Sampled By: CLIENT on 23-JUL-18 @ 15:10									
Matrix: SOIL									
Metals									
Thallium (Tl)	<0.50		0.50	ug/g	02-AUG-18	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	02-AUG-18	33	33	23	23
Vanadium (V)	18.7		1.0	ug/g	02-AUG-18	86	86	86	86
Zinc (Zn)	614		5.0	ug/g	02-AUG-18	*340	*340	*340	*340
Speciated Metals									
Chromium, Hexavalent	<0.20		0.20	ug/g	01-AUG-18	8	10	8	10
L2136825-10 BH18-206-2									
Sampled By: CLIENT on 23-JUL-18 @ 15:30									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	4.40		0.10	%	02-AUG-18				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	30-JUL-18	55	65	55	65
F2 (C10-C16)	<10		10	ug/g	01-AUG-18	230	250	98	150
F3 (C16-C34)	179		50	ug/g	01-AUG-18	1700	2500	300	1300
F4 (C34-C50)	<50		50	ug/g	01-AUG-18	3300	6600	2800	5600
F4G-SG (GHH-Silica)	<250		250	ug/g	01-AUG-18	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	179		72	ug/g	02-AUG-18				
Chrom. to baseline at nC50	NO			No Unit	01-AUG-18				
Surrogate: 2-Bromobenzotrifluoride	92.0		60-140	%	01-AUG-18				
Surrogate: 3,4-Dichlorotoluene	111.5		60-140	%	30-JUL-18				
L2136825-11 BH18-208-1									
Sampled By: CLIENT on 23-JUL-18 @ 16:30									
Matrix: SOIL						#1	#2	#3	#4
Physical Tests									
% Moisture	14.4		0.10	%	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	02-AUG-18	40	50	7.5	7.5
Arsenic (As)	10.1		1.0	ug/g	02-AUG-18	18	18	18	18
Barium (Ba)	29.1		1.0	ug/g	02-AUG-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	02-AUG-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	12-APR-21				
Boron (B)	9.8		5.0	ug/g	02-AUG-18	120	120	120	120
Cadmium (Cd)	0.80		0.50	ug/g	02-AUG-18	1.9	1.9	1.2	1.2
Calcium (Ca)	129000		50	ug/g	12-APR-21				
Chromium (Cr)	14.1		1.0	ug/g	02-AUG-18	160	160	160	160
Cobalt (Co)	12.6		1.0	ug/g	02-AUG-18	80	100	22	22
Copper (Cu)	13.6		1.0	ug/g	02-AUG-18	230	300	140	180
Iron (Fe)	24000		50	ug/g	12-APR-21				
Lead (Pb)	190		1.0	ug/g	02-AUG-18	*120	*120	*120	*120
Magnesium (Mg)	76100		20	ug/g	12-APR-21				
Molybdenum (Mo)	<1.0		1.0	ug/g	02-AUG-18	40	40	6.9	6.9
Nickel (Ni)	15.1		1.0	ug/g	02-AUG-18	270	340	100	130

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136825-11	BH18-208-1									
Sampled By:	CLIENT on 23-JUL-18 @ 16:30									
Matrix:	SOIL									
Metals										
	Selenium (Se)	<1.0		1.0	ug/g	02-AUG-18	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	02-AUG-18	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	02-AUG-18	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	02-AUG-18	33	33	23	23
	Vanadium (V)	30.0		1.0	ug/g	02-AUG-18	86	86	86	86
	Zinc (Zn)	665		5.0	ug/g	02-AUG-18	*340	*340	*340	*340
Polycyclic Aromatic Hydrocarbons										
	Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	21	29	7.9	29
	Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	0.15	0.17	0.15	0.17
	Anthracene	<0.050		0.050	ug/g	03-AUG-18	0.67	0.74	0.67	0.74
	Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.5	0.63
	Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.3	0.3	0.3	0.3
	Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
	Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	6.6	7.8
	Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
	Chrysene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	7	7.8
	Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.1	0.1	0.1	0.1
	Fluoranthene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	0.69	0.69
	Fluorene	<0.050		0.050	ug/g	03-AUG-18	62	69	62	69
	Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.76	0.95	0.38	0.48
	1+2-Methylnaphthalenes	<0.042		0.042	ug/g	03-AUG-18	30	42	0.99	3.4
	1-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
	2-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
	Naphthalene	<0.013		0.013	ug/g	03-AUG-18	9.6	28	0.6	0.75
	Phenanthrene	<0.046		0.046	ug/g	03-AUG-18	12	16	6.2	7.8
	Pyrene	<0.050		0.050	ug/g	03-AUG-18	96	96	78	78
	Surrogate: 2-Fluorobiphenyl	108.6		50-140	%	03-AUG-18				
	Surrogate: p-Terphenyl d14	113.8		50-140	%	03-AUG-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

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#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLS	Detection Limit Adjusted: Instrument Sensitivity

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-615353

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2136825 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R4155587								
WG2839053-4 DUP		**L2137057-1**						
Boron (B), Hot Water Ext.		<0.10	<0.10	RPD-NA	ug/g	N/A	30	02-AUG-18
WG2839053-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			90.2		%		70-130	02-AUG-18
WG2839053-3 LCS								
Boron (B), Hot Water Ext.			107.9		%		70-130	02-AUG-18
WG2839053-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	02-AUG-18
CN-WAD-R511-WT	**Soil**							
Batch R4152793								
WG2837946-3 DUP		**L2137057-3**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	01-AUG-18
WG2837946-2 LCS								
Cyanide, Weak Acid Diss			89.1		%		80-120	01-AUG-18
WG2837946-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	01-AUG-18
WG2837946-4 MS		**L2137057-3**						
Cyanide, Weak Acid Diss			97.2		%		70-130	01-AUG-18
CR-CR6-IC-WT	**Soil**							
Batch R4152655								
WG2837987-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			104.1		%		70-130	01-AUG-18
WG2837987-3 DUP		**L2137057-3**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	01-AUG-18
WG2837987-2 LCS								
Chromium, Hexavalent			89.9		%		80-120	01-AUG-18
WG2837987-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	01-AUG-18
EC-WT	**Soil**							
Batch R4155312								
WG2839068-4 DUP		**WG2839068-3**						
Conductivity		0.148	0.143		mS/cm	3.8	20	02-AUG-18
WG2839492-1 LCS								
Conductivity			97.4		%		90-110	02-AUG-18
WG2839068-1 MB								
Conductivity			<0.0040		mS/cm		0.004	02-AUG-18
F1-HS-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4147212								
WG2834308-4 DUP		**WG2834308-3**						
F1 (C6-C10)		227	238		ug/g	4.5	30	31-JUL-18
WG2834308-2 LCS								
F1 (C6-C10)			106.1		%		80-120	29-JUL-18
WG2834308-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	29-JUL-18
Surrogate: 3,4-Dichlorotoluene			115.8		%		60-140	29-JUL-18
WG2834308-6 MS		**L2135565-5**						
F1 (C6-C10)			N/A	E	%		60-140	31-JUL-18
F2-F4-511-WT	**Soil**							
Batch R4152921								
WG2837149-4 DUP		**WG2837149-3**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	01-AUG-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	01-AUG-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	01-AUG-18
WG2837149-2 LCS								
F2 (C10-C16)			103.7		%		80-120	01-AUG-18
F3 (C16-C34)			107.1		%		80-120	01-AUG-18
F4 (C34-C50)			105.7		%		80-120	01-AUG-18
WG2837149-1 MB								
F2 (C10-C16)			<10		ug/g		10	01-AUG-18
F3 (C16-C34)			<50		ug/g		50	01-AUG-18
F4 (C34-C50)			<50		ug/g		50	01-AUG-18
Surrogate: 2-Bromobenzotrifluoride			90.0		%		60-140	01-AUG-18
WG2837149-5 MS		**WG2837149-3**						
F2 (C10-C16)			105.7		%		60-140	01-AUG-18
F3 (C16-C34)			109.5		%		60-140	01-AUG-18
F4 (C34-C50)			108.7		%		60-140	01-AUG-18
F4G-ADD-511-WT	**Soil**							
Batch R4155274								
WG2840010-2 LCS								
F4G-SG (GHH-Silica)			78.6		%		60-140	01-AUG-18
WG2840010-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	01-AUG-18
HG-200.2-CVAA-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-200.2-CVAA-WT	**Soil**							
Batch R4154007								
WG2838968-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			110.3		%		70-130	02-AUG-18
WG2838968-6 DUP		**WG2838968-5**						
Mercury (Hg)		<0.0050	<0.0050	RPD-NA	ug/g	N/A	40	02-AUG-18
WG2838968-3 LCS								
Mercury (Hg)			104.0		%		80-120	02-AUG-18
WG2838968-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	02-AUG-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4158431								
WG2838968-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			99.4		%		70-130	02-AUG-18
Arsenic (As)			106.7		%		70-130	02-AUG-18
Barium (Ba)			114.6		%		70-130	02-AUG-18
Beryllium (Be)			95.3		%		70-130	02-AUG-18
Bismuth (Bi)			102.6		%		70-130	02-AUG-18
Boron (B)			2.7		mg/kg		0-8.2	02-AUG-18
Cadmium (Cd)			101.7		%		70-130	02-AUG-18
Calcium (Ca)			92.7		%		70-130	02-AUG-18
Chromium (Cr)			99.4		%		70-130	02-AUG-18
Cobalt (Co)			104.0		%		70-130	02-AUG-18
Copper (Cu)			106.0		%		70-130	02-AUG-18
Iron (Fe)			101.3		%		70-130	02-AUG-18
Lead (Pb)			109.1		%		70-130	02-AUG-18
Magnesium (Mg)			99.4		%		70-130	02-AUG-18
Molybdenum (Mo)			97.2		%		70-130	02-AUG-18
Nickel (Ni)			105.8		%		70-130	02-AUG-18
Selenium (Se)			0.28		mg/kg		0.11-0.51	02-AUG-18
Silver (Ag)			0.24		mg/kg		0.13-0.33	02-AUG-18
Thallium (Tl)			0.113		mg/kg		0.077-0.18	02-AUG-18
Uranium (U)			101.1		%		70-130	02-AUG-18
Vanadium (V)			100.8		%		70-130	02-AUG-18
Zinc (Zn)			102.5		%		70-130	02-AUG-18
WG2838968-6 DUP		**WG2838968-5**						
Antimony (Sb)		<0.10	<0.10	RPD-NA	ug/g	N/A	30	02-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4158431								
WG2838968-6 DUP		**WG2838968-5**						
Arsenic (As)		1.32	1.26		ug/g	4.9	30	02-AUG-18
Barium (Ba)		18.5	18.3		ug/g	1.0	40	02-AUG-18
Beryllium (Be)		0.14	0.14		ug/g	2.4	30	02-AUG-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	02-AUG-18
Boron (B)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	02-AUG-18
Cadmium (Cd)		0.032	0.032		ug/g	2.3	30	02-AUG-18
Calcium (Ca)		88300	83100		ug/g	6.1	30	02-AUG-18
Chromium (Cr)		6.44	6.44		ug/g	0.1	30	02-AUG-18
Cobalt (Co)		2.16	2.10		ug/g	2.5	30	02-AUG-18
Copper (Cu)		4.50	4.32		ug/g	4.0	30	02-AUG-18
Iron (Fe)		8280	8150		ug/g	1.6	30	02-AUG-18
Lead (Pb)		2.43	2.49		ug/g	2.8	40	02-AUG-18
Magnesium (Mg)		9580	9330		ug/g	2.7	30	02-AUG-18
Molybdenum (Mo)		0.18	0.15		ug/g	14	40	02-AUG-18
Nickel (Ni)		4.12	4.20		ug/g	1.8	30	02-AUG-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	02-AUG-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-AUG-18
Thallium (Tl)		<0.050	<0.050	RPD-NA	ug/g	N/A	30	02-AUG-18
Uranium (U)		0.419	0.445		ug/g	6.0	30	02-AUG-18
Vanadium (V)		14.8	15.0		ug/g	1.3	30	02-AUG-18
Zinc (Zn)		11.9	12.5		ug/g	4.9	30	02-AUG-18
WG2838968-4 LCS								
Antimony (Sb)			117.1		%		80-120	02-AUG-18
Arsenic (As)			118.5		%		80-120	02-AUG-18
Barium (Ba)			94.4		%		80-120	02-AUG-18
Beryllium (Be)			109.8		%		80-120	02-AUG-18
Bismuth (Bi)			112.9		%		80-120	02-AUG-18
Boron (B)			101.1		%		80-120	02-AUG-18
Cadmium (Cd)			104.8		%		80-120	02-AUG-18
Calcium (Ca)			108.2		%		80-120	02-AUG-18
Chromium (Cr)			116.9		%		80-120	02-AUG-18
Cobalt (Co)			117.3		%		80-120	02-AUG-18
Copper (Cu)			115.6		%		80-120	02-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4158431								
WG2838968-4 LCS								
Iron (Fe)			118.9		%		80-120	02-AUG-18
Lead (Pb)			112.0		%		80-120	02-AUG-18
Magnesium (Mg)			116.6		%		80-120	02-AUG-18
Molybdenum (Mo)			111.7		%		80-120	02-AUG-18
Nickel (Ni)			118.1		%		80-120	02-AUG-18
Selenium (Se)			110.1		%		80-120	02-AUG-18
Silver (Ag)			116.1		%		80-120	02-AUG-18
Thallium (Tl)			103.8		%		80-120	02-AUG-18
Uranium (U)			113.5		%		80-120	02-AUG-18
Vanadium (V)			119.1		%		80-120	02-AUG-18
Zinc (Zn)			111.2		%		80-120	02-AUG-18
WG2838968-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	02-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	02-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	02-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	02-AUG-18
Bismuth (Bi)			<0.20		mg/kg		0.2	02-AUG-18
Boron (B)			<5.0		mg/kg		5	02-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	02-AUG-18
Calcium (Ca)			<50		mg/kg		50	02-AUG-18
Chromium (Cr)			<0.50		mg/kg		0.5	02-AUG-18
Cobalt (Co)			<0.10		mg/kg		0.1	02-AUG-18
Copper (Cu)			<0.50		mg/kg		0.5	02-AUG-18
Iron (Fe)			<50		mg/kg		50	02-AUG-18
Lead (Pb)			<0.50		mg/kg		0.5	02-AUG-18
Magnesium (Mg)			<20		mg/kg		20	02-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	02-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	02-AUG-18
Selenium (Se)			<0.20		mg/kg		0.2	02-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	02-AUG-18
Thallium (Tl)			<0.050		mg/kg		0.05	02-AUG-18
Uranium (U)			<0.050		mg/kg		0.05	02-AUG-18
Vanadium (V)			<0.20		mg/kg		0.2	02-AUG-18
Zinc (Zn)			<2.0		mg/kg		2	02-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R4153151								
WG2838623-3 DUP		**L2137149-9**						
% Moisture		10.6	11.4		%	6.9	20	02-AUG-18
WG2838623-2 LCS								
% Moisture			99.98		%		90-110	02-AUG-18
WG2838623-1 MB								
% Moisture			<0.10		%		0.1	02-AUG-18
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-3 DUP		**WG2836404-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-AUG-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-AUG-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	03-AUG-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	03-AUG-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
WG2836404-2 LCS								
1-Methylnaphthalene			91.5		%		50-140	03-AUG-18
2-Methylnaphthalene			92.1		%		50-140	03-AUG-18
Acenaphthene			90.6		%		50-140	03-AUG-18
Acenaphthylene			84.3		%		50-140	03-AUG-18
Anthracene			84.7		%		50-140	03-AUG-18
Benzo(a)anthracene			89.9		%		50-140	03-AUG-18
Benzo(a)pyrene			85.9		%		50-140	03-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-2 LCS								
Benzo(b)fluoranthene			94.7		%		50-140	03-AUG-18
Benzo(g,h,i)perylene			80.8		%		50-140	03-AUG-18
Benzo(k)fluoranthene			88.9		%		50-140	03-AUG-18
Chrysene			86.2		%		50-140	03-AUG-18
Dibenzo(ah)anthracene			81.6		%		50-140	03-AUG-18
Fluoranthene			88.6		%		50-140	03-AUG-18
Fluorene			86.5		%		50-140	03-AUG-18
Indeno(1,2,3-cd)pyrene			88.6		%		50-140	03-AUG-18
Naphthalene			89.6		%		50-140	03-AUG-18
Phenanthrene			90.3		%		50-140	03-AUG-18
Pyrene			88.9		%		50-140	03-AUG-18
WG2836404-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	03-AUG-18
2-Methylnaphthalene			<0.030		ug/g		0.03	03-AUG-18
Acenaphthene			<0.050		ug/g		0.05	03-AUG-18
Acenaphthylene			<0.050		ug/g		0.05	03-AUG-18
Anthracene			<0.050		ug/g		0.05	03-AUG-18
Benzo(a)anthracene			<0.050		ug/g		0.05	03-AUG-18
Benzo(a)pyrene			<0.050		ug/g		0.05	03-AUG-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	03-AUG-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Chrysene			<0.050		ug/g		0.05	03-AUG-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	03-AUG-18
Fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Fluorene			<0.050		ug/g		0.05	03-AUG-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	03-AUG-18
Naphthalene			<0.013		ug/g		0.013	03-AUG-18
Phenanthrene			<0.046		ug/g		0.046	03-AUG-18
Pyrene			<0.050		ug/g		0.05	03-AUG-18
Surrogate: 2-Fluorobiphenyl			107.1		%		50-140	03-AUG-18
Surrogate: p-Terphenyl d14			106.2		%		50-140	03-AUG-18
WG2836404-4 MS		**WG2836404-5**						
1-Methylnaphthalene			89.6		%		50-140	03-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-4 MS		**WG2836404-5**						
2-Methylnaphthalene			89.1		%		50-140	03-AUG-18
Acenaphthene			88.4		%		50-140	03-AUG-18
Acenaphthylene			81.7		%		50-140	03-AUG-18
Anthracene			79.0		%		50-140	03-AUG-18
Benzo(a)anthracene			90.1		%		50-140	03-AUG-18
Benzo(a)pyrene			85.0		%		50-140	03-AUG-18
Benzo(b)fluoranthene			83.5		%		50-140	03-AUG-18
Benzo(g,h,i)perylene			76.3		%		50-140	03-AUG-18
Benzo(k)fluoranthene			83.7		%		50-140	03-AUG-18
Chrysene			82.4		%		50-140	03-AUG-18
Dibenzo(ah)anthracene			77.3		%		50-140	03-AUG-18
Fluoranthene			88.5		%		50-140	03-AUG-18
Fluorene			84.8		%		50-140	03-AUG-18
Indeno(1,2,3-cd)pyrene			84.3		%		50-140	03-AUG-18
Naphthalene			87.5		%		50-140	03-AUG-18
Phenanthrene			91.4		%		50-140	03-AUG-18
Pyrene			88.3		%		50-140	03-AUG-18
PH-WT	**Soil**							
Batch R4152670								
WG2837006-1 DUP		**L2137149-12**						
pH		11.53	11.52	J	pH units	0.01	0.3	01-AUG-18
WG2838317-1 LCS								
pH			6.95		pH units		6.9-7.1	01-AUG-18
SAR-R511-WT	**Soil**							
Batch R4157473								
WG2839068-4 DUP		**WG2839068-3**						
Calcium (Ca)		2.4	2.5		mg/L	2.3	30	02-AUG-18
Sodium (Na)		18.5	18.4		mg/L	0.8	30	02-AUG-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	02-AUG-18
WG2839068-2 IRM		**WT SAR2**						
Calcium (Ca)			126.8		%		70-130	02-AUG-18
Sodium (Na)			125.8		%		70-130	02-AUG-18
Magnesium (Mg)			113.4		%		70-130	02-AUG-18
WG2839068-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R4157473								
WG2839068-1 MB								
Calcium (Ca)			<1.0		mg/L		1	02-AUG-18
Sodium (Na)			<1.0		mg/L		1	02-AUG-18
Magnesium (Mg)			<1.0		mg/L		1	02-AUG-18
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-4 DUP		**WG2833040-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	31-JUL-18
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	31-JUL-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	31-JUL-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	31-JUL-18
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-4 DUP		**WG2833040-3**						
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	31-JUL-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	31-JUL-18
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	31-JUL-18
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	31-JUL-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	31-JUL-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	31-JUL-18
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	31-JUL-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	31-JUL-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	31-JUL-18
WG2833040-2 LCS								
1,1,1,2-Tetrachloroethane			99.5		%		60-130	31-JUL-18
1,1,2,2-Tetrachloroethane			98.2		%		60-130	31-JUL-18
1,1,1-Trichloroethane			103.5		%		60-130	31-JUL-18
1,1,2-Trichloroethane			99.5		%		60-130	31-JUL-18
1,1-Dichloroethane			103.7		%		60-130	31-JUL-18
1,1-Dichloroethylene			97.5		%		60-130	31-JUL-18
1,2-Dibromoethane			98.9		%		70-130	31-JUL-18
1,2-Dichlorobenzene			105.8		%		70-130	31-JUL-18
1,2-Dichloroethane			101.5		%		60-130	31-JUL-18
1,2-Dichloropropane			100.2		%		70-130	31-JUL-18
1,3-Dichlorobenzene			106.6		%		70-130	31-JUL-18
1,4-Dichlorobenzene			108.1		%		70-130	31-JUL-18
Acetone			96.2		%		60-140	31-JUL-18
Benzene			105.2		%		70-130	31-JUL-18
Bromodichloromethane			104.5		%		50-140	31-JUL-18
Bromoform			99.4		%		70-130	31-JUL-18
Bromomethane			88.2		%		50-140	31-JUL-18
Carbon tetrachloride			103.8		%		70-130	31-JUL-18
Chlorobenzene			104.5		%		70-130	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-2 LCS								
Chloroform			105.3		%		70-130	31-JUL-18
cis-1,2-Dichloroethylene			105.2		%		70-130	31-JUL-18
cis-1,3-Dichloropropene			107.4		%		70-130	31-JUL-18
Dibromochloromethane			99.5		%		60-130	31-JUL-18
Dichlorodifluoromethane			101.6		%		50-140	31-JUL-18
Ethylbenzene			93.9		%		70-130	31-JUL-18
n-Hexane			108.7		%		70-130	31-JUL-18
Methylene Chloride			105.4		%		70-130	31-JUL-18
MTBE			104.4		%		70-130	31-JUL-18
m+p-Xylenes			101.3		%		70-130	31-JUL-18
Methyl Ethyl Ketone			97.1		%		60-140	31-JUL-18
Methyl Isobutyl Ketone			94.7		%		60-140	31-JUL-18
o-Xylene			93.2		%		70-130	31-JUL-18
Styrene			99.96		%		70-130	31-JUL-18
Tetrachloroethylene			106.0		%		60-130	31-JUL-18
Toluene			97.3		%		70-130	31-JUL-18
trans-1,2-Dichloroethylene			103.2		%		60-130	31-JUL-18
trans-1,3-Dichloropropene			97.6		%		70-130	31-JUL-18
Trichloroethylene			111.2		%		60-130	31-JUL-18
Trichlorofluoromethane			114.4		%		50-140	31-JUL-18
Vinyl chloride			98.5		%		60-140	31-JUL-18
WG2833040-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	31-JUL-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	31-JUL-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	31-JUL-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	31-JUL-18
1,1-Dichloroethane			<0.050		ug/g		0.05	31-JUL-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	31-JUL-18
1,2-Dibromoethane			<0.050		ug/g		0.05	31-JUL-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	31-JUL-18
1,2-Dichloroethane			<0.050		ug/g		0.05	31-JUL-18
1,2-Dichloropropane			<0.050		ug/g		0.05	31-JUL-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	31-JUL-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-1 MB								
Acetone			<0.50		ug/g		0.5	31-JUL-18
Benzene			<0.0068		ug/g		0.0068	31-JUL-18
Bromodichloromethane			<0.050		ug/g		0.05	31-JUL-18
Bromoform			<0.050		ug/g		0.05	31-JUL-18
Bromomethane			<0.050		ug/g		0.05	31-JUL-18
Carbon tetrachloride			<0.050		ug/g		0.05	31-JUL-18
Chlorobenzene			<0.050		ug/g		0.05	31-JUL-18
Chloroform			<0.050		ug/g		0.05	31-JUL-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	31-JUL-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	31-JUL-18
Dibromochloromethane			<0.050		ug/g		0.05	31-JUL-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	31-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	31-JUL-18
n-Hexane			<0.050		ug/g		0.05	31-JUL-18
Methylene Chloride			<0.050		ug/g		0.05	31-JUL-18
MTBE			<0.050		ug/g		0.05	31-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	31-JUL-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	31-JUL-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	31-JUL-18
o-Xylene			<0.020		ug/g		0.02	31-JUL-18
Styrene			<0.050		ug/g		0.05	31-JUL-18
Tetrachloroethylene			<0.050		ug/g		0.05	31-JUL-18
Toluene			<0.080		ug/g		0.08	31-JUL-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	31-JUL-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	31-JUL-18
Trichloroethylene			<0.010		ug/g		0.01	31-JUL-18
Trichlorofluoromethane			<0.050		ug/g		0.05	31-JUL-18
Vinyl chloride			<0.020		ug/g		0.02	31-JUL-18
Surrogate: 1,4-Difluorobenzene			108.4		%		50-140	31-JUL-18
Surrogate: 4-Bromofluorobenzene			101.7		%		50-140	31-JUL-18
WG2833040-5 MS		**L2135948-1**						
1,1,1,2-Tetrachloroethane			106.6		%		50-140	31-JUL-18
1,1,2,2-Tetrachloroethane			103.4		%		50-140	31-JUL-18
1,1,1-Trichloroethane			106.9		%		50-140	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-5 MS		**L2135948-1**						
1,1,2-Trichloroethane			107.4		%		50-140	31-JUL-18
1,1-Dichloroethane			108.2		%		50-140	31-JUL-18
1,1-Dichloroethylene			99.5		%		50-140	31-JUL-18
1,2-Dibromoethane			106.8		%		50-140	31-JUL-18
1,2-Dichlorobenzene			111.2		%		50-140	31-JUL-18
1,2-Dichloroethane			107.7		%		50-140	31-JUL-18
1,2-Dichloropropane			106.4		%		50-140	31-JUL-18
1,3-Dichlorobenzene			110.6		%		50-140	31-JUL-18
1,4-Dichlorobenzene			111.9		%		50-140	31-JUL-18
Acetone			103.9		%		50-140	31-JUL-18
Benzene			109.6		%		50-140	31-JUL-18
Bromodichloromethane			109.9		%		50-140	31-JUL-18
Bromoform			105.8		%		50-140	31-JUL-18
Bromomethane			89.0		%		50-140	31-JUL-18
Carbon tetrachloride			106.5		%		50-140	31-JUL-18
Chlorobenzene			110.8		%		50-140	31-JUL-18
Chloroform			110.2		%		50-140	31-JUL-18
cis-1,2-Dichloroethylene			109.9		%		50-140	31-JUL-18
cis-1,3-Dichloropropene			109.7		%		50-140	31-JUL-18
Dibromochloromethane			107.3		%		50-140	31-JUL-18
Dichlorodifluoromethane			105.3		%		50-140	31-JUL-18
Ethylbenzene			100.3		%		50-140	31-JUL-18
n-Hexane			111.2		%		50-140	31-JUL-18
Methylene Chloride			109.8		%		50-140	31-JUL-18
MTBE			110.7		%		50-140	31-JUL-18
m+p-Xylenes			106.6		%		50-140	31-JUL-18
Methyl Ethyl Ketone			105.1		%		50-140	31-JUL-18
Methyl Isobutyl Ketone			101.3		%		50-140	31-JUL-18
o-Xylene			99.8		%		50-140	31-JUL-18
Styrene			106.1		%		50-140	31-JUL-18
Tetrachloroethylene			109.7		%		50-140	31-JUL-18
Toluene			103.8		%		50-140	31-JUL-18
trans-1,2-Dichloroethylene			104.9		%		50-140	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4151368								
WG2833040-5 MS		**L2135948-1**						
trans-1,3-Dichloropropene			101.7		%		50-140	31-JUL-18
Trichloroethylene			114.4		%		50-140	31-JUL-18
Trichlorofluoromethane			116.5		%		50-140	31-JUL-18
Vinyl chloride			100.0		%		50-140	31-JUL-18

Quality Control Report

Workorder: L2136825 Report Date: 12-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
E	Matrix Spike recovery outside ALS DQO due to heterogeneous analyte background in sample.
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

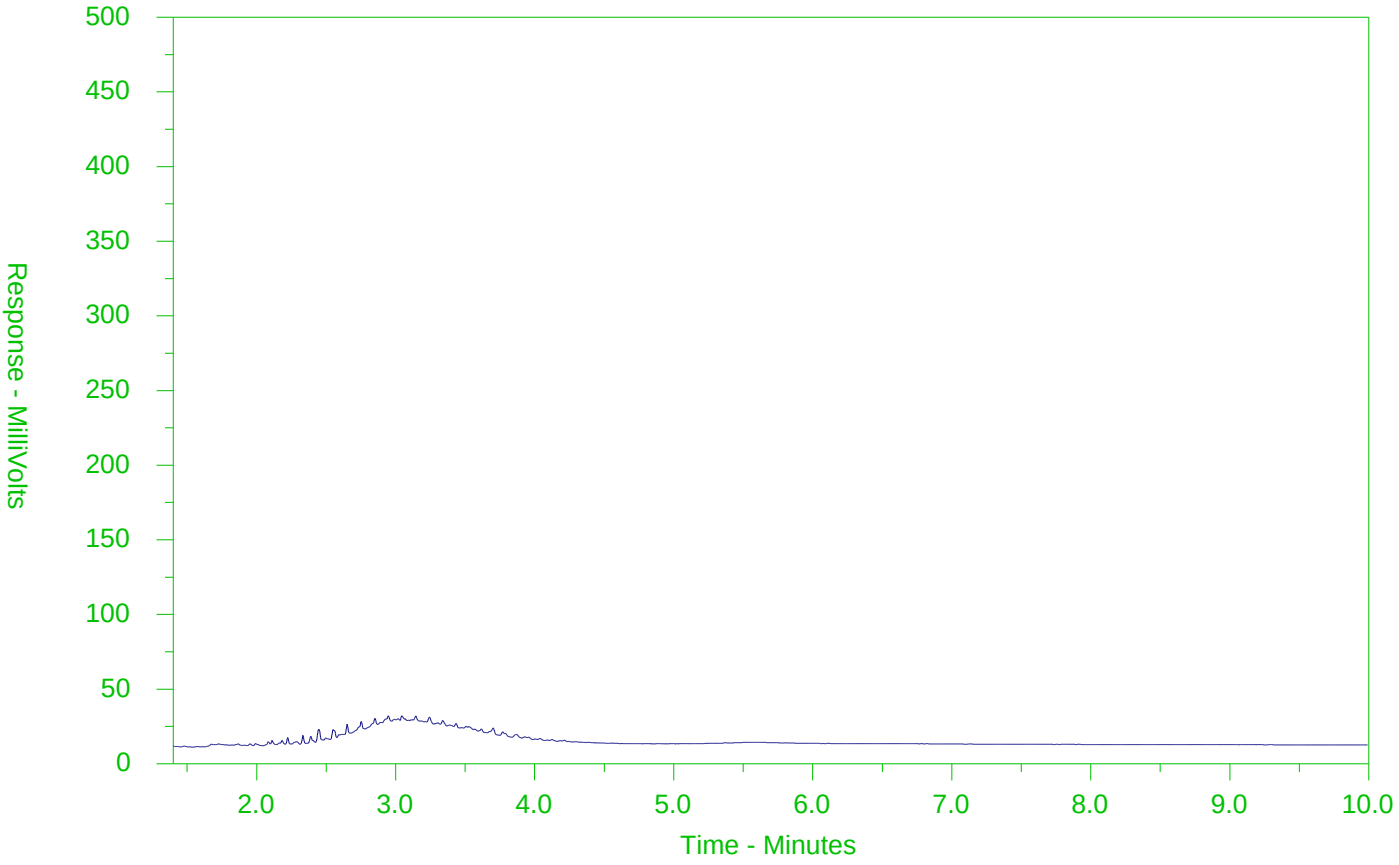
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2136825-8
Client Sample ID: MW18-129D-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

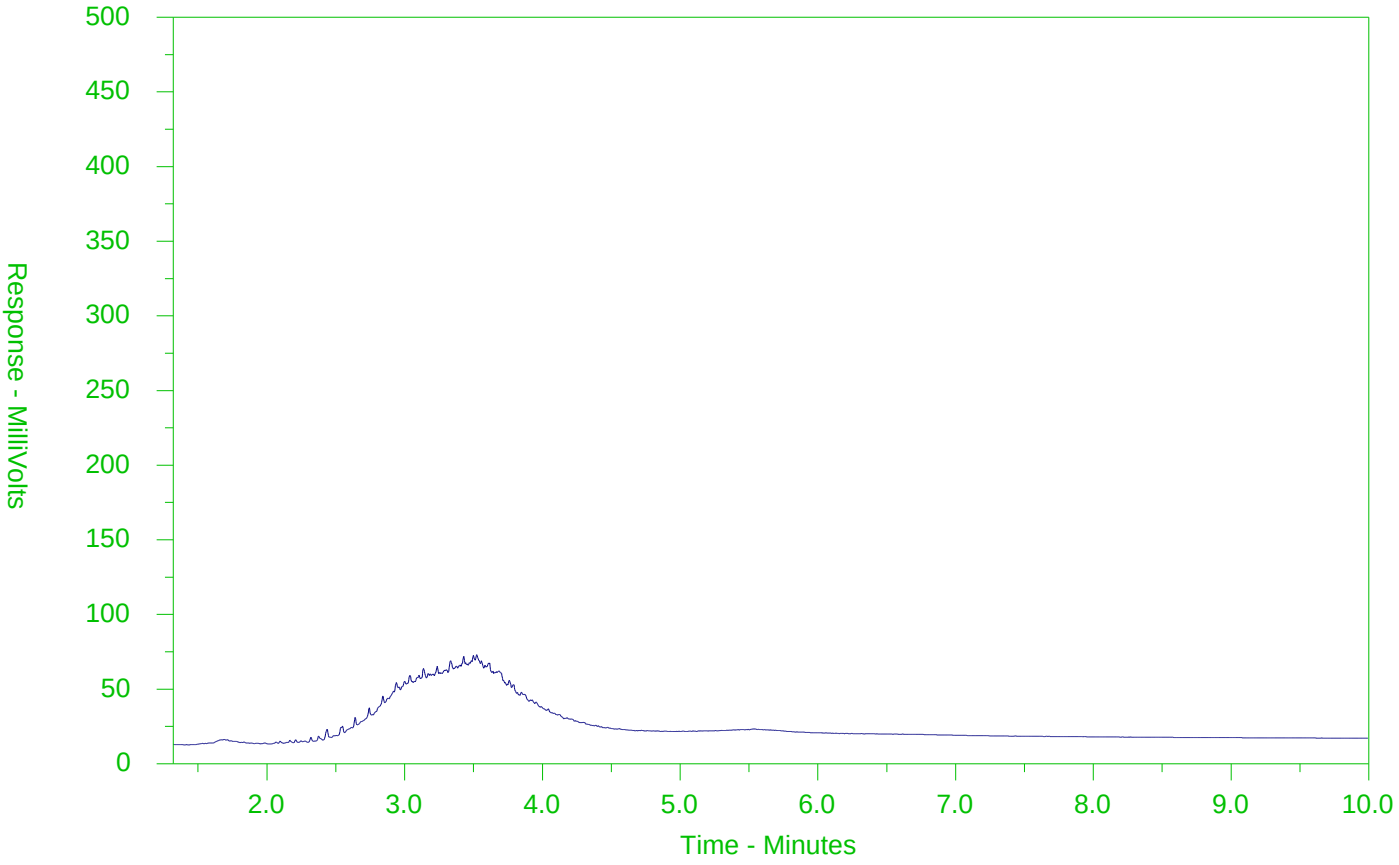
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2136825-10
Client Sample ID: BH18-206-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

L2136825-COFC

COC Number: 17 - 615353

Page of

ALS Environmental
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	CRA/M - JACOBS
Contact:	TANIA MCCARTHY
Phone:	519 579 5509
	Company address below will appear on the final report
Street:	72 VICTORIA STS SUITE 500
City/Province:	Kitchener ON
Postal Code:	N2G 4Y9

Report Format / Distribution

Select Report Format: [X] PDF [X] EXCEL [X] EDD (DIGITAL)
Quality Control (QC) Report with Report [X] YES [ ] NO
[X] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: Tania.Mccarthy@chlm.com
Email 2: Lucas.Alberts@chlm.com
Email 3:

[illegible]ow - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular (R) [ ] Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days): 4 day [P4-20%] [ ] / 3 day [P3-25%] [ ] / 2 day [P2-50%] [ ]
EMERGENCY: 1 Business day [E-100%] [ ] / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] [ ]
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	
Same as Report To	[X] YES [ ] NO
Copy of Invoice with Report	[X] YES [ ] NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax:
Email 2:

Project Information

ALS Account # / Quote #:
Job #:
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2136825 SC
ALS Contact: MM
Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC	Metals + ORG	PAH	PHC	Metals Only	Samples on Hold	Sample is hazardous (please provide further details)	Number of Containers
	BH18-204-1	23-JUL-18	09:10	Soil	X							
	DUP1 JUL23	23-JUL-18	00:00	Soil	X							
	BH18-204-2	23-JUL-18	09:30	Soil	X							
	MW18-129D-1	23-JUL-18	10:40	Soil		X						
	DUP2 JUL23	23-JUL-18	00:01	Soil		X						
	MW18-129D-2	23-JUL-18	11:00	Soil			X					
	DUP3 JUL23	23-JUL-18	00:02	Soil			X					
	MW18-129D-3	23-JUL-18	11:30	Soil				X				
	BH18-206-1	23-JUL-18	15:10	Soil		X						
	BH18-206-2	23-JUL-18	15:30	Soil				X				
	BH18-208-1	23-JUL-18	16:30	Soil			X		X			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [ ] NO
Are samples for human consumption/ use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Compare to O.REG. 153/04

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]
Ice Packs [ ] Ice Cubes [X] Custody seal intact Yes [ ] No [ ]
Cooling Initiated [ ]
INITIAL COOLER TEMPERATURES °C:
FINAL COOLER TEMPERATURES °C: 2.3

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Alberts	Date: 26-Jul-2018	Time: 10:50	Received by: PK	Date: 7-26-18	Time: 10:50	Received by: Andrea C.	Date: July 26	Time: 15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - LABORATORY COPY — YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
72 VICTORIA ST SOUTH
SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 26-JUL-18
Report Date: 19-APR-21 15:15 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2136911

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-615352
Legal Site Desc:

Comments: 19-APR-21:
L2136911-1, 6, 8 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136911-1 MW18-124S-1									
Sampled By: CLIENT on 24-JUL-18 @ 08:30									
Matrix: SOIL									
Physical Tests									
% Moisture	7.44		0.10	%	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	31-JUL-18	40	50	7.5	7.5
Arsenic (As)	2.7		1.0	ug/g	31-JUL-18	18	18	18	18
Barium (Ba)	16.6		1.0	ug/g	31-JUL-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	31-JUL-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21				
Boron (B)	<5.0		5.0	ug/g	31-JUL-18	120	120	120	120
Cadmium (Cd)	<0.50		0.50	ug/g	31-JUL-18	1.9	1.9	1.2	1.2
Calcium (Ca)	91000		50	ug/g	19-APR-21				
Chromium (Cr)	8.5		1.0	ug/g	31-JUL-18	160	160	160	160
Cobalt (Co)	3.3		1.0	ug/g	31-JUL-18	80	100	22	22
Copper (Cu)	11.0		1.0	ug/g	31-JUL-18	230	300	140	180
Iron (Fe)	11300		50	ug/g	19-APR-21				
Lead (Pb)	8.7		1.0	ug/g	31-JUL-18	120	120	120	120
Magnesium (Mg)	22300		20	ug/g	19-APR-21				
Molybdenum (Mo)	<1.0		1.0	ug/g	31-JUL-18	40	40	6.9	6.9
Nickel (Ni)	5.6		1.0	ug/g	31-JUL-18	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	31-JUL-18	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	31-JUL-18	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	31-JUL-18	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	31-JUL-18	33	33	23	23
Vanadium (V)	21.0		1.0	ug/g	31-JUL-18	86	86	86	86
Zinc (Zn)	48.7		5.0	ug/g	31-JUL-18	340	340	340	340
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	21	29	7.9	29
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	0.15	0.17	0.15	0.17
Anthracene	<0.050		0.050	ug/g	03-AUG-18	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.3	0.3	0.3	0.3
Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Chrysene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	0.1	0.1	0.1	0.1
Fluoranthene	<0.050		0.050	ug/g	03-AUG-18	9.6	9.6	0.69	0.69
Fluorene	<0.050		0.050	ug/g	03-AUG-18	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	0.76	0.95	0.38	0.48
1+2-Methylnaphthalenes	<0.042		0.042	ug/g	03-AUG-18	30	42	0.99	3.4
1-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
2-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	30	42	0.99	3.4
Naphthalene	<0.013		0.013	ug/g	03-AUG-18	9.6	28	0.6	0.75
Phenanthrene	<0.046		0.046	ug/g	03-AUG-18	12	16	6.2	7.8
Pyrene	<0.050		0.050	ug/g	03-AUG-18	96	96	78	78
Surrogate: 2-Fluorobiphenyl	105.8		50-140	%	03-AUG-18				
Surrogate: p-Terphenyl d14	111.3		50-140	%	03-AUG-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136911-2 MW18-124S-2									
Sampled By: CLIENT on 24-JUL-18 @ 08:45									
Matrix: SOIL									
Physical Tests									
% Moisture	8.55		0.10	%	02-AUG-18				
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	<0.50	DLM	0.50	ug/g	03-AUG-18	21	29	7.9	29
Acenaphthylene	<0.50	DLM	0.50	ug/g	03-AUG-18	**0.15	**0.17	**0.15	**0.17
Anthracene	<0.50	DLM	0.50	ug/g	03-AUG-18	0.67	0.74	0.67	0.74
Benzo(a)anthracene	<0.50	DLM	0.50	ug/g	03-AUG-18	0.96	0.96	0.5	0.63
Benzo(a)pyrene	<0.50	DLM	0.50	ug/g	03-AUG-18	**0.3	**0.3	**0.3	**0.3
Benzo(b)fluoranthene	<0.50	DLM	0.50	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Benzo(g,h,i)perylene	<0.50	DLM	0.50	ug/g	03-AUG-18	9.6	9.6	6.6	7.8
Benzo(k)fluoranthene	<0.50	DLM	0.50	ug/g	03-AUG-18	0.96	0.96	0.78	0.78
Chrysene	<0.50	DLM	0.50	ug/g	03-AUG-18	9.6	9.6	7	7.8
Dibenzo(ah)anthracene	<0.50	DLM	0.50	ug/g	03-AUG-18	**0.1	**0.1	**0.1	**0.1
Fluoranthene	<0.50	DLM	0.50	ug/g	03-AUG-18	9.6	9.6	0.69	0.69
Fluorene	<0.50	DLM	0.50	ug/g	03-AUG-18	62	69	62	69
Indeno(1,2,3-cd)pyrene	<0.50	DLM	0.50	ug/g	03-AUG-18	0.76	0.95	**0.38	**0.48
1+2-Methylnaphthalenes	<0.42		0.42	ug/g	03-AUG-18	30	42	0.99	3.4
1-Methylnaphthalene	<0.30	DLM	0.30	ug/g	03-AUG-18	30	42	0.99	3.4
2-Methylnaphthalene	<0.30	DLM	0.30	ug/g	03-AUG-18	30	42	0.99	3.4
Naphthalene	<0.13	DLM	0.13	ug/g	03-AUG-18	9.6	28	0.6	0.75
Phenanthrene	<0.46	DLM	0.46	ug/g	03-AUG-18	12	16	6.2	7.8
Pyrene	<0.50	DLM	0.50	ug/g	03-AUG-18	96	96	78	78
Surrogate: 2-Fluorobiphenyl	97.6		50-140	%	03-AUG-18				
Surrogate: p-Terphenyl d14	99.5		50-140	%	03-AUG-18				
L2136911-5 MW18-117S-1									
Sampled By: CLIENT on 25-JUL-18 @ 14:00									
Matrix: SOIL									
Physical Tests									
% Moisture	4.54		0.10	%	02-AUG-18				
Volatile Organic Compounds									
Benzene	0.0166		0.0068	ug/g	30-JUL-18	0.32	0.4	0.21	0.17
Ethylbenzene	0.033		0.018	ug/g	30-JUL-18	1.1	1.6	1.1	1.6
Toluene	0.101		0.080	ug/g	30-JUL-18	6.4	9	2.3	6
o-Xylene	0.098		0.020	ug/g	30-JUL-18				
m+p-Xylenes	0.116		0.030	ug/g	30-JUL-18				
Xylenes (Total)	0.214		0.050	ug/g	02-AUG-18	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	105.7		50-140	%	30-JUL-18				
Surrogate: 1,4-Difluorobenzene	108.7		50-140	%	30-JUL-18				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	30-JUL-18	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	02-AUG-18	55	65	55	65
F2 (C10-C16)	<50	DLM	50	ug/g	31-JUL-18	230	250	98	150
F3 (C16-C34)	670	DLM	250	ug/g	31-JUL-18	1700	2500	*300	1300
F4 (C34-C50)	490	DLM	250	ug/g	31-JUL-18	3300	6600	2800	5600
F4G-SG (GHH-Silica)	1330		250	ug/g	31-JUL-18	3300	6600	2800	5600
Total Hydrocarbons (C6-C50)	1160		360	ug/g	02-AUG-18				

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#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136911-5 MW18-117S-1									
Sampled By: CLIENT on 25-JUL-18 @ 14:00									
Matrix: SOIL									
Hydrocarbons									
Chrom. to baseline at nC50	NO			No Unit	31-JUL-18				
Surrogate: 2-Bromobenzotrifluoride	94.6		60-140	%	31-JUL-18				
Surrogate: 3,4-Dichlorotoluene	90.7		60-140	%	30-JUL-18				
L2136911-6 MW18-117S-2									
Sampled By: CLIENT on 25-JUL-18 @ 14:20									
Matrix: SOIL									
Physical Tests									
% Moisture	9.95		0.10	%	02-AUG-18				
Metals									
Antimony (Sb)	<1.0		1.0	ug/g	31-JUL-18	40	50	7.5	7.5
Arsenic (As)	1.5		1.0	ug/g	31-JUL-18	18	18	18	18
Barium (Ba)	27.8		1.0	ug/g	31-JUL-18	670	670	390	390
Beryllium (Be)	<0.50		0.50	ug/g	31-JUL-18	8	10	4	5
Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21				
Boron (B)	5.7		5.0	ug/g	31-JUL-18	120	120	120	120
Cadmium (Cd)	<0.50		0.50	ug/g	31-JUL-18	1.9	1.9	1.2	1.2
Calcium (Ca)	109000		50	ug/g	19-APR-21				
Chromium (Cr)	10.4		1.0	ug/g	31-JUL-18	160	160	160	160
Cobalt (Co)	5.9		1.0	ug/g	31-JUL-18	80	100	22	22
Copper (Cu)	14.9		1.0	ug/g	31-JUL-18	230	300	140	180
Iron (Fe)	18400		50	ug/g	19-APR-21				
Lead (Pb)	156		1.0	ug/g	31-JUL-18	*120	*120	*120	*120
Magnesium (Mg)	64000		20	ug/g	19-APR-21				
Molybdenum (Mo)	<1.0		1.0	ug/g	31-JUL-18	40	40	6.9	6.9
Nickel (Ni)	15.5		1.0	ug/g	31-JUL-18	270	340	100	130
Selenium (Se)	<1.0		1.0	ug/g	31-JUL-18	5.5	5.5	2.4	2.4
Silver (Ag)	<0.20		0.20	ug/g	31-JUL-18	40	50	20	25
Thallium (Tl)	<0.50		0.50	ug/g	31-JUL-18	3.3	3.3	1	1
Uranium (U)	<1.0		1.0	ug/g	31-JUL-18	33	33	23	23
Vanadium (V)	65.0		1.0	ug/g	31-JUL-18	86	86	86	86
Zinc (Zn)	536		5.0	ug/g	31-JUL-18	*340	*340	*340	*340
L2136911-7 DUP 1 JUL 25									
Sampled By: CLIENT on 25-JUL-18									
Matrix: SOIL									
Physical Tests									
% Moisture	8.90		0.10	%	01-AUG-18				
Volatile Organic Compounds									
Benzene	0.0132		0.0068	ug/g	30-JUL-18	0.32	0.4	0.21	0.17
Ethylbenzene	0.025		0.018	ug/g	30-JUL-18	1.1	1.6	1.1	1.6
Toluene	<0.080		0.080	ug/g	30-JUL-18	6.4	9	2.3	6
o-Xylene	0.077		0.020	ug/g	30-JUL-18				
m+p-Xylenes	0.103		0.030	ug/g	30-JUL-18				
Xylenes (Total)	0.179		0.050	ug/g	01-AUG-18	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	105.8		50-140	%	30-JUL-18				

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#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2136911-7	DUP 1 JUL 25									
Sampled By:	CLIENT on 25-JUL-18									
Matrix:	SOIL						#1	#2	#3	#4
Volatile Organic Compounds										
	Surrogate: 1,4-Difluorobenzene	109.3		50-140	%	30-JUL-18				
Hydrocarbons										
	F1 (C6-C10)	<5.0		5.0	ug/g	30-JUL-18	55	65	55	65
	F1-BTEX	<5.0		5.0	ug/g	01-AUG-18	55	65	55	65
	F2 (C10-C16)	<50	DLM	50	ug/g	31-JUL-18	230	250	98	150
	F3 (C16-C34)	800	DLM	250	ug/g	31-JUL-18	1700	2500	*300	1300
	F4 (C34-C50)	410	DLM	250	ug/g	31-JUL-18	3300	6600	2800	5600
	F4G-SG (GHH-Silica)	980		250	ug/g	31-JUL-18	3300	6600	2800	5600
	Total Hydrocarbons (C6-C50)	1220		360	ug/g	01-AUG-18				
	Chrom. to baseline at nC50	NO			No Unit	31-JUL-18				
	Surrogate: 2-Bromobenzotrifluoride	95.4		60-140	%	31-JUL-18				
	Surrogate: 3,4-Dichlorotoluene	80.1		60-140	%	30-JUL-18				
L2136911-8	DUP 2 JUL 25									
Sampled By:	CLIENT on 25-JUL-18 @ 00:01									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										
	% Moisture	15.6		0.10	%	02-AUG-18				
Metals										
	Antimony (Sb)	<1.0		1.0	ug/g	31-JUL-18	40	50	7.5	7.5
	Arsenic (As)	1.5		1.0	ug/g	31-JUL-18	18	18	18	18
	Barium (Ba)	24.6		1.0	ug/g	31-JUL-18	670	670	390	390
	Beryllium (Be)	<0.50		0.50	ug/g	31-JUL-18	8	10	4	5
	Bismuth (Bi)	<1.0		1.0	ug/g	19-APR-21				
	Boron (B)	7.5		5.0	ug/g	31-JUL-18	120	120	120	120
	Cadmium (Cd)	<0.50		0.50	ug/g	31-JUL-18	1.9	1.9	1.2	1.2
	Calcium (Ca)	106000		50	ug/g	19-APR-21				
	Chromium (Cr)	10.2		1.0	ug/g	31-JUL-18	160	160	160	160
	Cobalt (Co)	3.9		1.0	ug/g	31-JUL-18	80	100	22	22
	Copper (Cu)	11.1		1.0	ug/g	31-JUL-18	230	300	140	180
	Iron (Fe)	14100		50	ug/g	19-APR-21				
	Lead (Pb)	121		1.0	ug/g	31-JUL-18	*120	*120	*120	*120
	Magnesium (Mg)	64000		20	ug/g	19-APR-21				
	Molybdenum (Mo)	<1.0		1.0	ug/g	31-JUL-18	40	40	6.9	6.9
	Nickel (Ni)	11.0		1.0	ug/g	31-JUL-18	270	340	100	130
	Selenium (Se)	<1.0		1.0	ug/g	31-JUL-18	5.5	5.5	2.4	2.4
	Silver (Ag)	<0.20		0.20	ug/g	31-JUL-18	40	50	20	25
	Thallium (Tl)	<0.50		0.50	ug/g	31-JUL-18	3.3	3.3	1	1
	Uranium (U)	<1.0		1.0	ug/g	31-JUL-18	33	33	23	23
	Vanadium (V)	39.4		1.0	ug/g	31-JUL-18	86	86	86	86
	Zinc (Zn)	389		5.0	ug/g	31-JUL-18	*340	*340	*340	*340
L2136911-9	TRIP BLANK 2									
Sampled By:	CLIENT on 25-JUL-18 @ 15:00									
Matrix:	SOIL						#1	#2	#3	#4
Physical Tests										

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Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

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#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2	#3	#4
L2136911-9 TRIP BLANK 2 Sampled By: CLIENT on 25-JUL-18 @ 15:00 Matrix: SOIL									
Physical Tests									
% Moisture	<0.10		0.10	%	02-AUG-18				
Volatile Organic Compounds									
Benzene	<0.0068		0.0068	ug/g	29-JUL-18	0.32	0.4	0.21	0.17
Ethylbenzene	<0.018		0.018	ug/g	29-JUL-18	1.1	1.6	1.1	1.6
Toluene	<0.080		0.080	ug/g	29-JUL-18	6.4	9	2.3	6
o-Xylene	<0.020		0.020	ug/g	29-JUL-18				
m+p-Xylenes	<0.030		0.030	ug/g	29-JUL-18				
Xylenes (Total)	<0.050		0.050	ug/g	02-AUG-18	26	30	3.1	25
Surrogate: 4-Bromofluorobenzene	115.8		50-140	%	29-JUL-18				
Surrogate: 1,4-Difluorobenzene	117.0		50-140	%	29-JUL-18				
Hydrocarbons									
F1 (C6-C10)	<5.0		5.0	ug/g	29-JUL-18	55	65	55	65
F1-BTEX	<5.0		5.0	ug/g	02-AUG-18	55	65	55	65
Surrogate: 3,4-Dichlorotoluene	114.6		60-140	%	29-JUL-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Regulation 153/04 - April 15, 2011 Standards = [Suite] - T6-C/F-RPI-ICC

#1: T6-Soil-Ind/Com/Commu Property Use (Coarse)

#2: T6-Soil-Ind/Com/Commu Property Use (Fine)

#3: T6-Soil-Res/Park/Inst. Property Use (Coarse)

#4: T6-Soil-Res/Park/Inst. Property Use (Fine)

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BTX-511-HS-WT	Soil	BTEX-O.Reg 153/04 (July 2011)	SW846 8260

BTX is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT	Soil	F4G SG-O.Reg 153/04 (July 2011)	MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-615352

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Soil**							
Batch R4147212								
WG2834308-4 DUP		**WG2834308-3**						
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	29-JUL-18
Ethylbenzene		0.049	0.047		ug/g	4.2	40	29-JUL-18
m+p-Xylenes		0.221	0.231		ug/g	4.3	40	29-JUL-18
o-Xylene		1.07	1.10		ug/g	2.6	40	29-JUL-18
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	29-JUL-18
WG2834308-2 LCS								
Benzene			110.8		%		70-130	29-JUL-18
Ethylbenzene			111.5		%		70-130	29-JUL-18
m+p-Xylenes			110.9		%		70-130	29-JUL-18
o-Xylene			111.5		%		70-130	29-JUL-18
Toluene			112.0		%		70-130	29-JUL-18
WG2834308-1 MB								
Benzene			<0.0068		ug/g		0.0068	29-JUL-18
Ethylbenzene			<0.018		ug/g		0.018	29-JUL-18
m+p-Xylenes			<0.030		ug/g		0.03	29-JUL-18
o-Xylene			<0.020		ug/g		0.02	29-JUL-18
Toluene			<0.080		ug/g		0.08	29-JUL-18
Surrogate: 1,4-Difluorobenzene			108.0		%		50-140	29-JUL-18
Surrogate: 4-Bromofluorobenzene			107.9		%		50-140	29-JUL-18
WG2834308-5 MS		**L2135565-3**						
Benzene			109.5		%		60-140	29-JUL-18
Ethylbenzene			110.5		%		60-140	29-JUL-18
m+p-Xylenes			105.5		%		60-140	29-JUL-18
o-Xylene			81.8		%		60-140	29-JUL-18
Toluene			112.1		%		60-140	29-JUL-18
F1-HS-511-WT	**Soil**							
Batch R4147212								
WG2834308-4 DUP		**WG2834308-3**						
F1 (C6-C10)		227	238		ug/g	4.5	30	31-JUL-18
WG2834308-2 LCS								
F1 (C6-C10)			106.1		%		80-120	29-JUL-18
WG2834308-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	29-JUL-18
Surrogate: 3,4-Dichlorotoluene			115.8		%		60-140	29-JUL-18
WG2834308-6 MS		**L2135565-5**						

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4147212								
WG2834308-6 MS		**L2135565-5**						
F1 (C6-C10)			N/A	E	%		60-140	31-JUL-18
F2-F4-511-WT	**Soil**							
Batch R4151587								
WG2836073-3 DUP		**WG2836073-5**						
F2 (C10-C16)		<50	51	RPD-NA	ug/g	N/A	30	31-JUL-18
F3 (C16-C34)		800	1600	DUP-H,J	ug/g	800	500	31-JUL-18
F4 (C34-C50)		410	640	J	ug/g	230	500	31-JUL-18
WG2836073-2 LCS								
F2 (C10-C16)			99.1		%		80-120	31-JUL-18
F3 (C16-C34)			104.5		%		80-120	31-JUL-18
F4 (C34-C50)			102.7		%		80-120	31-JUL-18
WG2836073-1 MB								
F2 (C10-C16)			<10		ug/g		10	31-JUL-18
F3 (C16-C34)			<50		ug/g		50	31-JUL-18
F4 (C34-C50)			<50		ug/g		50	31-JUL-18
Surrogate: 2-Bromobenzotrifluoride			93.6		%		60-140	31-JUL-18
WG2836073-4 MS		**WG2836073-5**						
F2 (C10-C16)			107.6		%		60-140	31-JUL-18
F3 (C16-C34)			N/A	MS-B	%		-	31-JUL-18
F4 (C34-C50)			N/A	MS-B	%		-	31-JUL-18
F4G-ADD-511-WT	**Soil**							
Batch R4152356								
WG2838473-2 LCS								
F4G-SG (GHH-Silica)			64.0		%		60-140	31-JUL-18
WG2838473-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	31-JUL-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4151664								
WG2836882-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			96.6		%		70-130	31-JUL-18
Arsenic (As)			100.9		%		70-130	31-JUL-18
Barium (Ba)			109.1		%		70-130	31-JUL-18
Beryllium (Be)			102.7		%		70-130	31-JUL-18
Bismuth (Bi)			101.2		%		70-130	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4151664								
WG2836882-2 CRM		**WT-CANMET-TILL1**						
Boron (B)			3.2		mg/kg		0-8.2	31-JUL-18
Cadmium (Cd)			100.6		%		70-130	31-JUL-18
Calcium (Ca)			99.1		%		70-130	31-JUL-18
Chromium (Cr)			100.7		%		70-130	31-JUL-18
Cobalt (Co)			100.4		%		70-130	31-JUL-18
Copper (Cu)			101.2		%		70-130	31-JUL-18
Iron (Fe)			101.7		%		70-130	31-JUL-18
Lead (Pb)			102.0		%		70-130	31-JUL-18
Magnesium (Mg)			98.7		%		70-130	31-JUL-18
Molybdenum (Mo)			103.7		%		70-130	31-JUL-18
Nickel (Ni)			99.4		%		70-130	31-JUL-18
Selenium (Se)			0.33		mg/kg		0.11-0.51	31-JUL-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	31-JUL-18
Thallium (Tl)			0.130		mg/kg		0.077-0.18	31-JUL-18
Uranium (U)			94.5		%		70-130	31-JUL-18
Vanadium (V)			100.3		%		70-130	31-JUL-18
Zinc (Zn)			99.6		%		70-130	31-JUL-18
WG2836882-6 DUP		**WG2836882-5**						
Antimony (Sb)		0.12	<0.10	RPD-NA	ug/g	N/A	30	31-JUL-18
Arsenic (As)		2.16	2.12		ug/g	1.9	30	31-JUL-18
Barium (Ba)		65.3	67.2		ug/g	2.9	40	31-JUL-18
Beryllium (Be)		0.35	0.39		ug/g	9.5	30	31-JUL-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	31-JUL-18
Boron (B)		5.8	7.0		ug/g	18	30	31-JUL-18
Cadmium (Cd)		0.079	0.073		ug/g	7.0	30	31-JUL-18
Calcium (Ca)		85400	90600		ug/g	6.0	30	31-JUL-18
Chromium (Cr)		16.9	16.9		ug/g	0.0	30	31-JUL-18
Cobalt (Co)		5.85	5.70		ug/g	2.5	30	31-JUL-18
Copper (Cu)		11.1	10.8		ug/g	3.1	30	31-JUL-18
Iron (Fe)		15000	14700		ug/g	2.3	30	31-JUL-18
Lead (Pb)		5.28	5.56		ug/g	5.1	40	31-JUL-18
Magnesium (Mg)		9030	9070		ug/g	0.4	30	31-JUL-18
Molybdenum (Mo)		0.25	0.26		ug/g	2.6	40	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4151664								
WG2836882-6 DUP		**WG2836882-5**						
Nickel (Ni)		13.0	12.6		ug/g	3.4	30	31-JUL-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	31-JUL-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	31-JUL-18
Thallium (Tl)		0.105	0.117		ug/g	11	30	31-JUL-18
Uranium (U)		0.410	0.430		ug/g	4.7	30	31-JUL-18
Vanadium (V)		26.3	26.4		ug/g	0.5	30	31-JUL-18
Zinc (Zn)		31.8	30.6		ug/g	3.9	30	31-JUL-18
WG2836882-4 LCS								
Antimony (Sb)			96.8		%		80-120	31-JUL-18
Arsenic (As)			99.2		%		80-120	31-JUL-18
Barium (Ba)			98.7		%		80-120	31-JUL-18
Beryllium (Be)			89.1		%		80-120	31-JUL-18
Bismuth (Bi)			100.6		%		80-120	31-JUL-18
Boron (B)			88.6		%		80-120	31-JUL-18
Cadmium (Cd)			102.3		%		80-120	31-JUL-18
Calcium (Ca)			90.7		%		80-120	31-JUL-18
Chromium (Cr)			98.4		%		80-120	31-JUL-18
Cobalt (Co)			97.6		%		80-120	31-JUL-18
Copper (Cu)			97.0		%		80-120	31-JUL-18
Iron (Fe)			96.6		%		80-120	31-JUL-18
Lead (Pb)			102.8		%		80-120	31-JUL-18
Magnesium (Mg)			98.9		%		80-120	31-JUL-18
Molybdenum (Mo)			92.8		%		80-120	31-JUL-18
Nickel (Ni)			97.5		%		80-120	31-JUL-18
Selenium (Se)			96.2		%		80-120	31-JUL-18
Silver (Ag)			99.6		%		80-120	31-JUL-18
Thallium (Tl)			100.0		%		80-120	31-JUL-18
Uranium (U)			99.8		%		80-120	31-JUL-18
Vanadium (V)			102.0		%		80-120	31-JUL-18
Zinc (Zn)			93.0		%		80-120	31-JUL-18
WG2836882-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	31-JUL-18
Arsenic (As)			<0.10		mg/kg		0.1	31-JUL-18
Barium (Ba)			<0.50		mg/kg		0.5	31-JUL-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4151664								
WG2836882-1 MB								
Beryllium (Be)			<0.10		mg/kg		0.1	31-JUL-18
Bismuth (Bi)			<0.20		mg/kg		0.2	31-JUL-18
Boron (B)			<5.0		mg/kg		5	31-JUL-18
Cadmium (Cd)			<0.020		mg/kg		0.02	31-JUL-18
Calcium (Ca)			<50		mg/kg		50	31-JUL-18
Chromium (Cr)			<0.50		mg/kg		0.5	31-JUL-18
Cobalt (Co)			<0.10		mg/kg		0.1	31-JUL-18
Copper (Cu)			<0.50		mg/kg		0.5	31-JUL-18
Iron (Fe)			<50		mg/kg		50	31-JUL-18
Lead (Pb)			<0.50		mg/kg		0.5	31-JUL-18
Magnesium (Mg)			<20		mg/kg		20	31-JUL-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	31-JUL-18
Nickel (Ni)			<0.50		mg/kg		0.5	31-JUL-18
Selenium (Se)			<0.20		mg/kg		0.2	31-JUL-18
Silver (Ag)			<0.10		mg/kg		0.1	31-JUL-18
Thallium (Tl)			<0.050		mg/kg		0.05	31-JUL-18
Uranium (U)			<0.050		mg/kg		0.05	31-JUL-18
Vanadium (V)			<0.20		mg/kg		0.2	31-JUL-18
Zinc (Zn)			<2.0		mg/kg		2	31-JUL-18
MOISTURE-WT	**Soil**							
Batch R4152106								
WG2837978-3 DUP		**L2137149-1**						
% Moisture		6.56	6.69		%	2.0	20	01-AUG-18
WG2837978-2 LCS								
% Moisture			99.7		%		90-110	01-AUG-18
WG2837978-1 MB								
% Moisture			<0.10		%		0.1	01-AUG-18
Batch R4153271								
WG2838177-3 DUP		**L2138579-6**						
% Moisture		11.9	12.0		%	0.8	20	02-AUG-18
WG2838177-2 LCS								
% Moisture			102.2		%		90-110	02-AUG-18
WG2838177-1 MB								
% Moisture			<0.10		%		0.1	02-AUG-18
PAH-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-3 DUP		**WG2836404-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-AUG-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	03-AUG-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	03-AUG-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	03-AUG-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	03-AUG-18
WG2836404-2 LCS								
1-Methylnaphthalene			91.5		%		50-140	03-AUG-18
2-Methylnaphthalene			92.1		%		50-140	03-AUG-18
Acenaphthene			90.6		%		50-140	03-AUG-18
Acenaphthylene			84.3		%		50-140	03-AUG-18
Anthracene			84.7		%		50-140	03-AUG-18
Benzo(a)anthracene			89.9		%		50-140	03-AUG-18
Benzo(a)pyrene			85.9		%		50-140	03-AUG-18
Benzo(b)fluoranthene			94.7		%		50-140	03-AUG-18
Benzo(g,h,i)perylene			80.8		%		50-140	03-AUG-18
Benzo(k)fluoranthene			88.9		%		50-140	03-AUG-18
Chrysene			86.2		%		50-140	03-AUG-18
Dibenzo(ah)anthracene			81.6		%		50-140	03-AUG-18
Fluoranthene			88.6		%		50-140	03-AUG-18
Fluorene			86.5		%		50-140	03-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-2 LCS								
Indeno(1,2,3-cd)pyrene			88.6		%		50-140	03-AUG-18
Naphthalene			89.6		%		50-140	03-AUG-18
Phenanthrene			90.3		%		50-140	03-AUG-18
Pyrene			88.9		%		50-140	03-AUG-18
WG2836404-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	03-AUG-18
2-Methylnaphthalene			<0.030		ug/g		0.03	03-AUG-18
Acenaphthene			<0.050		ug/g		0.05	03-AUG-18
Acenaphthylene			<0.050		ug/g		0.05	03-AUG-18
Anthracene			<0.050		ug/g		0.05	03-AUG-18
Benzo(a)anthracene			<0.050		ug/g		0.05	03-AUG-18
Benzo(a)pyrene			<0.050		ug/g		0.05	03-AUG-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	03-AUG-18
Benzo(k)fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Chrysene			<0.050		ug/g		0.05	03-AUG-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	03-AUG-18
Fluoranthene			<0.050		ug/g		0.05	03-AUG-18
Fluorene			<0.050		ug/g		0.05	03-AUG-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	03-AUG-18
Naphthalene			<0.013		ug/g		0.013	03-AUG-18
Phenanthrene			<0.046		ug/g		0.046	03-AUG-18
Pyrene			<0.050		ug/g		0.05	03-AUG-18
Surrogate: 2-Fluorobiphenyl			107.1		%		50-140	03-AUG-18
Surrogate: p-Terphenyl d14			106.2		%		50-140	03-AUG-18
WG2836404-4 MS		**WG2836404-5**						
1-Methylnaphthalene			89.6		%		50-140	03-AUG-18
2-Methylnaphthalene			89.1		%		50-140	03-AUG-18
Acenaphthene			88.4		%		50-140	03-AUG-18
Acenaphthylene			81.7		%		50-140	03-AUG-18
Anthracene			79.0		%		50-140	03-AUG-18
Benzo(a)anthracene			90.1		%		50-140	03-AUG-18
Benzo(a)pyrene			85.0		%		50-140	03-AUG-18
Benzo(b)fluoranthene			83.5		%		50-140	03-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4157808								
WG2836404-4 MS		**WG2836404-5**						
Benzo(g,h,i)perylene			76.3		%		50-140	03-AUG-18
Benzo(k)fluoranthene			83.7		%		50-140	03-AUG-18
Chrysene			82.4		%		50-140	03-AUG-18
Dibenzo(ah)anthracene			77.3		%		50-140	03-AUG-18
Fluoranthene			88.5		%		50-140	03-AUG-18
Fluorene			84.8		%		50-140	03-AUG-18
Indeno(1,2,3-cd)pyrene			84.3		%		50-140	03-AUG-18
Naphthalene			87.5		%		50-140	03-AUG-18
Phenanthrene			91.4		%		50-140	03-AUG-18
Pyrene			88.3		%		50-140	03-AUG-18

Quality Control Report

Workorder: L2136911 Report Date: 19-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST SOUTH SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DUP-H,J	Duplicate results outside ALS DQO, due to sample heterogeneity. Duplicate results and limits are expressed in terms of absolute difference.
E	Matrix Spike recovery outside ALS DQO due to heterogeneous analyte background in sample.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

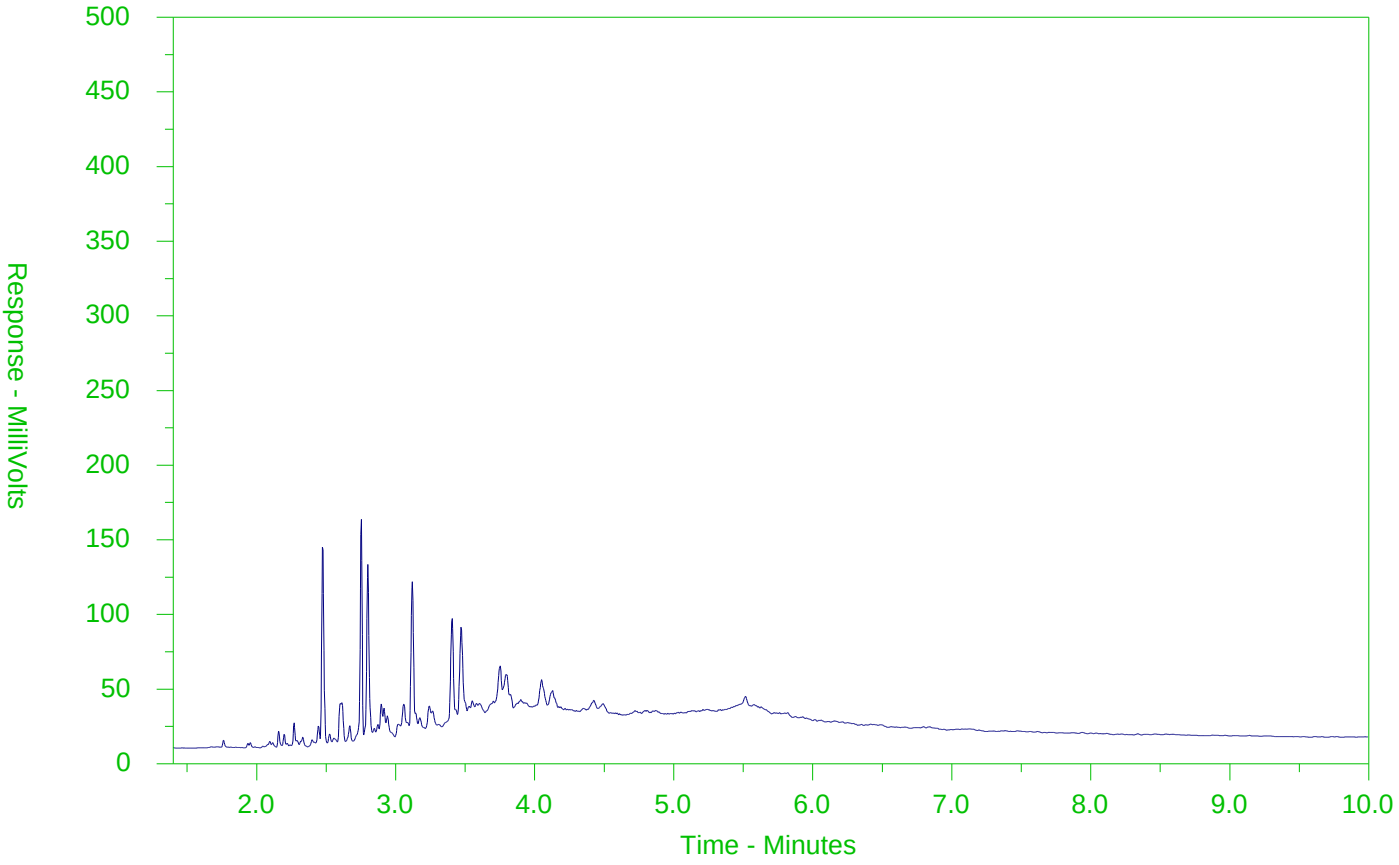
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2136911-5
Client Sample ID: MW18-117S-1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

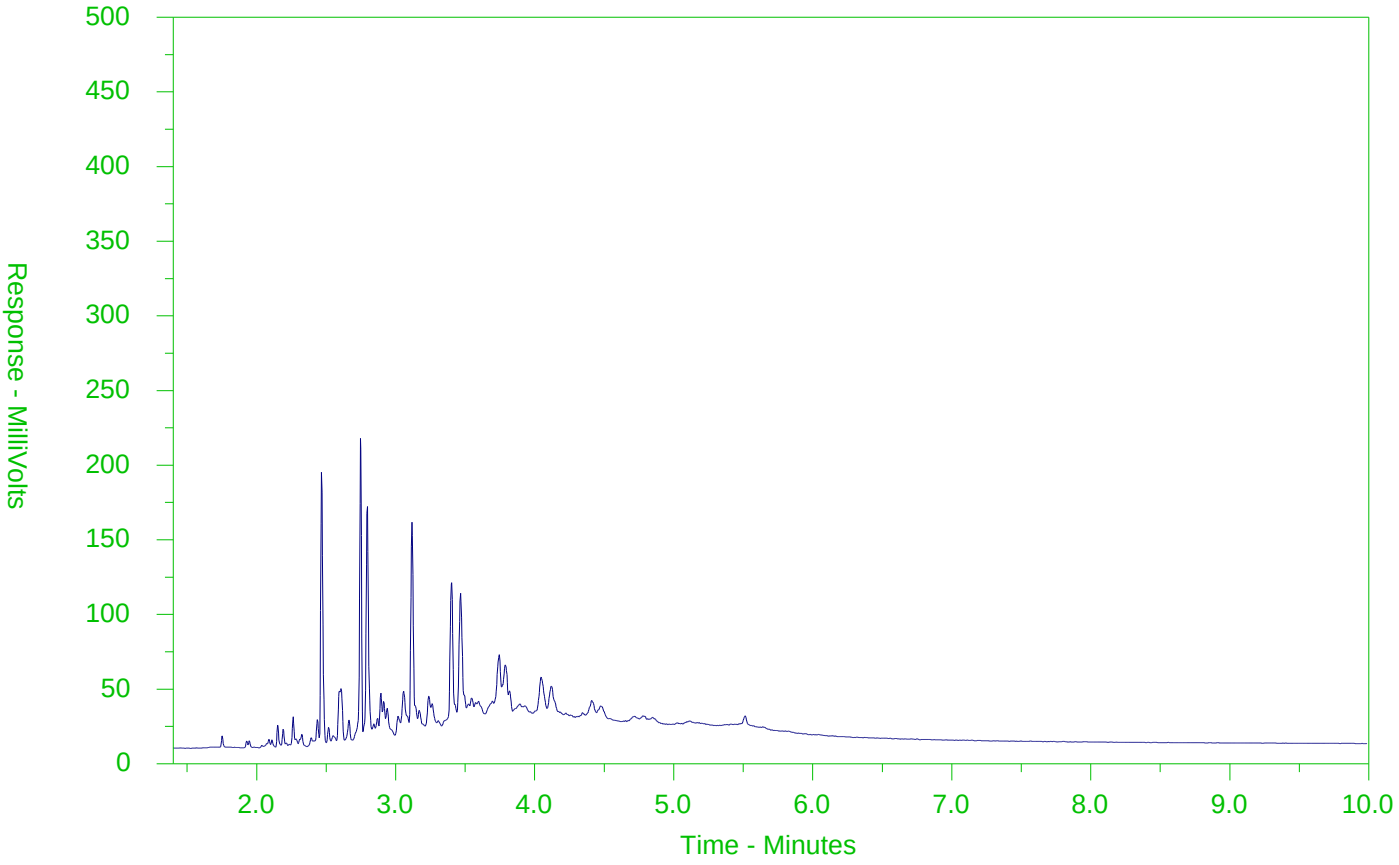
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2136911-7
Client Sample ID: DUP 1 JUL 25



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2136911-COFC

COC Number 17 - 615352

Page of

Report To	Contact and company name below will appear on the final report	Report Format	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Company	OAEM - JACOBS	Select Report Format: ☒ PDF ☒ EXCEL ☒ EDD (DIGITAL)	PRIORITY (Business days): 4 day [P4-20%] ☐ 3 day [P3-25%] ☐ 2 day [P2-50%] ☐
Contact:	TANIA MCCARTHY	Quality Control (QC) Report with Report ☒ YES ☐ NO	EMERGENCY: 1 Business day [E-100%] ☐ Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)) ☐
Phone:	519 579 3500	☒ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 VICTORIA ST. S. SUITE 300	Email 1 or Fax: Tania.McCarthy@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	KITCHENER - ON	Email 2: lucas.ribeiro@ch2m.com	
Postal Code:	N2G 4Y9	Email 3	
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☒ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center	PO#
Job #:		Major/Minor Code	Routing Code
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2136911 RK 200	ALS Contact: Matthy	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metals Only	PAH	PHC	BTEX	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW18-1245-1	24-JUL-18	09:30	Soil	X	X					
2	MW19-1245-2	24-JUL-18	09:45	Soil		X					
3	MW19-1145-1	25-JUL-18	10:45	Soil			X		X		
4	MW19-1145-2	25-JUL-18	10:55	Soil			X		X		
5	MW18-1175-1	25-JUL-18	14:00	Soil			X	X			
6	MW18-1175-2	25-JUL-18	14:20	Soil	X						
7	DUP 1 JUL 25	25-JUL-18	00:00	Soil			X	X			
8	DUP 2 JUL 25	25-JUL-18	00:01	Soil	X						
9	TRIP BLANK 2	26-JUL-18	15:00	Soil Blank							

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	Compare To O. Reg. 153/04
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No	☐
Ice Packs ☐ Ice Cubes ☒		Custody seal intact	Yes ☐	No	☐
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Ribeiro	Date:	Time:	Received by: RK	Date: 7-26-18	Time: 12:50	Received by: Andrea C	Date: July 26	Time: 15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

White Paper Co 604-951-5600

CH2M HILL CANADA LIMITED
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 01-AUG-18
Report Date: 08-AUG-18 11:31 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2139225

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2139225-1 MW18-120D						
Sampled By: CLIENT on 30-JUL-18 @ 09:55						
Matrix: WATER						
Dissolved Metals						
Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
Antimony (Sb)-Dissolved	0.50		0.10	ug/L	02-AUG-18	6
Arsenic (As)-Dissolved	1.74		0.10	ug/L	02-AUG-18	25
Barium (Ba)-Dissolved	67.8		0.10	ug/L	02-AUG-18	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
Boron (B)-Dissolved	67		10	ug/L	02-AUG-18	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
Cobalt (Co)-Dissolved	0.24		0.10	ug/L	02-AUG-18	3.8
Copper (Cu)-Dissolved	0.95		0.20	ug/L	02-AUG-18	69
Lead (Pb)-Dissolved	0.067		0.050	ug/L	02-AUG-18	10
Molybdenum (Mo)-Dissolved	5.96		0.050	ug/L	02-AUG-18	70
Nickel (Ni)-Dissolved	9.03		0.50	ug/L	02-AUG-18	100
Selenium (Se)-Dissolved	0.178		0.050	ug/L	02-AUG-18	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
Sodium (Na)-Dissolved	183000	DLHC	500	ug/L	02-AUG-18	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2
Uranium (U)-Dissolved	7.24		0.010	ug/L	02-AUG-18	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
Zinc (Zn)-Dissolved	3.0		1.0	ug/L	02-AUG-18	890
Volatile Organic Compounds						
Acetone	<30		30	ug/L	08-AUG-18	2700
Benzene	<0.50		0.50	ug/L	08-AUG-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	08-AUG-18	16
Bromoform	<5.0		5.0	ug/L	08-AUG-18	5
Bromomethane	<0.50		0.50	ug/L	08-AUG-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	08-AUG-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	08-AUG-18	30
Dibromochloromethane	<2.0		2.0	ug/L	08-AUG-18	25
Chloroform	<1.0		1.0	ug/L	08-AUG-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	08-AUG-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	08-AUG-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	08-AUG-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	08-AUG-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	08-AUG-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	08-AUG-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	08-AUG-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	08-AUG-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-AUG-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	08-AUG-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	08-AUG-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	08-AUG-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	08-AUG-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	08-AUG-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	08-AUG-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	08-AUG-18	2.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-1	MW18-120D						
Sampled By:	CLIENT on 30-JUL-18 @ 09:55						
Matrix:	WATER						#1
Volatile Organic Compounds							
	n-Hexane	<0.50		0.50	ug/L	08-AUG-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	08-AUG-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	08-AUG-18	640
	MTBE	<2.0		2.0	ug/L	08-AUG-18	15
	Styrene	<0.50		0.50	ug/L	08-AUG-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	08-AUG-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	08-AUG-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	08-AUG-18	0.5
	Toluene	<0.50		0.50	ug/L	08-AUG-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	08-AUG-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	08-AUG-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	08-AUG-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	08-AUG-18	150
	Vinyl chloride	<0.50		0.50	ug/L	08-AUG-18	0.5
	o-Xylene	<0.30		0.30	ug/L	08-AUG-18	
	m+p-Xylenes	<0.40		0.40	ug/L	08-AUG-18	
	Xylenes (Total)	<0.50		0.50	ug/L	08-AUG-18	72
	Surrogate: 4-Bromofluorobenzene	96.9		70-130	%	08-AUG-18	
	Surrogate: 1,4-Difluorobenzene	98.3		70-130	%	08-AUG-18	
L2139225-2	MW18-121D						
Sampled By:	CLIENT on 30-JUL-18 @ 11:50						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	03-AUG-18	2700
	Benzene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	03-AUG-18	16
	Bromoform	<5.0		5.0	ug/L	03-AUG-18	5
	Bromomethane	<0.50		0.50	ug/L	03-AUG-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	03-AUG-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	03-AUG-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	03-AUG-18	25
	Chloroform	1.5		1.0	ug/L	03-AUG-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	03-AUG-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	03-AUG-18	590
	1,1-Dichloroethane	1.82		0.50	ug/L	03-AUG-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	cis-1,2-Dichloroethylene	3.17		0.50	ug/L	03-AUG-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	03-AUG-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	03-AUG-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-2 MW18-121D						
Sampled By: CLIENT on 30-JUL-18 @ 11:50						
Matrix: WATER						#1
Volatile Organic Compounds						
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-AUG-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	03-AUG-18	2.4
n-Hexane	<0.50		0.50	ug/L	03-AUG-18	5
Methyl Ethyl Ketone	<20		20	ug/L	03-AUG-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	03-AUG-18	640
MTBE	<2.0		2.0	ug/L	03-AUG-18	15
Styrene	<0.50		0.50	ug/L	03-AUG-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
Toluene	0.53		0.50	ug/L	03-AUG-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	03-AUG-18	150
Vinyl chloride	0.67		0.50	ug/L	03-AUG-18	*0.5
o-Xylene	<0.30		0.30	ug/L	03-AUG-18	
m+p-Xylenes	0.43		0.40	ug/L	03-AUG-18	
Xylenes (Total)	<0.50		0.50	ug/L	03-AUG-18	72
Surrogate: 4-Bromofluorobenzene	96.9		70-130	%	03-AUG-18	
Surrogate: 1,4-Difluorobenzene	99.2		70-130	%	03-AUG-18	
L2139225-3 MW18-107D						
Sampled By: CLIENT on 30-JUL-18 @ 12:50						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	03-AUG-18	2700
Benzene	<0.50		0.50	ug/L	03-AUG-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	03-AUG-18	16
Bromoform	<5.0		5.0	ug/L	03-AUG-18	5
Bromomethane	<0.50		0.50	ug/L	03-AUG-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	03-AUG-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	03-AUG-18	30
Dibromochloromethane	<2.0		2.0	ug/L	03-AUG-18	25
Chloroform	1.3		1.0	ug/L	03-AUG-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	03-AUG-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	03-AUG-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
cis-1,2-Dichloroethylene	1.23		0.50	ug/L	03-AUG-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-3	MW18-107D						
Sampled By:	CLIENT on 30-JUL-18 @ 12:50						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Methylene Chloride	<5.0		5.0	ug/L	03-AUG-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	03-AUG-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-AUG-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	03-AUG-18	2.4
	n-Hexane	0.52		0.50	ug/L	03-AUG-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	03-AUG-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	03-AUG-18	640
	MTBE	<2.0		2.0	ug/L	03-AUG-18	15
	Styrene	<0.50		0.50	ug/L	03-AUG-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Toluene	<0.50		0.50	ug/L	03-AUG-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	03-AUG-18	150
	Vinyl chloride	<0.50		0.50	ug/L	03-AUG-18	0.5
	o-Xylene	0.42		0.30	ug/L	03-AUG-18	
	m+p-Xylenes	0.57		0.40	ug/L	03-AUG-18	
	Xylenes (Total)	0.99		0.50	ug/L	03-AUG-18	72
	Surrogate: 4-Bromofluorobenzene	96.1		70-130	%	03-AUG-18	
	Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	03-AUG-18	
L2139225-4	MW18-123D						
Sampled By:	CLIENT on 30-JUL-18 @ 14:05						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	03-AUG-18	2700
	Benzene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	03-AUG-18	16
	Bromoform	<5.0		5.0	ug/L	03-AUG-18	5
	Bromomethane	<0.50		0.50	ug/L	03-AUG-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	03-AUG-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	03-AUG-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	03-AUG-18	25
	Chloroform	<1.0		1.0	ug/L	03-AUG-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	03-AUG-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	03-AUG-18	590
	1,1-Dichloroethane	0.89		0.50	ug/L	03-AUG-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-4	MW18-123D						
Sampled By:	CLIENT on 30-JUL-18 @ 14:05						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,1-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	cis-1,2-Dichloroethylene	2.78		0.50	ug/L	03-AUG-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	03-AUG-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	03-AUG-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-AUG-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	03-AUG-18	2.4
	n-Hexane	<0.50		0.50	ug/L	03-AUG-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	03-AUG-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	03-AUG-18	640
	MTBE	<2.0		2.0	ug/L	03-AUG-18	15
	Styrene	<0.50		0.50	ug/L	03-AUG-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Toluene	0.84		0.50	ug/L	03-AUG-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	03-AUG-18	150
	Vinyl chloride	<0.50		0.50	ug/L	03-AUG-18	0.5
	o-Xylene	0.33		0.30	ug/L	03-AUG-18	
	m+p-Xylenes	0.45		0.40	ug/L	03-AUG-18	
	Xylenes (Total)	0.78		0.50	ug/L	03-AUG-18	72
	Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	03-AUG-18	
	Surrogate: 1,4-Difluorobenzene	99.3		70-130	%	03-AUG-18	
L2139225-5	MW18-128D						
Sampled By:	CLIENT on 30-JUL-18 @ 17:20						
Matrix:	WATER						#1
Hydrocarbons							
	F1 (C6-C10)	60		25	ug/L	03-AUG-18	420
	F2 (C10-C16)	<100		100	ug/L	02-AUG-18	150
	F3 (C16-C34)	<250		250	ug/L	02-AUG-18	500
	F4 (C34-C50)	<250		250	ug/L	02-AUG-18	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	03-AUG-18	
	Chrom. to baseline at nC50	YES			No Unit	02-AUG-18	
	Surrogate: 2-Bromobenzotrifluoride	97.8		60-140	%	02-AUG-18	
	Surrogate: 3,4-Dichlorotoluene	94.9		60-140	%	03-AUG-18	
L2139225-6	MW18-129D						
Sampled By:	CLIENT on 30-JUL-18 @ 16:55						
Matrix:	WATER						#1
Dissolved Metals							

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2139225-6	MW18-129D						
Sampled By:	CLIENT on 30-JUL-18 @ 16:55						
Matrix:	WATER						
Dissolved Metals							
	Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
	Antimony (Sb)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	6
	Arsenic (As)-Dissolved	20.7		0.10	ug/L	02-AUG-18	25
	Barium (Ba)-Dissolved	166		0.10	ug/L	02-AUG-18	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
	Boron (B)-Dissolved	76		10	ug/L	02-AUG-18	5000
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
	Cobalt (Co)-Dissolved	0.21		0.10	ug/L	02-AUG-18	3.8
	Copper (Cu)-Dissolved	<0.20		0.20	ug/L	02-AUG-18	69
	Lead (Pb)-Dissolved	1.06		0.050	ug/L	02-AUG-18	10
	Molybdenum (Mo)-Dissolved	2.35		0.050	ug/L	02-AUG-18	70
	Nickel (Ni)-Dissolved	2.76		0.50	ug/L	02-AUG-18	100
	Selenium (Se)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
	Sodium (Na)-Dissolved	35000		500	ug/L	02-AUG-18	490000
	Thallium (Tl)-Dissolved	0.032		0.010	ug/L	02-AUG-18	2
	Uranium (U)-Dissolved	2.26		0.010	ug/L	02-AUG-18	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
	Zinc (Zn)-Dissolved	156		1.0	ug/L	02-AUG-18	890
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	03-AUG-18	2700
	Benzene	4.57		0.50	ug/L	03-AUG-18	*0.5
	Bromodichloromethane	<2.0		2.0	ug/L	03-AUG-18	16
	Bromoform	<5.0		5.0	ug/L	03-AUG-18	5
	Bromomethane	<0.50		0.50	ug/L	03-AUG-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	03-AUG-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	03-AUG-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	03-AUG-18	25
	Chloroform	<1.0		1.0	ug/L	03-AUG-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	03-AUG-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	03-AUG-18	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	cis-1,2-Dichloroethylene	3.52		0.50	ug/L	03-AUG-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	03-AUG-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	03-AUG-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-AUG-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	03-AUG-18	2.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-6	MW18-129D						
Sampled By:	CLIENT on 30-JUL-18 @ 16:55						
Matrix:	WATER						#1
Volatile Organic Compounds							
	n-Hexane	<0.50		0.50	ug/L	03-AUG-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	03-AUG-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	03-AUG-18	640
	MTBE	<2.0		2.0	ug/L	03-AUG-18	15
	Styrene	<0.50		0.50	ug/L	03-AUG-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Toluene	<0.50		0.50	ug/L	03-AUG-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	03-AUG-18	150
	Vinyl chloride	4.93		0.50	ug/L	03-AUG-18	*0.5
	o-Xylene	<0.30		0.30	ug/L	03-AUG-18	
	m+p-Xylenes	<0.40		0.40	ug/L	03-AUG-18	
	Xylenes (Total)	<0.50		0.50	ug/L	03-AUG-18	72
	Surrogate: 4-Bromofluorobenzene	96.9		70-130	%	03-AUG-18	
	Surrogate: 1,4-Difluorobenzene	98.5		70-130	%	03-AUG-18	
L2139225-7	MW18-130D						
Sampled By:	CLIENT on 31-JUL-18 @ 09:55						
Matrix:	WATER						#1
Dissolved Metals							
	Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
	Antimony (Sb)-Dissolved	0.19		0.10	ug/L	02-AUG-18	6
	Arsenic (As)-Dissolved	8.33		0.10	ug/L	02-AUG-18	25
	Barium (Ba)-Dissolved	88.7		0.10	ug/L	02-AUG-18	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
	Boron (B)-Dissolved	63		10	ug/L	02-AUG-18	5000
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
	Cobalt (Co)-Dissolved	0.82		0.10	ug/L	02-AUG-18	3.8
	Copper (Cu)-Dissolved	0.92		0.20	ug/L	02-AUG-18	69
	Lead (Pb)-Dissolved	0.378		0.050	ug/L	02-AUG-18	10
	Molybdenum (Mo)-Dissolved	2.73		0.050	ug/L	02-AUG-18	70
	Nickel (Ni)-Dissolved	7.30		0.50	ug/L	02-AUG-18	100
	Selenium (Se)-Dissolved	0.090		0.050	ug/L	02-AUG-18	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
	Sodium (Na)-Dissolved	25400		500	ug/L	02-AUG-18	490000
	Thallium (Tl)-Dissolved	0.082		0.010	ug/L	02-AUG-18	2
	Uranium (U)-Dissolved	4.98		0.010	ug/L	02-AUG-18	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
	Zinc (Zn)-Dissolved	803		1.0	ug/L	02-AUG-18	890

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-8	MW18-132D						
Sampled By:	CLIENT on 31-JUL-18 @ 10:55						
Matrix:	WATER						#1
Dissolved Metals							
	Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
	Antimony (Sb)-Dissolved	0.22		0.10	ug/L	02-AUG-18	6
	Arsenic (As)-Dissolved	5.13		0.10	ug/L	02-AUG-18	25
	Barium (Ba)-Dissolved	202		0.10	ug/L	02-AUG-18	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
	Boron (B)-Dissolved	72		10	ug/L	02-AUG-18	5000
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
	Cobalt (Co)-Dissolved	0.15		0.10	ug/L	02-AUG-18	3.8
	Copper (Cu)-Dissolved	0.86		0.20	ug/L	02-AUG-18	69
	Lead (Pb)-Dissolved	1.16		0.050	ug/L	02-AUG-18	10
	Molybdenum (Mo)-Dissolved	3.02		0.050	ug/L	02-AUG-18	70
	Nickel (Ni)-Dissolved	1.79		0.50	ug/L	02-AUG-18	100
	Selenium (Se)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
	Sodium (Na)-Dissolved	41500		500	ug/L	02-AUG-18	490000
	Thallium (Tl)-Dissolved	0.028		0.010	ug/L	02-AUG-18	2
	Uranium (U)-Dissolved	3.78		0.010	ug/L	02-AUG-18	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
	Zinc (Zn)-Dissolved	212		1.0	ug/L	02-AUG-18	890
L2139225-9	MW18-133D						
Sampled By:	CLIENT on 31-JUL-18 @ 12:20						
Matrix:	WATER						#1
Dissolved Metals							
	Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
	Antimony (Sb)-Dissolved	0.29		0.10	ug/L	02-AUG-18	6
	Arsenic (As)-Dissolved	9.46		0.10	ug/L	02-AUG-18	25
	Barium (Ba)-Dissolved	102		0.10	ug/L	02-AUG-18	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
	Boron (B)-Dissolved	66		10	ug/L	02-AUG-18	5000
	Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
	Cobalt (Co)-Dissolved	0.16		0.10	ug/L	02-AUG-18	3.8
	Copper (Cu)-Dissolved	3.93		0.20	ug/L	02-AUG-18	69
	Lead (Pb)-Dissolved	1.92		0.050	ug/L	02-AUG-18	10
	Molybdenum (Mo)-Dissolved	3.81		0.050	ug/L	02-AUG-18	70
	Nickel (Ni)-Dissolved	3.22		0.50	ug/L	02-AUG-18	100
	Selenium (Se)-Dissolved	0.134		0.050	ug/L	02-AUG-18	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
	Sodium (Na)-Dissolved	96900		500	ug/L	02-AUG-18	490000
	Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	02-AUG-18	2
	Uranium (U)-Dissolved	4.08		0.010	ug/L	02-AUG-18	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
	Zinc (Zn)-Dissolved	473		1.0	ug/L	02-AUG-18	890

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-10	MW18-131S						
Sampled By:	CLIENT on 31-JUL-18 @ 13:20						
Matrix:	WATER						#1
Dissolved Metals							
	Dissolved Metals Filtration Location	FIELD			No Unit	02-AUG-18	
	Antimony (Sb)-Dissolved	0.20		0.10	ug/L	02-AUG-18	6
	Arsenic (As)-Dissolved	0.48		0.10	ug/L	02-AUG-18	25
	Barium (Ba)-Dissolved	38.8		0.10	ug/L	02-AUG-18	1000
	Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	02-AUG-18	4
	Boron (B)-Dissolved	52		10	ug/L	02-AUG-18	5000
	Cadmium (Cd)-Dissolved	0.014		0.010	ug/L	02-AUG-18	2.1
	Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	50
	Cobalt (Co)-Dissolved	1.03		0.10	ug/L	02-AUG-18	3.8
	Copper (Cu)-Dissolved	4.09		0.20	ug/L	02-AUG-18	69
	Lead (Pb)-Dissolved	0.079		0.050	ug/L	02-AUG-18	10
	Molybdenum (Mo)-Dissolved	1.43		0.050	ug/L	02-AUG-18	70
	Nickel (Ni)-Dissolved	7.68		0.50	ug/L	02-AUG-18	100
	Selenium (Se)-Dissolved	0.375		0.050	ug/L	02-AUG-18	10
	Silver (Ag)-Dissolved	<0.050		0.050	ug/L	02-AUG-18	1.2
	Sodium (Na)-Dissolved	13400		500	ug/L	02-AUG-18	490000
	Thallium (Tl)-Dissolved	0.614		0.010	ug/L	02-AUG-18	2
	Uranium (U)-Dissolved	3.41		0.010	ug/L	02-AUG-18	20
	Vanadium (V)-Dissolved	<0.50		0.50	ug/L	02-AUG-18	6.2
	Zinc (Zn)-Dissolved	1160	DLHC	10	ug/L	03-AUG-18	*890
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	03-AUG-18	420
	F2 (C10-C16)	<100		100	ug/L	02-AUG-18	150
	F3 (C16-C34)	<250		250	ug/L	02-AUG-18	500
	F4 (C34-C50)	<250		250	ug/L	02-AUG-18	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	03-AUG-18	
	Chrom. to baseline at nC50	YES			No Unit	02-AUG-18	
	Surrogate: 2-Bromobenzotrifluoride	93.4		60-140	%	02-AUG-18	
	Surrogate: 3,4-Dichlorotoluene	92.2		60-140	%	03-AUG-18	
L2139225-11	MW17-140D						
Sampled By:	CLIENT on 31-JUL-18 @ 13:15						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	03-AUG-18	4.1
	Acenaphthylene	<0.020		0.020	ug/L	03-AUG-18	1
	Anthracene	<0.020		0.020	ug/L	03-AUG-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	03-AUG-18	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	03-AUG-18	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	03-AUG-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Chrysene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	03-AUG-18	0.2
	Fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.41
	Fluorene	<0.020		0.020	ug/L	03-AUG-18	120

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2139225-11	MW17-140D						
Sampled By:	CLIENT on 31-JUL-18 @ 13:15						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	03-AUG-18	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	07-AUG-18	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2
	Naphthalene	<0.050		0.050	ug/L	03-AUG-18	7
	Phenanthrene	<0.020		0.020	ug/L	03-AUG-18	1
	Pyrene	<0.020		0.020	ug/L	03-AUG-18	4.1
	Surrogate: d10-Acenaphthene	100.9		60-140	%	03-AUG-18	
	Surrogate: d12-Chrysene	109.2		60-140	%	03-AUG-18	
	Surrogate: d8-Naphthalene	85.5		60-140	%	03-AUG-18	
	Surrogate: d10-Phenanthrene	106.5		60-140	%	03-AUG-18	
L2139225-12	MW17-100S						
Sampled By:	CLIENT on 31-JUL-18 @ 16:55						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	03-AUG-18	4.1
	Acenaphthylene	<0.020		0.020	ug/L	03-AUG-18	1
	Anthracene	<0.020		0.020	ug/L	03-AUG-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	03-AUG-18	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	03-AUG-18	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	03-AUG-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Chrysene	<0.020		0.020	ug/L	03-AUG-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	03-AUG-18	0.2
	Fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.41
	Fluorene	<0.020		0.020	ug/L	03-AUG-18	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	03-AUG-18	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	07-AUG-18	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2
	Naphthalene	<0.050		0.050	ug/L	03-AUG-18	7
	Phenanthrene	<0.020		0.020	ug/L	03-AUG-18	1
	Pyrene	<0.020		0.020	ug/L	03-AUG-18	4.1
	Surrogate: d10-Acenaphthene	98.0		60-140	%	03-AUG-18	
	Surrogate: d12-Chrysene	102.2		60-140	%	03-AUG-18	
	Surrogate: d8-Naphthalene	81.5		60-140	%	03-AUG-18	
	Surrogate: d10-Phenanthrene	102.1		60-140	%	03-AUG-18	
L2139225-13	DUP1						
Sampled By:	CLIENT on 31-JUL-18 @ 15:20						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	03-AUG-18	4.1
	Acenaphthylene	<0.020		0.020	ug/L	03-AUG-18	1

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2139225-13	DUP1									
Sampled By:	CLIENT on 31-JUL-18 @ 15:20									
Matrix:	WATER						#1			
Polycyclic Aromatic Hydrocarbons										
	Anthracene	<0.020		0.020	ug/L	03-AUG-18	1			
	Benzo(a)anthracene	<0.020		0.020	ug/L	03-AUG-18	1			
	Benzo(a)pyrene	<0.010		0.010	ug/L	03-AUG-18	0.01			
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1			
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	03-AUG-18	0.2			
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.1			
	Chrysene	<0.020		0.020	ug/L	03-AUG-18	0.1			
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	03-AUG-18	0.2			
	Fluoranthene	<0.020		0.020	ug/L	03-AUG-18	0.41			
	Fluorene	<0.020		0.020	ug/L	03-AUG-18	120			
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	03-AUG-18	0.2			
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	07-AUG-18	3.2			
	1-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2			
	2-Methylnaphthalene	<0.020		0.020	ug/L	03-AUG-18	3.2			
	Naphthalene	<0.050		0.050	ug/L	03-AUG-18	7			
	Phenanthrene	<0.020		0.020	ug/L	03-AUG-18	1			
	Pyrene	<0.020		0.020	ug/L	03-AUG-18	4.1			
	Surrogate: d10-Acenaphthene	96.6		60-140	%	03-AUG-18				
	Surrogate: d12-Chrysene	103.7		60-140	%	03-AUG-18				
	Surrogate: d8-Naphthalene	82.0		60-140	%	03-AUG-18				
	Surrogate: d10-Phenanthrene	104.4		60-140	%	03-AUG-18				
L2139225-14	TRIP BLANK									
Sampled By:	CLIENT on 31-JUL-18									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Acetone	<30		30	ug/L	03-AUG-18	2700			
	Benzene	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Bromodichloromethane	<2.0		2.0	ug/L	03-AUG-18	16			
	Bromoform	<5.0		5.0	ug/L	03-AUG-18	5			
	Bromomethane	<0.50		0.50	ug/L	03-AUG-18	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	03-AUG-18	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	03-AUG-18	30			
	Dibromochloromethane	<2.0		2.0	ug/L	03-AUG-18	25			
	Chloroform	<1.0		1.0	ug/L	03-AUG-18	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	03-AUG-18	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	3			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	59			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	03-AUG-18	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5			
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-AUG-18	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	03-AUG-18	26			

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2139225-14	TRIP BLANK									
Sampled By:	CLIENT on 31-JUL-18									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	1,2-Dichloropropane	<0.50		0.50	ug/L	03-AUG-18	0.58			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-AUG-18				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	03-AUG-18	2.4			
	n-Hexane	<0.50		0.50	ug/L	03-AUG-18	5			
	Methyl Ethyl Ketone	<20		20	ug/L	03-AUG-18	1800			
	Methyl Isobutyl Ketone	<20		20	ug/L	03-AUG-18	640			
	MTBE	<2.0		2.0	ug/L	03-AUG-18	15			
	Styrene	<0.50		0.50	ug/L	03-AUG-18	5.4			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Toluene	<0.50		0.50	ug/L	03-AUG-18	24			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	23			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	03-AUG-18	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	03-AUG-18	150			
	Vinyl chloride	<0.50		0.50	ug/L	03-AUG-18	0.5			
	o-Xylene	<0.30		0.30	ug/L	03-AUG-18				
	m+p-Xylenes	<0.40		0.40	ug/L	03-AUG-18				
	Xylenes (Total)	<0.50		0.50	ug/L	03-AUG-18	72			
	Surrogate: 4-Bromofluorobenzene	100.3		70-130	%	03-AUG-18				
	Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	03-AUG-18				

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2139225 Report Date: 08-AUG-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4157627								
WG2840050-4 DUP		**WG2840050-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	03-AUG-18
WG2840050-1 LCS								
F1 (C6-C10)			104.0		%		80-120	03-AUG-18
WG2840050-2 MB								
F1 (C6-C10)			<25		ug/L		25	03-AUG-18
Surrogate: 3,4-Dichlorotoluene			108.8		%		60-140	03-AUG-18
WG2840050-5 MS		**WG2840050-3**						
F1 (C6-C10)			88.9		%		60-140	03-AUG-18
F2-F4-511-WT	**Water**							
Batch R4155048								
WG2839303-2 LCS								
F2 (C10-C16)			97.7		%		70-130	02-AUG-18
F3 (C16-C34)			105.3		%		70-130	02-AUG-18
F4 (C34-C50)			116.4		%		70-130	02-AUG-18
WG2839303-3 LCSD		**WG2839303-2**						
F2 (C10-C16)		97.7	104.8		%	6.9	50	02-AUG-18
F3 (C16-C34)		105.3	106.1		%	0.7	50	02-AUG-18
F4 (C34-C50)		116.4	105.4		%	10	50	02-AUG-18
WG2839303-1 MB								
F2 (C10-C16)			<100		ug/L		100	02-AUG-18
F3 (C16-C34)			<250		ug/L		250	02-AUG-18
F4 (C34-C50)			<250		ug/L		250	02-AUG-18
Surrogate: 2-Bromobenzotrifluoride			83.6		%		60-140	02-AUG-18
MET-D-UG/L-MS-WT	**Water**							
Batch R4156627								
WG2839302-4 DUP		**WG2839302-3**						
Antimony (Sb)-Dissolved		0.50	0.50		ug/L	0.3	20	02-AUG-18
Arsenic (As)-Dissolved		1.74	1.71		ug/L	1.8	20	02-AUG-18
Barium (Ba)-Dissolved		67.8	67.4		ug/L	0.5	20	02-AUG-18
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	02-AUG-18
Boron (B)-Dissolved		67	67		ug/L	0.2	20	02-AUG-18
Cadmium (Cd)-Dissolved		<0.0050	<0.0050	RPD-NA	ug/L	N/A	20	02-AUG-18
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	02-AUG-18
Cobalt (Co)-Dissolved		0.24	0.25		ug/L	3.2	20	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4156627								
WG2839302-4 DUP		**WG2839302-3**						
Copper (Cu)-Dissolved		0.95	0.91		ug/L	4.8	20	02-AUG-18
Lead (Pb)-Dissolved		0.067	0.068		ug/L	2.1	20	02-AUG-18
Molybdenum (Mo)-Dissolved		5.96	5.86		ug/L	1.6	20	02-AUG-18
Nickel (Ni)-Dissolved		9.03	9.12		ug/L	1.0	20	02-AUG-18
Selenium (Se)-Dissolved		0.178	0.196		ug/L	9.3	20	02-AUG-18
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	02-AUG-18
Sodium (Na)-Dissolved		183000	180000		ug/L	2.0	20	02-AUG-18
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	02-AUG-18
Uranium (U)-Dissolved		7.24	7.24		ug/L	0.0	20	02-AUG-18
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	02-AUG-18
Zinc (Zn)-Dissolved		3.0	3.1		ug/L	2.7	20	02-AUG-18
WG2839302-2 LCS								
Antimony (Sb)-Dissolved			100.8		%		80-120	02-AUG-18
Arsenic (As)-Dissolved			102.0		%		80-120	02-AUG-18
Barium (Ba)-Dissolved			105.4		%		80-120	02-AUG-18
Beryllium (Be)-Dissolved			107.5		%		80-120	02-AUG-18
Boron (B)-Dissolved			101.8		%		80-120	02-AUG-18
Cadmium (Cd)-Dissolved			100.7		%		80-120	02-AUG-18
Chromium (Cr)-Dissolved			99.6		%		80-120	02-AUG-18
Cobalt (Co)-Dissolved			99.6		%		80-120	02-AUG-18
Copper (Cu)-Dissolved			99.6		%		80-120	02-AUG-18
Lead (Pb)-Dissolved			106.4		%		80-120	02-AUG-18
Molybdenum (Mo)-Dissolved			102.3		%		80-120	02-AUG-18
Nickel (Ni)-Dissolved			99.7		%		80-120	02-AUG-18
Selenium (Se)-Dissolved			96.8		%		80-120	02-AUG-18
Silver (Ag)-Dissolved			109.9		%		80-120	02-AUG-18
Sodium (Na)-Dissolved			104.2		%		80-120	02-AUG-18
Thallium (Tl)-Dissolved			102.1		%		80-120	02-AUG-18
Uranium (U)-Dissolved			109.8		%		80-120	02-AUG-18
Vanadium (V)-Dissolved			102.2		%		80-120	02-AUG-18
Zinc (Zn)-Dissolved			98.7		%		80-120	02-AUG-18
WG2839302-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	02-AUG-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4156627								
WG2839302-1 MB								
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	02-AUG-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	02-AUG-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	02-AUG-18
Boron (B)-Dissolved			<10		ug/L		10	02-AUG-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	02-AUG-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	02-AUG-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	02-AUG-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	02-AUG-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	02-AUG-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	02-AUG-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	02-AUG-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	02-AUG-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	02-AUG-18
Sodium (Na)-Dissolved			<50		ug/L		50	02-AUG-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	02-AUG-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	02-AUG-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	02-AUG-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	02-AUG-18
WG2839302-5 MS		**WG2839302-6**						
Antimony (Sb)-Dissolved			96.2		%		70-130	02-AUG-18
Arsenic (As)-Dissolved			110.0		%		70-130	02-AUG-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	02-AUG-18
Beryllium (Be)-Dissolved			104.1		%		70-130	02-AUG-18
Boron (B)-Dissolved			N/A	MS-B	%		-	02-AUG-18
Cadmium (Cd)-Dissolved			99.9		%		70-130	02-AUG-18
Chromium (Cr)-Dissolved			100.8		%		70-130	02-AUG-18
Cobalt (Co)-Dissolved			97.8		%		70-130	02-AUG-18
Copper (Cu)-Dissolved			96.6		%		70-130	02-AUG-18
Lead (Pb)-Dissolved			98.9		%		70-130	02-AUG-18
Molybdenum (Mo)-Dissolved			102.5		%		70-130	02-AUG-18
Nickel (Ni)-Dissolved			97.1		%		70-130	02-AUG-18
Selenium (Se)-Dissolved			100.9		%		70-130	02-AUG-18
Silver (Ag)-Dissolved			100.2		%		70-130	02-AUG-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4156627								
WG2839302-5 MS		**WG2839302-6**						
Thallium (Tl)-Dissolved			100.4		%		70-130	02-AUG-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	02-AUG-18
Vanadium (V)-Dissolved			104.4		%		70-130	02-AUG-18
Zinc (Zn)-Dissolved			N/A	MS-B	%		-	02-AUG-18
PAH-511-WT	**Water**							
Batch R4160001								
WG2839346-2 LCS								
1-Methylnaphthalene			90.2		%		50-140	03-AUG-18
2-Methylnaphthalene			72.8		%		50-140	03-AUG-18
Acenaphthene			89.3		%		50-140	03-AUG-18
Acenaphthylene			91.8		%		50-140	03-AUG-18
Anthracene			95.6		%		50-140	03-AUG-18
Benzo(a)anthracene			105.8		%		50-140	03-AUG-18
Benzo(a)pyrene			95.7		%		50-140	03-AUG-18
Benzo(b)fluoranthene			92.3		%		50-140	03-AUG-18
Benzo(g,h,i)perylene			98.9		%		50-140	03-AUG-18
Benzo(k)fluoranthene			96.4		%		50-140	03-AUG-18
Chrysene			113.8		%		50-140	03-AUG-18
Dibenzo(ah)anthracene			103.1		%		50-140	03-AUG-18
Fluoranthene			100.7		%		50-140	03-AUG-18
Fluorene			94.8		%		50-140	03-AUG-18
Indeno(1,2,3-cd)pyrene			111.8		%		50-140	03-AUG-18
Naphthalene			72.2		%		50-140	03-AUG-18
Phenanthrene			97.8		%		50-140	03-AUG-18
Pyrene			98.2		%		50-140	03-AUG-18
WG2839346-3 LCSD		**WG2839346-2**						
1-Methylnaphthalene		90.2	97.4		%	7.6	50	03-AUG-18
2-Methylnaphthalene		72.8	84.6		%	15	50	03-AUG-18
Acenaphthene		89.3	99.1		%	10	50	03-AUG-18
Acenaphthylene		91.8	98.1		%	6.7	50	03-AUG-18
Anthracene		95.6	97.9		%	2.4	50	03-AUG-18
Benzo(a)anthracene		105.8	112.2		%	5.9	50	03-AUG-18
Benzo(a)pyrene		95.7	98.9		%	3.3	50	03-AUG-18
Benzo(b)fluoranthene		92.3	88.1		%	4.7	50	03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4160001								
WG2839346-3 LCSD		**WG2839346-2**						
Benzo(g,h,i)perylene		98.9	101.8		%	2.9	50	03-AUG-18
Benzo(k)fluoranthene		96.4	104.6		%	8.1	50	03-AUG-18
Chrysene		113.8	108.7		%	4.6	50	03-AUG-18
Dibenzo(ah)anthracene		103.1	112.1		%	8.3	50	03-AUG-18
Fluoranthene		100.7	104.9		%	4.0	50	03-AUG-18
Fluorene		94.8	101.5		%	6.8	50	03-AUG-18
Indeno(1,2,3-cd)pyrene		111.8	113.8		%	1.7	50	03-AUG-18
Naphthalene		72.2	81.2		%	12	50	03-AUG-18
Phenanthrene		97.8	102.6		%	4.7	50	03-AUG-18
Pyrene		98.2	107.2		%	8.7	50	03-AUG-18
WG2839346-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	03-AUG-18
2-Methylnaphthalene			<0.020		ug/L		0.02	03-AUG-18
Acenaphthene			<0.020		ug/L		0.02	03-AUG-18
Acenaphthylene			<0.020		ug/L		0.02	03-AUG-18
Anthracene			<0.020		ug/L		0.02	03-AUG-18
Benzo(a)anthracene			<0.020		ug/L		0.02	03-AUG-18
Benzo(a)pyrene			<0.010		ug/L		0.01	03-AUG-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	03-AUG-18
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	03-AUG-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	03-AUG-18
Chrysene			<0.020		ug/L		0.02	03-AUG-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	03-AUG-18
Fluoranthene			<0.020		ug/L		0.02	03-AUG-18
Fluorene			<0.020		ug/L		0.02	03-AUG-18
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	03-AUG-18
Naphthalene			<0.050		ug/L		0.05	03-AUG-18
Phenanthrene			<0.020		ug/L		0.02	03-AUG-18
Pyrene			<0.020		ug/L		0.02	03-AUG-18
Surrogate: d8-Naphthalene			84.0		%		60-140	03-AUG-18
Surrogate: d10-Phenanthrene			111.4		%		60-140	03-AUG-18
Surrogate: d12-Chrysene			106.6		%		60-140	03-AUG-18
Surrogate: d10-Acenaphthene			104.9		%		60-140	03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4153488								
WG2837157-4 DUP		**WG2837157-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,1-Dichloroethane		0.89	0.90		ug/L	1.1	30	03-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	03-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	03-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	03-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-AUG-18
cis-1,2-Dichloroethylene		2.78	2.76		ug/L	0.7	30	03-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	03-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
m+p-Xylenes		0.45	0.46		ug/L	2.2	30	03-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	03-AUG-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	03-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-AUG-18
o-Xylene		0.33	0.33		ug/L	0.0	30	03-AUG-18
Styrene		<0.50	<0.50		ug/L			03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4153488								
WG2837157-4 DUP		**WG2837157-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Toluene		0.84	0.84		ug/L	0.0	30	03-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	03-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-AUG-18
WG2837157-1 LCS								
1,1,1,2-Tetrachloroethane			104.8		%		70-130	02-AUG-18
1,1,2,2-Tetrachloroethane			87.9		%		70-130	02-AUG-18
1,1,1-Trichloroethane			107.0		%		70-130	02-AUG-18
1,1,2-Trichloroethane			95.8		%		70-130	02-AUG-18
1,1-Dichloroethane			97.8		%		70-130	02-AUG-18
1,1-Dichloroethylene			102.1		%		70-130	02-AUG-18
1,2-Dibromoethane			99.6		%		70-130	02-AUG-18
1,2-Dichlorobenzene			104.5		%		70-130	02-AUG-18
1,2-Dichloroethane			101.5		%		70-130	02-AUG-18
1,2-Dichloropropane			100.5		%		70-130	02-AUG-18
1,3-Dichlorobenzene			104.8		%		70-130	02-AUG-18
1,4-Dichlorobenzene			105.1		%		70-130	02-AUG-18
Acetone			93.4		%		60-140	02-AUG-18
Benzene			104.4		%		70-130	02-AUG-18
Bromodichloromethane			104.8		%		70-130	02-AUG-18
Bromoform			94.2		%		70-130	02-AUG-18
Bromomethane			85.0		%		60-140	02-AUG-18
Carbon tetrachloride			106.4		%		70-130	02-AUG-18
Chlorobenzene			106.8		%		70-130	02-AUG-18
Chloroform			105.4		%		70-130	02-AUG-18
cis-1,2-Dichloroethylene			103.2		%		70-130	02-AUG-18
cis-1,3-Dichloropropene			99.2		%		70-130	02-AUG-18
Dibromochloromethane			100.1		%		70-130	02-AUG-18
Dichlorodifluoromethane			111.8		%		50-140	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4153488								
WG2837157-1 LCS								
Ethylbenzene			102.4		%		70-130	02-AUG-18
n-Hexane			122.5		%		70-130	02-AUG-18
m+p-Xylenes			106.3		%		70-130	02-AUG-18
Methyl Ethyl Ketone			89.7		%		60-140	02-AUG-18
Methyl Isobutyl Ketone			81.2		%		60-140	02-AUG-18
Methylene Chloride			100.6		%		70-130	02-AUG-18
MTBE			106.8		%		70-130	02-AUG-18
o-Xylene			100.5		%		70-130	02-AUG-18
Styrene			104.5		%		70-130	02-AUG-18
Tetrachloroethylene			105.2		%		70-130	02-AUG-18
Toluene			104.0		%		70-130	02-AUG-18
trans-1,2-Dichloroethylene			105.3		%		70-130	02-AUG-18
trans-1,3-Dichloropropene			105.2		%		70-130	02-AUG-18
Trichloroethylene			108.5		%		70-130	02-AUG-18
Trichlorofluoromethane			114.8		%		60-140	02-AUG-18
Vinyl chloride			101.8		%		60-140	02-AUG-18
WG2837157-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	02-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	02-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	02-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	02-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	02-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	02-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	02-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	02-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	02-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	02-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-AUG-18
Acetone			<30		ug/L		30	02-AUG-18
Benzene			<0.50		ug/L		0.5	02-AUG-18
Bromodichloromethane			<2.0		ug/L		2	02-AUG-18
Bromoform			<5.0		ug/L		5	02-AUG-18
Bromomethane			<0.50		ug/L		0.5	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4153488								
WG2837157-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	02-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	02-AUG-18
Chloroform			<1.0		ug/L		1	02-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	02-AUG-18
Dibromochloromethane			<2.0		ug/L		2	02-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	02-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	02-AUG-18
n-Hexane			<0.50		ug/L		0.5	02-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	02-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	02-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	02-AUG-18
Methylene Chloride			<5.0		ug/L		5	02-AUG-18
MTBE			<2.0		ug/L		2	02-AUG-18
o-Xylene			<0.30		ug/L		0.3	02-AUG-18
Styrene			<0.50		ug/L		0.5	02-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	02-AUG-18
Toluene			<0.50		ug/L		0.5	02-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	02-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	02-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	02-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	02-AUG-18
Surrogate: 1,4-Difluorobenzene			99.0		%		70-130	02-AUG-18
Surrogate: 4-Bromofluorobenzene			98.6		%		70-130	02-AUG-18
WG2837157-5 MS		**WG2837157-3**						
1,1,1,2-Tetrachloroethane			105.6		%		50-140	03-AUG-18
1,1,2,2-Tetrachloroethane			99.1		%		50-140	03-AUG-18
1,1,1-Trichloroethane			106.2		%		50-140	03-AUG-18
1,1,2-Trichloroethane			101.5		%		50-140	03-AUG-18
1,1-Dichloroethane			101.0		%		50-140	03-AUG-18
1,1-Dichloroethylene			100.8		%		50-140	03-AUG-18
1,2-Dibromoethane			105.9		%		50-140	03-AUG-18
1,2-Dichlorobenzene			104.6		%		50-140	03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4153488								
WG2837157-5 MS		**WG2837157-3**						
1,2-Dichloroethane			109.3		%		50-140	03-AUG-18
1,2-Dichloropropane			105.6		%		50-140	03-AUG-18
1,3-Dichlorobenzene			102.2		%		50-140	03-AUG-18
1,4-Dichlorobenzene			103.7		%		50-140	03-AUG-18
Acetone			102.4		%		50-140	03-AUG-18
Benzene			106.8		%		50-140	03-AUG-18
Bromodichloromethane			108.6		%		50-140	03-AUG-18
Bromoform			100.6		%		50-140	03-AUG-18
Bromomethane			83.5		%		50-140	03-AUG-18
Carbon tetrachloride			104.6		%		50-140	03-AUG-18
Chlorobenzene			107.0		%		50-140	03-AUG-18
Chloroform			108.6		%		50-140	03-AUG-18
cis-1,2-Dichloroethylene			105.5		%		50-140	03-AUG-18
cis-1,3-Dichloropropene			102.6		%		50-140	03-AUG-18
Dibromochloromethane			104.0		%		50-140	03-AUG-18
Dichlorodifluoromethane			103.6		%		50-140	03-AUG-18
Ethylbenzene			96.9		%		50-140	03-AUG-18
n-Hexane			118.9		%		50-140	03-AUG-18
m+p-Xylenes			102.0		%		50-140	03-AUG-18
Methyl Ethyl Ketone			101.9		%		50-140	03-AUG-18
Methyl Isobutyl Ketone			94.5		%		50-140	03-AUG-18
Methylene Chloride			105.3		%		50-140	03-AUG-18
MTBE			107.3		%		50-140	03-AUG-18
o-Xylene			96.6		%		50-140	03-AUG-18
Styrene			102.9		%		50-140	03-AUG-18
Tetrachloroethylene			99.5		%		50-140	03-AUG-18
Toluene			100.2		%		50-140	03-AUG-18
trans-1,2-Dichloroethylene			105.8		%		50-140	03-AUG-18
trans-1,3-Dichloropropene			105.5		%		50-140	03-AUG-18
Trichloroethylene			107.0		%		50-140	03-AUG-18
Trichlorofluoromethane			111.0		%		50-140	03-AUG-18
Vinyl chloride			98.1		%		50-140	03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4158369								
WG2835871-4 DUP		**WG2835871-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	02-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	02-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-AUG-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-AUG-18
Styrene		<0.50	<0.50		ug/L			02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4158369								
WG2835871-4 DUP		**WG2835871-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-AUG-18
WG2835871-1 LCS								
1,1,1,2-Tetrachloroethane			104.0		%		70-130	02-AUG-18
1,1,2,2-Tetrachloroethane			97.0		%		70-130	02-AUG-18
1,1,1-Trichloroethane			103.6		%		70-130	02-AUG-18
1,1,2-Trichloroethane			107.9		%		70-130	02-AUG-18
1,1-Dichloroethane			106.8		%		70-130	02-AUG-18
1,1-Dichloroethylene			102.4		%		70-130	02-AUG-18
1,2-Dibromoethane			104.9		%		70-130	02-AUG-18
1,2-Dichlorobenzene			100.7		%		70-130	02-AUG-18
1,2-Dichloroethane			107.5		%		70-130	02-AUG-18
1,2-Dichloropropane			103.2		%		70-130	02-AUG-18
1,3-Dichlorobenzene			99.0		%		70-130	02-AUG-18
1,4-Dichlorobenzene			97.6		%		70-130	02-AUG-18
Acetone			113.1		%		60-140	02-AUG-18
Benzene			102.9		%		70-130	02-AUG-18
Bromodichloromethane			104.1		%		70-130	02-AUG-18
Bromoform			98.8		%		70-130	02-AUG-18
Bromomethane			84.7		%		60-140	02-AUG-18
Carbon tetrachloride			103.8		%		70-130	02-AUG-18
Chlorobenzene			102.5		%		70-130	02-AUG-18
Chloroform			105.7		%		70-130	02-AUG-18
cis-1,2-Dichloroethylene			104.6		%		70-130	02-AUG-18
cis-1,3-Dichloropropene			99.0		%		70-130	02-AUG-18
Dibromochloromethane			101.6		%		70-130	02-AUG-18
Dichlorodifluoromethane			131.5		%		50-140	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4158369								
WG2835871-1 LCS								
Ethylbenzene			103.8		%		70-130	02-AUG-18
n-Hexane			125.7		%		70-130	02-AUG-18
m+p-Xylenes			103.1		%		70-130	02-AUG-18
Methyl Ethyl Ketone			101.5		%		60-140	02-AUG-18
Methyl Isobutyl Ketone			95.2		%		60-140	02-AUG-18
Methylene Chloride			105.2		%		70-130	02-AUG-18
MTBE			104.8		%		70-130	02-AUG-18
o-Xylene			101.2		%		70-130	02-AUG-18
Styrene			100.2		%		70-130	02-AUG-18
Tetrachloroethylene			109.4		%		70-130	02-AUG-18
Toluene			105.2		%		70-130	02-AUG-18
trans-1,2-Dichloroethylene			103.5		%		70-130	02-AUG-18
trans-1,3-Dichloropropene			103.0		%		70-130	02-AUG-18
Trichloroethylene			107.1		%		70-130	02-AUG-18
Trichlorofluoromethane			114.5		%		60-140	02-AUG-18
Vinyl chloride			104.2		%		60-140	02-AUG-18
WG2835871-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	03-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	03-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	03-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	03-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	03-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	03-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	03-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	03-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	03-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	03-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	03-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	03-AUG-18
Acetone			<30		ug/L		30	03-AUG-18
Benzene			<0.50		ug/L		0.5	03-AUG-18
Bromodichloromethane			<2.0		ug/L		2	03-AUG-18
Bromoform			<5.0		ug/L		5	03-AUG-18
Bromomethane			<0.50		ug/L		0.5	03-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4158369								
WG2835871-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	03-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	03-AUG-18
Chloroform			<1.0		ug/L		1	03-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	03-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	03-AUG-18
Dibromochloromethane			<2.0		ug/L		2	03-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	03-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	03-AUG-18
n-Hexane			<0.50		ug/L		0.5	03-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	03-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	03-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	03-AUG-18
Methylene Chloride			<5.0		ug/L		5	03-AUG-18
MTBE			<2.0		ug/L		2	03-AUG-18
o-Xylene			<0.30		ug/L		0.3	03-AUG-18
Styrene			<0.50		ug/L		0.5	03-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	03-AUG-18
Toluene			<0.50		ug/L		0.5	03-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	03-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	03-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	03-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	03-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	03-AUG-18
Surrogate: 1,4-Difluorobenzene			99.8		%		70-130	03-AUG-18
Surrogate: 4-Bromofluorobenzene			98.2		%		70-130	03-AUG-18
WG2835871-5 MS		**WG2835871-3**						
1,1,1,2-Tetrachloroethane			106.3		%		50-140	02-AUG-18
1,1,2,2-Tetrachloroethane			89.2		%		50-140	02-AUG-18
1,1,1-Trichloroethane			107.7		%		50-140	02-AUG-18
1,1,2-Trichloroethane			103.6		%		50-140	02-AUG-18
1,1-Dichloroethane			108.4		%		50-140	02-AUG-18
1,1-Dichloroethylene			105.4		%		50-140	02-AUG-18
1,2-Dibromoethane			99.3		%		50-140	02-AUG-18
1,2-Dichlorobenzene			103.7		%		50-140	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4158369								
WG2835871-5 MS		**WG2835871-3**						
1,2-Dichloroethane			103.3		%		50-140	02-AUG-18
1,2-Dichloropropane			102.6		%		50-140	02-AUG-18
1,3-Dichlorobenzene			105.9		%		50-140	02-AUG-18
1,4-Dichlorobenzene			103.3		%		50-140	02-AUG-18
Acetone			101.0		%		50-140	02-AUG-18
Benzene			104.0		%		50-140	02-AUG-18
Bromodichloromethane			103.3		%		50-140	02-AUG-18
Bromoform			92.9		%		50-140	02-AUG-18
Bromomethane			84.4		%		50-140	02-AUG-18
Carbon tetrachloride			108.5		%		50-140	02-AUG-18
Chlorobenzene			105.0		%		50-140	02-AUG-18
Chloroform			106.9		%		50-140	02-AUG-18
cis-1,2-Dichloroethylene			105.6		%		50-140	02-AUG-18
cis-1,3-Dichloropropene			101.0		%		50-140	02-AUG-18
Dibromochloromethane			99.1		%		50-140	02-AUG-18
Dichlorodifluoromethane			126.0		%		50-140	02-AUG-18
Ethylbenzene			109.0		%		50-140	02-AUG-18
n-Hexane			127.6		%		50-140	02-AUG-18
m+p-Xylenes			108.4		%		50-140	02-AUG-18
Methyl Ethyl Ketone			88.7		%		50-140	02-AUG-18
Methyl Isobutyl Ketone			85.4		%		50-140	02-AUG-18
Methylene Chloride			102.9		%		50-140	02-AUG-18
MTBE			107.9		%		50-140	02-AUG-18
o-Xylene			105.3		%		50-140	02-AUG-18
Styrene			101.3		%		50-140	02-AUG-18
Tetrachloroethylene			118.1		%		50-140	02-AUG-18
Toluene			109.9		%		50-140	02-AUG-18
trans-1,2-Dichloroethylene			108.5		%		50-140	02-AUG-18
trans-1,3-Dichloropropene			105.1		%		50-140	02-AUG-18
Trichloroethylene			112.3		%		50-140	02-AUG-18
Trichlorofluoromethane			117.3		%		50-140	02-AUG-18
Vinyl chloride			104.4		%		50-140	02-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160750								
WG2835840-4 DUP		**WG2835840-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	08-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	08-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	08-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-AUG-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Styrene		<0.50	<0.50		ug/L			08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160750								
WG2835840-4 DUP		**WG2835840-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
WG2835840-1 LCS								
1,1,1,2-Tetrachloroethane			96.8		%		70-130	08-AUG-18
1,1,2,2-Tetrachloroethane			90.8		%		70-130	08-AUG-18
1,1,1-Trichloroethane			99.4		%		70-130	08-AUG-18
1,1,2-Trichloroethane			94.2		%		70-130	08-AUG-18
1,1-Dichloroethane			104.9		%		70-130	08-AUG-18
1,1-Dichloroethylene			99.6		%		70-130	08-AUG-18
1,2-Dibromoethane			89.3		%		70-130	08-AUG-18
1,2-Dichlorobenzene			106.1		%		70-130	08-AUG-18
1,2-Dichloroethane			87.6		%		70-130	08-AUG-18
1,2-Dichloropropane			100.1		%		70-130	08-AUG-18
1,3-Dichlorobenzene			109.3		%		70-130	08-AUG-18
1,4-Dichlorobenzene			110.1		%		70-130	08-AUG-18
Acetone			78.8		%		60-140	08-AUG-18
Benzene			107.9		%		70-130	08-AUG-18
Bromodichloromethane			93.7		%		70-130	08-AUG-18
Bromoform			85.6		%		70-130	08-AUG-18
Bromomethane			85.3		%		60-140	08-AUG-18
Carbon tetrachloride			100.8		%		70-130	08-AUG-18
Chlorobenzene			105.2		%		70-130	08-AUG-18
Chloroform			101.6		%		70-130	08-AUG-18
cis-1,2-Dichloroethylene			104.7		%		70-130	08-AUG-18
cis-1,3-Dichloropropene			97.5		%		70-130	08-AUG-18
Dibromochloromethane			88.4		%		70-130	08-AUG-18
Dichlorodifluoromethane			110.3		%		50-140	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160750								
WG2835840-1 LCS								
Ethylbenzene			104.2		%		70-130	08-AUG-18
n-Hexane			130.2	MES	%		70-130	08-AUG-18
m+p-Xylenes			106.5		%		70-130	08-AUG-18
Methyl Ethyl Ketone			80.3		%		60-140	08-AUG-18
Methyl Isobutyl Ketone			74.6		%		60-140	08-AUG-18
Methylene Chloride			100.6		%		70-130	08-AUG-18
MTBE			108.1		%		70-130	08-AUG-18
o-Xylene			99.9		%		70-130	08-AUG-18
Styrene			99.2		%		70-130	08-AUG-18
Tetrachloroethylene			107.5		%		70-130	08-AUG-18
Toluene			104.9		%		70-130	08-AUG-18
trans-1,2-Dichloroethylene			105.7		%		70-130	08-AUG-18
trans-1,3-Dichloropropene			88.8		%		70-130	08-AUG-18
Trichloroethylene			112.2		%		70-130	08-AUG-18
Trichlorofluoromethane			106.8		%		60-140	08-AUG-18
Vinyl chloride			107.3		%		60-140	08-AUG-18
WG2835840-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	08-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	08-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
Acetone			<30		ug/L		30	08-AUG-18
Benzene			<0.50		ug/L		0.5	08-AUG-18
Bromodichloromethane			<2.0		ug/L		2	08-AUG-18
Bromoform			<5.0		ug/L		5	08-AUG-18
Bromomethane			<0.50		ug/L		0.5	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160750								
WG2835840-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	08-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	08-AUG-18
Chloroform			<1.0		ug/L		1	08-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	08-AUG-18
Dibromochloromethane			<2.0		ug/L		2	08-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	08-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	08-AUG-18
n-Hexane			<0.50		ug/L		0.5	08-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	08-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	08-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	08-AUG-18
Methylene Chloride			<5.0		ug/L		5	08-AUG-18
MTBE			<2.0		ug/L		2	08-AUG-18
o-Xylene			<0.30		ug/L		0.3	08-AUG-18
Styrene			<0.50		ug/L		0.5	08-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	08-AUG-18
Toluene			<0.50		ug/L		0.5	08-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	08-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	08-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	08-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	08-AUG-18
Surrogate: 1,4-Difluorobenzene			99.2		%		70-130	08-AUG-18
Surrogate: 4-Bromofluorobenzene			96.5		%		70-130	08-AUG-18
WG2835840-5 MS		**WG2835840-3**						
1,1,1,2-Tetrachloroethane			98.6		%		50-140	08-AUG-18
1,1,2,2-Tetrachloroethane			98.5		%		50-140	08-AUG-18
1,1,1-Trichloroethane			98.1		%		50-140	08-AUG-18
1,1,2-Trichloroethane			102.4		%		50-140	08-AUG-18
1,1-Dichloroethane			106.4		%		50-140	08-AUG-18
1,1-Dichloroethylene			95.5		%		50-140	08-AUG-18
1,2-Dibromoethane			97.6		%		50-140	08-AUG-18
1,2-Dichlorobenzene			106.1		%		50-140	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160750								
WG2835840-5 MS		**WG2835840-3**						
1,2-Dichloroethane			94.5		%		50-140	08-AUG-18
1,2-Dichloropropane			105.5		%		50-140	08-AUG-18
1,3-Dichlorobenzene			104.1		%		50-140	08-AUG-18
1,4-Dichlorobenzene			104.9		%		50-140	08-AUG-18
Acetone			93.0		%		50-140	08-AUG-18
Benzene			109.0		%		50-140	08-AUG-18
Bromodichloromethane			98.0		%		50-140	08-AUG-18
Bromoform			91.4		%		50-140	08-AUG-18
Bromomethane			81.2		%		50-140	08-AUG-18
Carbon tetrachloride			97.8		%		50-140	08-AUG-18
Chlorobenzene			105.3		%		50-140	08-AUG-18
Chloroform			104.5		%		50-140	08-AUG-18
cis-1,2-Dichloroethylene			105.8		%		50-140	08-AUG-18
cis-1,3-Dichloropropene			96.6		%		50-140	08-AUG-18
Dibromochloromethane			93.6		%		50-140	08-AUG-18
Dichlorodifluoromethane			101.1		%		50-140	08-AUG-18
Ethylbenzene			100.2		%		50-140	08-AUG-18
n-Hexane			122.6		%		50-140	08-AUG-18
m+p-Xylenes			100.7		%		50-140	08-AUG-18
Methyl Ethyl Ketone			97.2		%		50-140	08-AUG-18
Methyl Isobutyl Ketone			84.8		%		50-140	08-AUG-18
Methylene Chloride			104.7		%		50-140	08-AUG-18
MTBE			109.2		%		50-140	08-AUG-18
o-Xylene			97.6		%		50-140	08-AUG-18
Styrene			97.7		%		50-140	08-AUG-18
Tetrachloroethylene			99.7		%		50-140	08-AUG-18
Toluene			103.2		%		50-140	08-AUG-18
trans-1,2-Dichloroethylene			100.3		%		50-140	08-AUG-18
trans-1,3-Dichloropropene			87.5		%		50-140	08-AUG-18
Trichloroethylene			108.8		%		50-140	08-AUG-18
Trichlorofluoromethane			102.0		%		50-140	08-AUG-18
Vinyl chloride			100.8		%		50-140	08-AUG-18

Quality Control Report

Workorder: L2139225 Report Date: 08-AUG-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

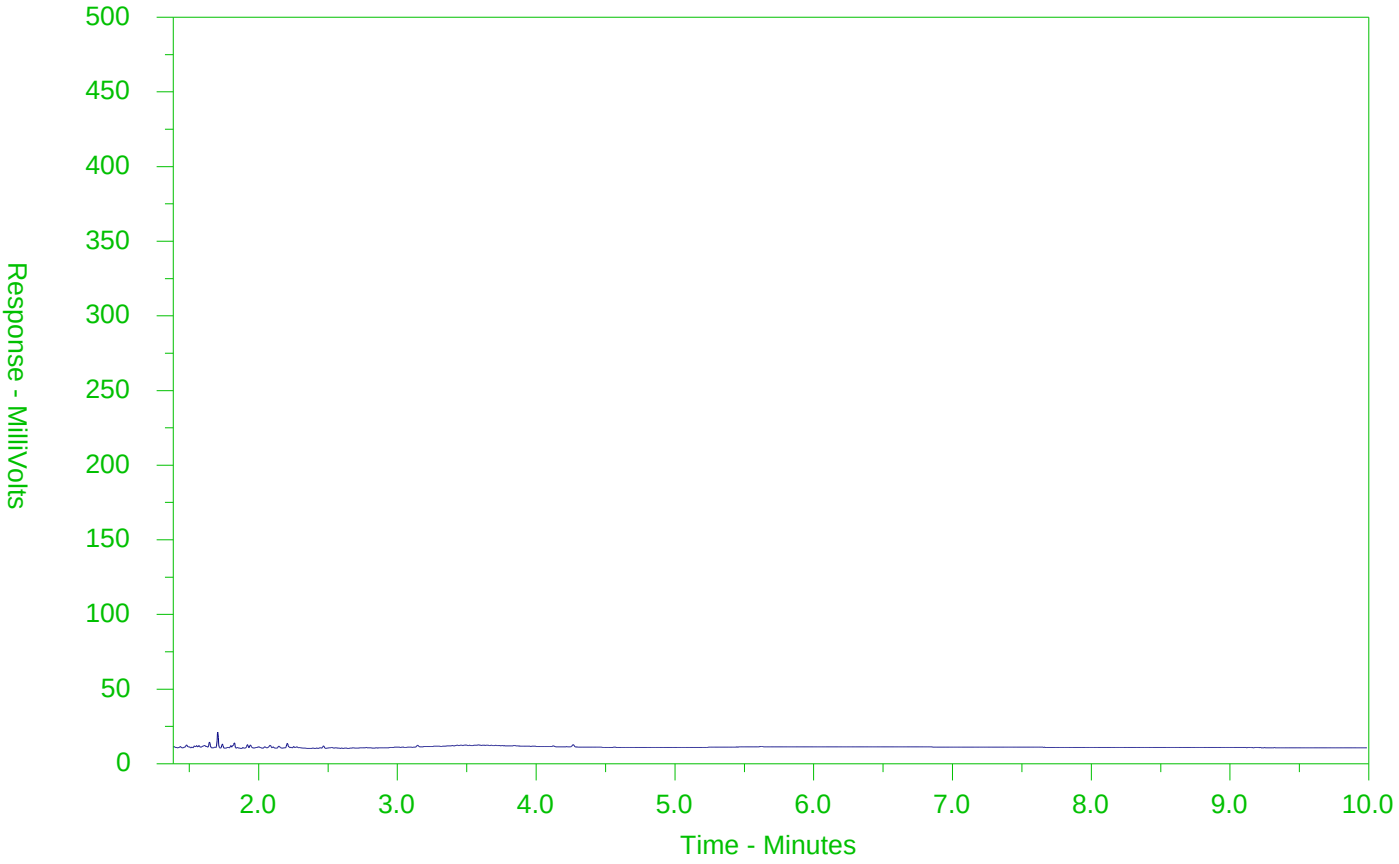
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2139225-5
Client Sample ID: MW18-128D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

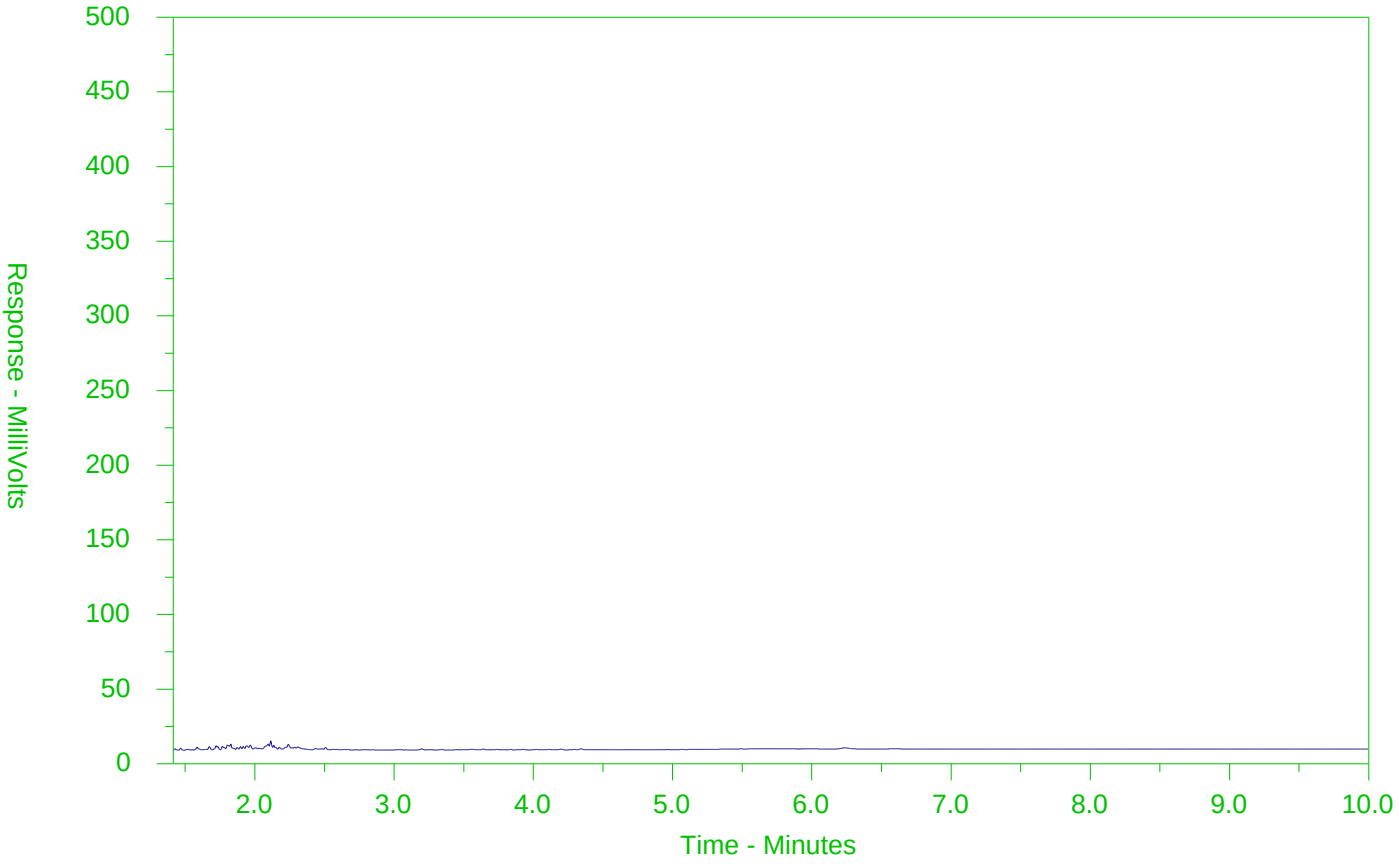
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2139225-10
Client Sample ID: MW18-131S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2139225-COFC

COC Number: 15 -

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Tania McCarthy	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	519 579 3500	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	72 Victoria Street South, Suite 300	Email 1 or Fax: Tania McCarthy@jacobs.com	Date and Time Required for all E&P TATs:
City/Province:	Kitchener	Email 2: Ed.Taves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3: curry.casey@jacobs.com	
Invoice To:	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M Hill	Email 1 or Fax: Accounts Payable	
Contact:	Accounts Payable	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q66850	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only): WF L2139225		ALS Contact: Mathy	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F1-F4-511-P-WT	MET-HYD-R511-WT	MET-R511-D-MS-WT	PAH-511-WT * lab filter for B(a)P	PCB-511-WT	VOC-511-MS-WT	VOC-R511,F1-F4-P-WT	BAP-LABFILTER-511-WT BI	Number of Containers
1*	MW18-120D	30-007-18	09:55	W			X			X			3
2*	MW18-121D	↓	11:50	W						X			2
3	MW18-107D		12:50	W						X			2
4	MW18-123D		14:05	W						X			2
5	MW18-128D		~~15:30~~ 13:20	W	X								4
6	MW18-129D	↓	16:55	W			X			X			3
7	MW18-130D	31-007-18	09:55	W			X						1
8	*MW18-132D		10:55	W			X						1
9	MW18-133D		12:20	W			X						1
10	MW18-131S		13:20	W	X		X						5
11	MW17-140D		13:15	W				X					
12	MW17-100S		16:55	W				X					

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	* Please lab filter for B(a)P on all PAH samples.
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			8.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Curry-A. Casey	31/07/18						Aug 01/18	8:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

WC heather398

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2139225-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	CH2M Hill	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Tania McCarthy	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐
Phone:	519 579 3500	☐ Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Street:	72 Victoria Street South, Suite 300	Email 1 or Fax: Tania.McCarthy@jacobs.com	Date and Time Required for all E&P TATs:
City/Province:	Kitchener	Email 2: Ed.Taves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3: amy.casey@jacobs.com	Analysis Request
Invoice To	Same as Report To ☐ YES ☐ NO	Invoice Distribution	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	CH2M Hill	Email 1 or Fax: Accounts Payable	
Contact:	Accounts Payable	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q66850	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code	Routing Code
PO / AFE:		Requisitioner	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2139225	ALS Contact: Mathy	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F1-F4-511-P-WT	MET-HYD-R511-WT	MET-R511-D-MS-WT	PAH-511-WT * (lab filter for B(a)P)	PCB-511-WT	VOC-511-HS-WT	VOC-R511,F1-F4-P-WT	BAP-LABFILTER-511-WT Bk	Number of Containers
13	DUP1	31-OCT-18	15:20	(W)				X					
14	TRIP BLANK			(W)						X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	* Please lab filter for B(a)P for all PAH samples.
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			8.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Amy Casey	Date: 07/31/18	Time:	Received by:	Date:	Time:	Received by:	Date: Aug 01/18	Time: 8:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 3rd 2018

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

Jacobs Consultancy Canada Inc.
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 01-AUG-18
Report Date: 14-APR-21 14:53 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2140486

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-626955
Legal Site Desc:

Comments: 13-APR-21:
L2140486-1, 2, 4, 6 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-1 MW18-122D-1 Sampled By: CLIENT on 26-JUL-18 @ 13:30 Matrix: SOIL							
Physical Tests							
Conductivity	0.117		0.0040	mS/cm		08-AUG-18	R4161151
% Moisture	6.64		0.10	%	08-AUG-18	09-AUG-18	R4161124
pH	6.98		0.10	pH units		08-AUG-18	R4160971
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	08-AUG-18	09-AUG-18	R4162110
Saturated Paste Extractables							
SAR	0.64		0.10	SAR		08-AUG-18	R4161040
Calcium (Ca)	4.0		1.0	mg/L		08-AUG-18	R4161040
Magnesium (Mg)	1.1		1.0	mg/L		08-AUG-18	R4161040
Sodium (Na)	5.6		1.0	mg/L		08-AUG-18	R4161040
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Arsenic (As)	3.7		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Barium (Ba)	25.3		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Beryllium (Be)	<0.50		0.50	ug/g	07-AUG-18	14-APR-21	R4162617
Bismuth (Bi)	<1.0		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Boron (B)	<5.0		5.0	ug/g	07-AUG-18	14-APR-21	R4162617
Boron (B), Hot Water Ext.	0.25		0.10	ug/g	08-AUG-18	08-AUG-18	R4162729
Cadmium (Cd)	<0.50		0.50	ug/g	07-AUG-18	14-APR-21	R4162617
Calcium (Ca)	2880		50	ug/g	07-AUG-18	14-APR-21	R4162617
Chromium (Cr)	7.4		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Cobalt (Co)	2.7		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Copper (Cu)	6.9		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Iron (Fe)	9040		50	ug/g	07-AUG-18	14-APR-21	R4162617
Lead (Pb)	18.7		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Magnesium (Mg)	1800		20	ug/g	07-AUG-18	14-APR-21	R4162617
Mercury (Hg)	0.0092		0.0050	ug/g	07-AUG-18	08-AUG-18	R4160880
Molybdenum (Mo)	<1.0		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Nickel (Ni)	6.1		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Selenium (Se)	<1.0		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Silver (Ag)	<0.20		0.20	ug/g	07-AUG-18	14-APR-21	R4162617
Thallium (Tl)	<0.50		0.50	ug/g	07-AUG-18	14-APR-21	R4162617
Uranium (U)	<1.0		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Vanadium (V)	13.1		1.0	ug/g	07-AUG-18	14-APR-21	R4162617
Zinc (Zn)	44.1		5.0	ug/g	07-AUG-18	14-APR-21	R4162617
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	07-AUG-18	08-AUG-18	R4160920
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-1 MW18-122D-1 Sampled By: CLIENT on 26-JUL-18 @ 13:30 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Chrysene	0.055		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluoranthene	0.060		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluorene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
1+2-Methylnaphthalenes	0.160		0.042	ug/g		09-AUG-18	
1-Methylnaphthalene	0.070		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
2-Methylnaphthalene	0.091		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
Naphthalene	0.073		0.013	ug/g	03-AUG-18	08-AUG-18	R4160819
Phenanthrene	0.074		0.046	ug/g	03-AUG-18	08-AUG-18	R4160819
Pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Surrogate: 2-Fluorobiphenyl	88.9		50-140	%	03-AUG-18	08-AUG-18	R4160819
Surrogate: p-Terphenyl d14	94.9		50-140	%	03-AUG-18	08-AUG-18	R4160819
L2140486-2 MW18-121S-1 Sampled By: CLIENT on 27-JUL-18 @ 10:25 Matrix: SOIL							
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Arsenic (As)	8.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Barium (Ba)	58.3		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Beryllium (Be)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Bismuth (Bi)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Boron (B)	9.6		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cadmium (Cd)	0.99		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Calcium (Ca)	106000		50	ug/g	08-AUG-18	14-APR-21	R4162646
Chromium (Cr)	10.3		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cobalt (Co)	5.3		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Copper (Cu)	15.1		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Iron (Fe)	16100		50	ug/g	08-AUG-18	14-APR-21	R4162646
Lead (Pb)	82.7		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Magnesium (Mg)	58600		20	ug/g	08-AUG-18	14-APR-21	R4162646
Molybdenum (Mo)	1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Nickel (Ni)	11.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Selenium (Se)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Silver (Ag)	<0.20		0.20	ug/g	08-AUG-18	14-APR-21	R4162646
Thallium (Tl)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Uranium (U)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Vanadium (V)	20.8		1.0	ug/g	08-AUG-18	14-APR-21	R4162646

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-2 MW18-121S-1 Sampled By: CLIENT on 27-JUL-18 @ 10:25 Matrix: SOIL							
Metals							
Zinc (Zn)	403		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
L2140486-3 MW18-125S-1 Sampled By: CLIENT on 31-JUL-18 @ 11:05 Matrix: SOIL							
Physical Tests							
% Moisture	19.9		0.10	%	08-AUG-18	09-AUG-18	R4161124
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1248	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1254	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1260	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Total PCBs	<0.020		0.020	ug/g	09-AUG-18	09-AUG-18	R4162178
Surrogate: d14-Terphenyl	79.2		60-140	%	09-AUG-18	09-AUG-18	R4162178
L2140486-4 MW18-125S-2 Sampled By: CLIENT on 31-JUL-18 @ 11:15 Matrix: SOIL							
Physical Tests							
% Moisture	4.10		0.10	%	08-AUG-18	09-AUG-18	R4161124
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Arsenic (As)	2.3		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Barium (Ba)	18.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Beryllium (Be)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Bismuth (Bi)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Boron (B)	7.1		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cadmium (Cd)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Calcium (Ca)	182000		50	ug/g	08-AUG-18	14-APR-21	R4162646
Chromium (Cr)	7.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cobalt (Co)	1.7		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Copper (Cu)	6.5		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Iron (Fe)	6560		50	ug/g	08-AUG-18	14-APR-21	R4162646
Lead (Pb)	95.2		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Magnesium (Mg)	111000		20	ug/g	08-AUG-18	14-APR-21	R4162646
Molybdenum (Mo)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Nickel (Ni)	4.9		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Selenium (Se)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Silver (Ag)	<0.20		0.20	ug/g	08-AUG-18	14-APR-21	R4162646
Thallium (Tl)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Uranium (U)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Vanadium (V)	9.2		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Zinc (Zn)	175		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
Hydrocarbons							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-4 MW18-125S-2 Sampled By: CLIENT on 31-JUL-18 @ 11:15 Matrix: SOIL							
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	03-AUG-18	08-AUG-18	R4161033
F2 (C10-C16)	<10		10	ug/g	03-AUG-18	07-AUG-18	R4161901
F3 (C16-C34)	53		50	ug/g	03-AUG-18	07-AUG-18	R4161901
F4 (C34-C50)	<50		50	ug/g	03-AUG-18	07-AUG-18	R4161901
Total Hydrocarbons (C6-C50)	<72		72	ug/g		10-AUG-18	
Chrom. to baseline at nC50	YES				03-AUG-18	07-AUG-18	R4161901
Surrogate: 2-Bromobenzotrifluoride	98.2		60-140	%	03-AUG-18	07-AUG-18	R4161901
Surrogate: 3,4-Dichlorotoluene	96.7		60-140	%	03-AUG-18	08-AUG-18	R4161033
L2140486-5 MW18-125S-3 Sampled By: CLIENT on 31-JUL-18 @ 11:30 Matrix: SOIL							
Physical Tests							
% Moisture	9.19		0.10	%	08-AUG-18	09-AUG-18	R4161124
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(a)anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(a)pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(b)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(k)fluoranthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Chrysene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluoranthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluorene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		09-AUG-18	
1-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
2-Methylnaphthalene	<0.030		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
Naphthalene	<0.013		0.013	ug/g	03-AUG-18	08-AUG-18	R4160819
Phenanthrene	<0.046		0.046	ug/g	03-AUG-18	08-AUG-18	R4160819
Pyrene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Surrogate: 2-Fluorobiphenyl	90.3		50-140	%	03-AUG-18	08-AUG-18	R4160819
Surrogate: p-Terphenyl d14	98.6		50-140	%	03-AUG-18	08-AUG-18	R4160819
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1248	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1254	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Aroclor 1260	<0.010		0.010	ug/g	09-AUG-18	09-AUG-18	R4162178
Total PCBs	<0.020		0.020	ug/g	09-AUG-18	09-AUG-18	R4162178
Surrogate: d14-Terphenyl	80.6		60-140	%	09-AUG-18	09-AUG-18	R4162178

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-5 MW18-125S-3 Sampled By: CLIENT on 31-JUL-18 @ 11:30 Matrix: SOIL							
Polychlorinated Biphenyls							
L2140486-6 MW18-126D-1 Sampled By: CLIENT on 31-JUL-18 @ 14:20 Matrix: SOIL							
Physical Tests							
% Moisture	5.81		0.10	%	08-AUG-18	09-AUG-18	R4161717
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Arsenic (As)	3.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Barium (Ba)	31.3		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Beryllium (Be)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Bismuth (Bi)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Boron (B)	5.2		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cadmium (Cd)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Calcium (Ca)	10900		50	ug/g	08-AUG-18	14-APR-21	R4162646
Chromium (Cr)	10.1		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Cobalt (Co)	2.5		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Copper (Cu)	8.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Iron (Fe)	11300		50	ug/g	08-AUG-18	14-APR-21	R4162646
Lead (Pb)	28.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Magnesium (Mg)	3890		20	ug/g	08-AUG-18	14-APR-21	R4162646
Molybdenum (Mo)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Nickel (Ni)	7.6		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Selenium (Se)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Silver (Ag)	<0.20		0.20	ug/g	08-AUG-18	14-APR-21	R4162646
Thallium (Tl)	<0.50		0.50	ug/g	08-AUG-18	14-APR-21	R4162646
Uranium (U)	<1.0		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Vanadium (V)	14.2		1.0	ug/g	08-AUG-18	14-APR-21	R4162646
Zinc (Zn)	71.5		5.0	ug/g	08-AUG-18	14-APR-21	R4162646
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Acenaphthylene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Anthracene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(a)anthracene	0.182		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(a)pyrene	0.230		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(b)fluoranthene	0.385		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(g,h,i)perylene	0.193		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Benzo(k)fluoranthene	0.221		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Chrysene	0.295		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Dibenzo(ah)anthracene	0.073		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluoranthene	0.238		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Fluorene	<0.050		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Indeno(1,2,3-cd)pyrene	0.181		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-6 MW18-126D-1 Sampled By: CLIENT on 31-JUL-18 @ 14:20 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
1+2-Methylnaphthalenes	0.600		0.042	ug/g		09-AUG-18	
1-Methylnaphthalene	0.262		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
2-Methylnaphthalene	0.338		0.030	ug/g	03-AUG-18	08-AUG-18	R4160819
Naphthalene	0.276		0.013	ug/g	03-AUG-18	08-AUG-18	R4160819
Phenanthrene	0.224		0.046	ug/g	03-AUG-18	08-AUG-18	R4160819
Pyrene	0.210		0.050	ug/g	03-AUG-18	08-AUG-18	R4160819
Surrogate: 2-Fluorobiphenyl	88.1		50-140	%	03-AUG-18	08-AUG-18	R4160819
Surrogate: p-Terphenyl d14	94.0		50-140	%	03-AUG-18	08-AUG-18	R4160819
L2140486-7 MW18-126D-2 Sampled By: CLIENT on 31-JUL-18 @ 14:30 Matrix: SOIL							
Physical Tests							
% Moisture	5.74		0.10	%	07-AUG-18	08-AUG-18	R4160643
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	03-AUG-18	07-AUG-18	R4159969
Benzene	0.0205		0.0068	ug/g	03-AUG-18	07-AUG-18	R4159969
Bromodichloromethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Bromoform	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Bromomethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Carbon tetrachloride	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Chlorobenzene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Dibromochloromethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Chloroform	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,2-Dibromoethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,2-Dichlorobenzene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,3-Dichlorobenzene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,4-Dichlorobenzene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Dichlorodifluoromethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1-Dichloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,2-Dichloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1-Dichloroethylene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Methylene Chloride	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,2-Dichloropropane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	03-AUG-18	07-AUG-18	R4159969
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	03-AUG-18	07-AUG-18	R4159969
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		08-AUG-18	
Ethylbenzene	0.033		0.018	ug/g	03-AUG-18	07-AUG-18	R4159969
n-Hexane	<0.17	RRR	0.17	ug/g	03-AUG-18	07-AUG-18	R4159969
Methyl Ethyl Ketone	<0.50		0.50	ug/g	03-AUG-18	07-AUG-18	R4159969
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	03-AUG-18	07-AUG-18	R4159969

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-7 MW18-126D-2 Sampled By: CLIENT on 31-JUL-18 @ 14:30 Matrix: SOIL							
Volatile Organic Compounds							
MTBE	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Styrene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Tetrachloroethylene	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Toluene	0.116		0.080	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1,1-Trichloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
1,1,2-Trichloroethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Trichloroethylene	0.017		0.010	ug/g	03-AUG-18	07-AUG-18	R4159969
Trichlorofluoromethane	<0.050		0.050	ug/g	03-AUG-18	07-AUG-18	R4159969
Vinyl chloride	<0.020		0.020	ug/g	03-AUG-18	07-AUG-18	R4159969
o-Xylene	0.112		0.020	ug/g	03-AUG-18	07-AUG-18	R4159969
m+p-Xylenes	0.114		0.030	ug/g	03-AUG-18	07-AUG-18	R4159969
Xylenes (Total)	0.225		0.050	ug/g		08-AUG-18	
Surrogate: 4-Bromofluorobenzene	120.6		50-140	%	03-AUG-18	07-AUG-18	R4159969
Surrogate: 1,4-Difluorobenzene	125.1		50-140	%	03-AUG-18	07-AUG-18	R4159969
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	03-AUG-18	07-AUG-18	R4159969
F1-BTEX	<5.0		5.0	ug/g		09-AUG-18	
F2 (C10-C16)	<10		10	ug/g	03-AUG-18	07-AUG-18	R4161901
F3 (C16-C34)	60		50	ug/g	03-AUG-18	07-AUG-18	R4161901
F4 (C34-C50)	<50		50	ug/g	03-AUG-18	07-AUG-18	R4161901
Total Hydrocarbons (C6-C50)	<72		72	ug/g		09-AUG-18	
Chrom. to baseline at nC50	YES				03-AUG-18	07-AUG-18	R4161901
Surrogate: 2-Bromobenzotrifluoride	111.2		60-140	%	03-AUG-18	07-AUG-18	R4161901
Surrogate: 3,4-Dichlorotoluene	107.9		60-140	%	03-AUG-18	07-AUG-18	R4159969
Report Remarks : RL raised due to instrument sensitivity.							
L2140486-8 MW18-126D-3 Sampled By: CLIENT on 31-JUL-18 @ 14:40 Matrix: SOIL							
Physical Tests							
% Moisture	3.26		0.10	%	07-AUG-18	08-AUG-18	R4160643
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1248	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1254	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1260	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Total PCBs	<0.020		0.020	ug/g	10-AUG-18	10-AUG-18	R4162178
Surrogate: d14-Terphenyl	76.5		60-140	%	10-AUG-18	10-AUG-18	R4162178
L2140486-9 DUP JULY 31 Sampled By: CLIENT on 31-JUL-18 Matrix: SOIL							
Physical Tests							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2140486-9 DUP JULY 31 Sampled By: CLIENT on 31-JUL-18 Matrix: SOIL							
Physical Tests							
% Moisture	18.6		0.10	%	07-AUG-18	08-AUG-18	R4160643
Polychlorinated Biphenyls							
Aroclor 1242	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1248	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1254	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Aroclor 1260	<0.010		0.010	ug/g	10-AUG-18	10-AUG-18	R4162178
Total PCBs	<0.020		0.020	ug/g	10-AUG-18	10-AUG-18	R4162178
Surrogate: d14-Terphenyl	85.7		60-140	%	10-AUG-18	10-AUG-18	R4162178

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
RRR	Refer to Report Remarks for issues regarding this analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Reference Information

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

HG-200.2-CVAA-WT Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT Soil Metals in Soil by CRC ICPMS EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT Soil ABN-Calculated Parameters SW846 8270

MOISTURE-WT Soil % Moisture CCME PHC in Soil - Tier 1 (mod)

PAH-511-WT Soil PAH-O.Reg 153/04 (July 2011) SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Soil PCB-O.Reg 153/04 (July 2011) SW846 3510/8082

An aliquot of a solid sample is extracted with a solvent, extract is cleaned up and analyzed on the GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT Soil pH MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-626955

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2140486 Report Date: 14-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R4162729								
WG2843168-4 DUP		**L2140662-3**						
Boron (B), Hot Water Ext.		0.22	0.21		ug/g	4.2	30	08-AUG-18
WG2843168-2 IRM		**HOTB-SAL_SOIL5**						
Boron (B), Hot Water Ext.			79.3		%		70-130	10-AUG-18
WG2843168-3 LCS								
Boron (B), Hot Water Ext.			109.4		%		70-130	10-AUG-18
WG2843168-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	08-AUG-18
CN-WAD-R511-WT	**Soil**							
Batch R4162110								
WG2843783-3 DUP		**L2140651-2**						
Cyanide, Weak Acid Diss		0.079	<0.050	RPD-NA	ug/g	N/A	35	09-AUG-18
WG2843783-2 LCS								
Cyanide, Weak Acid Diss			91.2		%		80-120	09-AUG-18
WG2843783-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	09-AUG-18
WG2843783-4 MS		**L2140651-2**						
Cyanide, Weak Acid Diss			99.5		%		70-130	09-AUG-18
CR-CR6-IC-WT	**Soil**							
Batch R4160920								
WG2842635-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			92.1		%		70-130	08-AUG-18
WG2842635-3 DUP		**L2140225-1**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	08-AUG-18
WG2842635-2 LCS								
Chromium, Hexavalent			87.0		%		80-120	08-AUG-18
WG2842635-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	08-AUG-18
EC-WT	**Soil**							
Batch R4161151								
WG2843172-4 DUP		**WG2843172-3**						
Conductivity		0.379	0.391		mS/cm	3.1	20	08-AUG-18
WG2843402-1 LCS								
Conductivity			97.6		%		90-110	08-AUG-18
WG2843172-1 MB								
Conductivity			<0.0040		mS/cm		0.004	08-AUG-18
F1-HS-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R4159969								
WG2840561-4 DUP		**WG2840561-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	07-AUG-18
WG2840561-2 LCS								
F1 (C6-C10)			105.9		%		80-120	07-AUG-18
WG2840561-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	07-AUG-18
Surrogate: 3,4-Dichlorotoluene			107.1		%		60-140	07-AUG-18
WG2840561-6 MS		**L2140662-3**						
F1 (C6-C10)			105.8		%		60-140	07-AUG-18
Batch R4161033								
WG2840727-4 DUP		**WG2840727-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	08-AUG-18
WG2840727-2 LCS								
F1 (C6-C10)			103.6		%		80-120	08-AUG-18
WG2840727-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	08-AUG-18
Surrogate: 3,4-Dichlorotoluene			87.2		%		60-140	08-AUG-18
WG2840727-6 MS		**L2140792-4**						
F1 (C6-C10)			110.1		%		60-140	08-AUG-18
F2-F4-511-WT	**Soil**							
Batch R4161901								
WG2841068-5 DUP		**WG2841068-1**						
F2 (C10-C16)		11	<10	RPD-NA	ug/g	N/A	30	07-AUG-18
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	07-AUG-18
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	07-AUG-18
WG2841068-3 LCS								
F2 (C10-C16)			107.6		%		80-120	07-AUG-18
F3 (C16-C34)			108.8		%		80-120	07-AUG-18
F4 (C34-C50)			107.6		%		80-120	07-AUG-18
WG2841068-2 MB								
F2 (C10-C16)			<10		ug/g		10	07-AUG-18
F3 (C16-C34)			<50		ug/g		50	07-AUG-18
F4 (C34-C50)			<50		ug/g		50	07-AUG-18
Surrogate: 2-Bromobenzotrifluoride			106.5		%		60-140	07-AUG-18
WG2841068-4 MS		**WG2841068-1**						
F2 (C10-C16)			108.5		%		60-140	07-AUG-18
F3 (C16-C34)			114.9		%		60-140	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Soil**							
Batch R4161901								
WG2841068-4 MS		**WG2841068-1**						
F4 (C34-C50)			115.1		%		60-140	07-AUG-18
HG-200.2-CVAA-WT	**Soil**							
Batch R4160880								
WG2842896-2 CRM		**WT-CANMET-TILL1**						
Mercury (Hg)			116.3		%		70-130	08-AUG-18
WG2842896-6 DUP		**WG2842896-5**						
Mercury (Hg)		0.0289	0.0299		ug/g	3.3	40	08-AUG-18
WG2842896-3 LCS								
Mercury (Hg)			114.5		%		80-120	08-AUG-18
WG2842896-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	08-AUG-18
MET-200.2-CCMS-WT	**Soil**							
Batch R4162617								
WG2842896-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			101.7		%		70-130	08-AUG-18
Arsenic (As)			110.8		%		70-130	08-AUG-18
Barium (Ba)			119.6		%		70-130	08-AUG-18
Beryllium (Be)			107.9		%		70-130	08-AUG-18
Bismuth (Bi)			104.3		%		70-130	08-AUG-18
Boron (B)			3.2		mg/kg		0-8.2	08-AUG-18
Cadmium (Cd)			100.1		%		70-130	08-AUG-18
Calcium (Ca)			109.6		%		70-130	08-AUG-18
Chromium (Cr)			103.8		%		70-130	08-AUG-18
Cobalt (Co)			102.1		%		70-130	08-AUG-18
Copper (Cu)			103.8		%		70-130	08-AUG-18
Iron (Fe)			101.1		%		70-130	08-AUG-18
Lead (Pb)			105.9		%		70-130	08-AUG-18
Magnesium (Mg)			106.8		%		70-130	08-AUG-18
Molybdenum (Mo)			109.0		%		70-130	08-AUG-18
Nickel (Ni)			102.9		%		70-130	08-AUG-18
Selenium (Se)			0.34		mg/kg		0.11-0.51	08-AUG-18
Silver (Ag)			0.23		mg/kg		0.13-0.33	08-AUG-18
Thallium (Tl)			0.122		mg/kg		0.077-0.18	08-AUG-18
Uranium (U)			101.3		%		70-130	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4162617								
WG2842896-2 CRM		**WT-CANMET-TILL1**						
Vanadium (V)			104.0		%		70-130	08-AUG-18
Zinc (Zn)			105.3		%		70-130	08-AUG-18
WG2842896-6 DUP		**WG2842896-5**						
Antimony (Sb)		0.33	0.35		ug/g	4.2	30	08-AUG-18
Arsenic (As)		6.67	7.41		ug/g	11	30	08-AUG-18
Barium (Ba)		117	127		ug/g	8.6	40	08-AUG-18
Beryllium (Be)		0.67	0.86		ug/g	24	30	08-AUG-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	08-AUG-18
Boron (B)		19.1	25.1		ug/g	27	30	08-AUG-18
Cadmium (Cd)		0.154	0.173		ug/g	12	30	08-AUG-18
Calcium (Ca)		85700	109000		ug/g	24	30	08-AUG-18
Chromium (Cr)		28.3	31.1		ug/g	9.4	30	08-AUG-18
Cobalt (Co)		10.7	11.5		ug/g	6.7	30	08-AUG-18
Copper (Cu)		19.4	21.0		ug/g	8.0	30	08-AUG-18
Iron (Fe)		22300	24500		ug/g	9.5	30	08-AUG-18
Lead (Pb)		9.75	11.1		ug/g	13	40	08-AUG-18
Magnesium (Mg)		31400	34500		ug/g	9.5	30	08-AUG-18
Molybdenum (Mo)		2.51	3.25		ug/g	26	40	08-AUG-18
Nickel (Ni)		28.3	31.4		ug/g	10	30	08-AUG-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	08-AUG-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	08-AUG-18
Thallium (Tl)		0.227	0.255		ug/g	12	30	08-AUG-18
Uranium (U)		1.31	1.53		ug/g	16	30	08-AUG-18
Vanadium (V)		37.7	41.6		ug/g	9.7	30	08-AUG-18
Zinc (Zn)		49.8	54.7		ug/g	9.5	30	08-AUG-18
WG2842896-4 LCS								
Antimony (Sb)			102.9		%		80-120	08-AUG-18
Arsenic (As)			99.4		%		80-120	08-AUG-18
Barium (Ba)			111.3		%		80-120	08-AUG-18
Beryllium (Be)			94.4		%		80-120	08-AUG-18
Bismuth (Bi)			94.3		%		80-120	08-AUG-18
Boron (B)			86.2		%		80-120	08-AUG-18
Cadmium (Cd)			93.8		%		80-120	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4162617								
WG2842896-4 LCS								
Calcium (Ca)			97.8		%		80-120	08-AUG-18
Chromium (Cr)			94.8		%		80-120	08-AUG-18
Cobalt (Co)			92.8		%		80-120	08-AUG-18
Copper (Cu)			91.6		%		80-120	08-AUG-18
Iron (Fe)			85.5		%		80-120	08-AUG-18
Lead (Pb)			95.0		%		80-120	08-AUG-18
Magnesium (Mg)			95.9		%		80-120	08-AUG-18
Molybdenum (Mo)			96.3		%		80-120	08-AUG-18
Nickel (Ni)			93.1		%		80-120	08-AUG-18
Selenium (Se)			96.9		%		80-120	08-AUG-18
Silver (Ag)			95.3		%		80-120	08-AUG-18
Thallium (Tl)			94.9		%		80-120	08-AUG-18
Uranium (U)			93.3		%		80-120	08-AUG-18
Vanadium (V)			97.1		%		80-120	08-AUG-18
Zinc (Zn)			89.9		%		80-120	08-AUG-18
WG2842896-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	08-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	08-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	08-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	08-AUG-18
Bismuth (Bi)			<0.20		mg/kg		0.2	08-AUG-18
Boron (B)			<5.0		mg/kg		5	08-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	08-AUG-18
Calcium (Ca)			<50		mg/kg		50	08-AUG-18
Chromium (Cr)			<0.50		mg/kg		0.5	08-AUG-18
Cobalt (Co)			<0.10		mg/kg		0.1	08-AUG-18
Copper (Cu)			<0.50		mg/kg		0.5	08-AUG-18
Iron (Fe)			<50		mg/kg		50	08-AUG-18
Lead (Pb)			<0.50		mg/kg		0.5	08-AUG-18
Magnesium (Mg)			<20		mg/kg		20	08-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	08-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	08-AUG-18
Selenium (Se)			<0.20		mg/kg		0.2	08-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4162617								
WG2842896-1 MB								
Thallium (Tl)			<0.050		mg/kg		0.05	08-AUG-18
Uranium (U)			<0.050		mg/kg		0.05	08-AUG-18
Vanadium (V)			<0.20		mg/kg		0.2	08-AUG-18
Zinc (Zn)			<2.0		mg/kg		2	08-AUG-18
Batch R4162646								
WG2843152-2 CRM		**WT-CANMET-TILL1**						
Antimony (Sb)			93.1		%		70-130	08-AUG-18
Arsenic (As)			100.8		%		70-130	08-AUG-18
Barium (Ba)			104.4		%		70-130	08-AUG-18
Beryllium (Be)			108.2		%		70-130	08-AUG-18
Bismuth (Bi)			99.3		%		70-130	08-AUG-18
Boron (B)			3.2		mg/kg		0-8.2	08-AUG-18
Cadmium (Cd)			93.3		%		70-130	08-AUG-18
Calcium (Ca)			104.5		%		70-130	08-AUG-18
Chromium (Cr)			97.5		%		70-130	08-AUG-18
Cobalt (Co)			98.7		%		70-130	08-AUG-18
Copper (Cu)			98.4		%		70-130	08-AUG-18
Iron (Fe)			99.2		%		70-130	08-AUG-18
Lead (Pb)			98.2		%		70-130	08-AUG-18
Magnesium (Mg)			99.3		%		70-130	08-AUG-18
Molybdenum (Mo)			106.1		%		70-130	08-AUG-18
Nickel (Ni)			98.6		%		70-130	08-AUG-18
Selenium (Se)			0.31		mg/kg		0.11-0.51	08-AUG-18
Silver (Ag)			0.21		mg/kg		0.13-0.33	08-AUG-18
Thallium (Tl)			0.118		mg/kg		0.077-0.18	08-AUG-18
Uranium (U)			99.2		%		70-130	08-AUG-18
Vanadium (V)			97.8		%		70-130	08-AUG-18
Zinc (Zn)			96.8		%		70-130	08-AUG-18
WG2843152-6 DUP		**WG2843152-5**						
Antimony (Sb)		0.12	0.12		ug/g	0.5	30	08-AUG-18
Arsenic (As)		3.25	3.46		ug/g	6.4	30	08-AUG-18
Barium (Ba)		54.8	56.0		ug/g	2.2	40	08-AUG-18
Beryllium (Be)		0.29	0.30		ug/g	5.4	30	08-AUG-18
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4162646								
WG2843152-6 DUP		**WG2843152-5**						
Boron (B)		6.0	5.8		ug/g	3.6	30	08-AUG-18
Cadmium (Cd)		0.094	0.088		ug/g	6.5	30	08-AUG-18
Calcium (Ca)		102000	102000		ug/g	0.1	30	08-AUG-18
Chromium (Cr)		12.5	13.0		ug/g	3.9	30	08-AUG-18
Cobalt (Co)		4.89	5.07		ug/g	3.6	30	08-AUG-18
Copper (Cu)		21.0	22.2		ug/g	5.8	30	08-AUG-18
Iron (Fe)		13700	13900		ug/g	1.2	30	08-AUG-18
Lead (Pb)		10.9	11.5		ug/g	5.0	40	08-AUG-18
Magnesium (Mg)		13700	14100		ug/g	2.7	30	08-AUG-18
Molybdenum (Mo)		0.37	0.39		ug/g	5.3	40	08-AUG-18
Nickel (Ni)		10.1	10.6		ug/g	4.8	30	08-AUG-18
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	08-AUG-18
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	08-AUG-18
Thallium (Tl)		0.085	0.084		ug/g	1.3	30	08-AUG-18
Uranium (U)		0.455	0.422		ug/g	7.6	30	08-AUG-18
Vanadium (V)		20.1	20.7		ug/g	3.2	30	08-AUG-18
Zinc (Zn)		39.8	41.6		ug/g	4.4	30	08-AUG-18
WG2843152-4 LCS								
Antimony (Sb)			98.5		%		80-120	08-AUG-18
Arsenic (As)			95.7		%		80-120	08-AUG-18
Barium (Ba)			97.7		%		80-120	08-AUG-18
Beryllium (Be)			95.0		%		80-120	08-AUG-18
Bismuth (Bi)			93.7		%		80-120	08-AUG-18
Boron (B)			92.2		%		80-120	08-AUG-18
Cadmium (Cd)			92.9		%		80-120	08-AUG-18
Calcium (Ca)			94.5		%		80-120	08-AUG-18
Chromium (Cr)			95.7		%		80-120	08-AUG-18
Cobalt (Co)			94.6		%		80-120	08-AUG-18
Copper (Cu)			93.2		%		80-120	08-AUG-18
Iron (Fe)			90.6		%		80-120	08-AUG-18
Lead (Pb)			98.6		%		80-120	08-AUG-18
Magnesium (Mg)			98.6		%		80-120	08-AUG-18
Molybdenum (Mo)			97.9		%		80-120	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R4162646								
WG2843152-4 LCS								
Nickel (Ni)			94.1		%		80-120	08-AUG-18
Selenium (Se)			96.5		%		80-120	08-AUG-18
Silver (Ag)			91.3		%		80-120	08-AUG-18
Thallium (Tl)			93.3		%		80-120	08-AUG-18
Uranium (U)			94.6		%		80-120	08-AUG-18
Vanadium (V)			97.3		%		80-120	08-AUG-18
Zinc (Zn)			86.2		%		80-120	08-AUG-18
WG2843152-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	08-AUG-18
Arsenic (As)			<0.10		mg/kg		0.1	08-AUG-18
Barium (Ba)			<0.50		mg/kg		0.5	08-AUG-18
Beryllium (Be)			<0.10		mg/kg		0.1	08-AUG-18
Bismuth (Bi)			<0.20		mg/kg		0.2	08-AUG-18
Boron (B)			<5.0		mg/kg		5	08-AUG-18
Cadmium (Cd)			<0.020		mg/kg		0.02	08-AUG-18
Calcium (Ca)			<50		mg/kg		50	08-AUG-18
Chromium (Cr)			<0.50		mg/kg		0.5	08-AUG-18
Cobalt (Co)			<0.10		mg/kg		0.1	08-AUG-18
Copper (Cu)			<0.50		mg/kg		0.5	08-AUG-18
Iron (Fe)			<50		mg/kg		50	08-AUG-18
Lead (Pb)			<0.50		mg/kg		0.5	08-AUG-18
Magnesium (Mg)			<20		mg/kg		20	08-AUG-18
Molybdenum (Mo)			<0.10		mg/kg		0.1	08-AUG-18
Nickel (Ni)			<0.50		mg/kg		0.5	08-AUG-18
Selenium (Se)			<0.20		mg/kg		0.2	08-AUG-18
Silver (Ag)			<0.10		mg/kg		0.1	08-AUG-18
Thallium (Tl)			<0.050		mg/kg		0.05	08-AUG-18
Uranium (U)			<0.050		mg/kg		0.05	08-AUG-18
Vanadium (V)			<0.20		mg/kg		0.2	08-AUG-18
Zinc (Zn)			<2.0		mg/kg		2	08-AUG-18
MOISTURE-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R4160643								
WG2842487-3 DUP		**L2140486-7**						
% Moisture		5.74	6.83		%	17	20	08-AUG-18
WG2842487-2 LCS								
% Moisture			97.9		%		90-110	08-AUG-18
WG2842487-1 MB								
% Moisture			<0.10		%		0.1	08-AUG-18
Batch R4161124								
WG2843444-3 DUP		**L2139996-1**						
% Moisture		3.53	3.63		%	2.8	20	09-AUG-18
WG2843444-2 LCS								
% Moisture			99.9		%		90-110	09-AUG-18
WG2843444-1 MB								
% Moisture			<0.10		%		0.1	09-AUG-18
Batch R4161717								
WG2843270-3 DUP		**L2140812-2**						
% Moisture		11.8	11.3		%	3.8	20	09-AUG-18
WG2843270-2 LCS								
% Moisture			99.8		%		90-110	09-AUG-18
WG2843270-1 MB								
% Moisture			<0.10		%		0.1	09-AUG-18
PAH-511-WT	**Soil**							
Batch R4160819								
WG2840890-4 DUP		**WG2840890-3**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-AUG-18
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-AUG-18
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Fluoranthene		0.056	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4160819								
WG2840890-4 DUP		**WG2840890-3**						
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	08-AUG-18
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	08-AUG-18
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-AUG-18
WG2840890-2 LCS								
1-Methylnaphthalene			91.5		%		50-140	08-AUG-18
2-Methylnaphthalene			91.8		%		50-140	08-AUG-18
Acenaphthene			91.8		%		50-140	08-AUG-18
Acenaphthylene			86.2		%		50-140	08-AUG-18
Anthracene			86.0		%		50-140	08-AUG-18
Benzo(a)anthracene			86.2		%		50-140	08-AUG-18
Benzo(a)pyrene			90.0		%		50-140	08-AUG-18
Benzo(b)fluoranthene			86.7		%		50-140	08-AUG-18
Benzo(g,h,i)perylene			76.7		%		50-140	08-AUG-18
Benzo(k)fluoranthene			98.6		%		50-140	08-AUG-18
Chrysene			90.0		%		50-140	08-AUG-18
Dibenzo(ah)anthracene			80.0		%		50-140	08-AUG-18
Fluoranthene			88.7		%		50-140	08-AUG-18
Fluorene			87.9		%		50-140	08-AUG-18
Indeno(1,2,3-cd)pyrene			77.7		%		50-140	08-AUG-18
Naphthalene			90.2		%		50-140	08-AUG-18
Phenanthrene			91.2		%		50-140	08-AUG-18
Pyrene			89.4		%		50-140	08-AUG-18
WG2840890-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	08-AUG-18
2-Methylnaphthalene			<0.030		ug/g		0.03	08-AUG-18
Acenaphthene			<0.050		ug/g		0.05	08-AUG-18
Acenaphthylene			<0.050		ug/g		0.05	08-AUG-18
Anthracene			<0.050		ug/g		0.05	08-AUG-18
Benzo(a)anthracene			<0.050		ug/g		0.05	08-AUG-18
Benzo(a)pyrene			<0.050		ug/g		0.05	08-AUG-18
Benzo(b)fluoranthene			<0.050		ug/g		0.05	08-AUG-18
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R4160819								
WG2840890-1 MB								
Benzo(k)fluoranthene			<0.050		ug/g		0.05	08-AUG-18
Chrysene			<0.050		ug/g		0.05	08-AUG-18
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	08-AUG-18
Fluoranthene			<0.050		ug/g		0.05	08-AUG-18
Fluorene			<0.050		ug/g		0.05	08-AUG-18
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	08-AUG-18
Naphthalene			<0.013		ug/g		0.013	08-AUG-18
Phenanthrene			<0.046		ug/g		0.046	08-AUG-18
Pyrene			<0.050		ug/g		0.05	08-AUG-18
Surrogate: 2-Fluorobiphenyl			92.5		%		50-140	08-AUG-18
Surrogate: p-Terphenyl d14			96.1		%		50-140	08-AUG-18
WG2840890-5 MS		**WG2840890-3**						
1-Methylnaphthalene			74.3		%		50-140	08-AUG-18
2-Methylnaphthalene			74.0		%		50-140	08-AUG-18
Acenaphthene			74.2		%		50-140	08-AUG-18
Acenaphthylene			70.3		%		50-140	08-AUG-18
Anthracene			71.8		%		50-140	08-AUG-18
Benzo(a)anthracene			69.7		%		50-140	08-AUG-18
Benzo(a)pyrene			71.8		%		50-140	08-AUG-18
Benzo(b)fluoranthene			70.2		%		50-140	08-AUG-18
Benzo(g,h,i)perylene			65.6		%		50-140	08-AUG-18
Benzo(k)fluoranthene			70.3		%		50-140	08-AUG-18
Chrysene			72.3		%		50-140	08-AUG-18
Dibenzo(ah)anthracene			65.9		%		50-140	08-AUG-18
Fluoranthene			67.5		%		50-140	08-AUG-18
Fluorene			71.4		%		50-140	08-AUG-18
Indeno(1,2,3-cd)pyrene			66.2		%		50-140	08-AUG-18
Naphthalene			71.7		%		50-140	08-AUG-18
Phenanthrene			66.9		%		50-140	08-AUG-18
Pyrene			67.6		%		50-140	08-AUG-18
PCB-511-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-511-WT	**Soil**							
Batch R4162178								
WG2840890-4 DUP		**WG2840890-3**						
Aroclor 1242		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-AUG-18
Aroclor 1248		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-AUG-18
Aroclor 1254		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-AUG-18
Aroclor 1260		<0.010	<0.010	RPD-NA	ug/g	N/A	40	09-AUG-18
WG2840890-2 LCS								
Aroclor 1242			83.8		%		60-140	09-AUG-18
Aroclor 1248			76.3		%		60-140	09-AUG-18
Aroclor 1254			95.2		%		60-140	09-AUG-18
Aroclor 1260			91.7		%		60-140	09-AUG-18
WG2840890-1 MB								
Aroclor 1242			<0.010		ug/g		0.01	09-AUG-18
Aroclor 1248			<0.010		ug/g		0.01	09-AUG-18
Aroclor 1254			<0.010		ug/g		0.01	09-AUG-18
Aroclor 1260			<0.010		ug/g		0.01	09-AUG-18
Surrogate: d14-Terphenyl			88.4		%		60-140	09-AUG-18
WG2840890-5 MS		**WG2840890-3**						
Aroclor 1242			74.3		%		60-140	09-AUG-18
Aroclor 1254			93.1		%		60-140	09-AUG-18
Aroclor 1260			90.9		%		60-140	09-AUG-18
PH-WT	**Soil**							
Batch R4160971								
WG2842315-1 DUP		**L2140812-4**						
pH		7.96	8.01	J	pH units	0.05	0.3	08-AUG-18
WG2843413-1 LCS								
pH			6.99		pH units		6.9-7.1	08-AUG-18
SAR-R511-WT	**Soil**							
Batch R4161040								
WG2843172-4 DUP		**WG2843172-3**						
Calcium (Ca)		<1.0	1.1	RPD-NA	mg/L	N/A	30	08-AUG-18
Sodium (Na)		75.5	74.5		mg/L	1.3	30	08-AUG-18
Magnesium (Mg)		<1.0	<1.0	RPD-NA	mg/L	N/A	30	08-AUG-18
WG2843172-2 IRM		**WT SAR2**						
Calcium (Ca)			96.3		%		70-130	08-AUG-18
Sodium (Na)			99.1		%		70-130	08-AUG-18
Magnesium (Mg)			93.7		%		70-130	08-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R4161040								
WG2843172-1 MB								
Calcium (Ca)			<1.0		mg/L		1	08-AUG-18
Sodium (Na)			<1.0		mg/L		1	08-AUG-18
Magnesium (Mg)			<1.0		mg/L		1	08-AUG-18
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-4 DUP		**WG2840561-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	07-AUG-18
Benzene		0.0700	0.0697		ug/g	0.4	40	07-AUG-18
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	07-AUG-18
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Ethylbenzene		0.057	0.056		ug/g	1.4	40	07-AUG-18
n-Hexane		<0.080	<0.080	RPD-NA	ug/g	N/A	40	07-AUG-18
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-4 DUP		**WG2840561-3**						
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
m+p-Xylenes		0.178	0.177		ug/g	0.3	40	07-AUG-18
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	07-AUG-18
Methyl Isobutyl Ketone		0.63	0.69		ug/g	9.3	40	07-AUG-18
o-Xylene		0.088	0.089		ug/g	0.3	40	07-AUG-18
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Toluene		0.191	0.191		ug/g	0.3	40	07-AUG-18
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	07-AUG-18
Trichloroethylene		0.014	0.013		ug/g	7.7	40	07-AUG-18
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	07-AUG-18
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	07-AUG-18
WG2840561-2 LCS								
1,1,1,2-Tetrachloroethane			105.4		%		60-130	07-AUG-18
1,1,2,2-Tetrachloroethane			105.1		%		60-130	07-AUG-18
1,1,1-Trichloroethane			102.9		%		60-130	07-AUG-18
1,1,2-Trichloroethane			108.5		%		60-130	07-AUG-18
1,1-Dichloroethane			107.6		%		60-130	07-AUG-18
1,1-Dichloroethylene			94.2		%		60-130	07-AUG-18
1,2-Dibromoethane			108.7		%		70-130	07-AUG-18
1,2-Dichlorobenzene			106.8		%		70-130	07-AUG-18
1,2-Dichloroethane			107.7		%		60-130	07-AUG-18
1,2-Dichloropropane			107.5		%		70-130	07-AUG-18
1,3-Dichlorobenzene			104.7		%		70-130	07-AUG-18
1,4-Dichlorobenzene			105.5		%		70-130	07-AUG-18
Acetone			109.9		%		60-140	07-AUG-18
Benzene			107.2		%		70-130	07-AUG-18
Bromodichloromethane			109.3		%		50-140	07-AUG-18
Bromoform			105.7		%		70-130	07-AUG-18
Bromomethane			84.2		%		50-140	07-AUG-18
Carbon tetrachloride			102.3		%		70-130	07-AUG-18
Chlorobenzene			106.1		%		70-130	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-2 LCS								
Chloroform			107.6		%		70-130	07-AUG-18
cis-1,2-Dichloroethylene			106.2		%		70-130	07-AUG-18
cis-1,3-Dichloropropene			109.7		%		70-130	07-AUG-18
Dibromochloromethane			106.7		%		60-130	07-AUG-18
Dichlorodifluoromethane			86.9		%		50-140	07-AUG-18
Ethylbenzene			99.5		%		70-130	07-AUG-18
n-Hexane			106.6		%		70-130	07-AUG-18
Methylene Chloride			107.2		%		70-130	07-AUG-18
MTBE			107.3		%		70-130	07-AUG-18
m+p-Xylenes			100.8		%		70-130	07-AUG-18
Methyl Ethyl Ketone			113.7		%		60-140	07-AUG-18
Methyl Isobutyl Ketone			110.1		%		60-140	07-AUG-18
o-Xylene			98.8		%		70-130	07-AUG-18
Styrene			99.8		%		70-130	07-AUG-18
Tetrachloroethylene			104.7		%		60-130	07-AUG-18
Toluene			102.0		%		70-130	07-AUG-18
trans-1,2-Dichloroethylene			102.5		%		60-130	07-AUG-18
trans-1,3-Dichloropropene			108.0		%		70-130	07-AUG-18
Trichloroethylene			109.9		%		60-130	07-AUG-18
Trichlorofluoromethane			106.4		%		50-140	07-AUG-18
Vinyl chloride			93.6		%		60-140	07-AUG-18
WG2840561-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	07-AUG-18
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	07-AUG-18
1,1,1-Trichloroethane			<0.050		ug/g		0.05	07-AUG-18
1,1,2-Trichloroethane			<0.050		ug/g		0.05	07-AUG-18
1,1-Dichloroethane			<0.050		ug/g		0.05	07-AUG-18
1,1-Dichloroethylene			<0.050		ug/g		0.05	07-AUG-18
1,2-Dibromoethane			<0.050		ug/g		0.05	07-AUG-18
1,2-Dichlorobenzene			<0.050		ug/g		0.05	07-AUG-18
1,2-Dichloroethane			<0.050		ug/g		0.05	07-AUG-18
1,2-Dichloropropane			<0.050		ug/g		0.05	07-AUG-18
1,3-Dichlorobenzene			<0.050		ug/g		0.05	07-AUG-18
1,4-Dichlorobenzene			<0.050		ug/g		0.05	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-1 MB								
Acetone			<0.50		ug/g		0.5	07-AUG-18
Benzene			<0.0068		ug/g		0.0068	07-AUG-18
Bromodichloromethane			<0.050		ug/g		0.05	07-AUG-18
Bromoform			<0.050		ug/g		0.05	07-AUG-18
Bromomethane			<0.050		ug/g		0.05	07-AUG-18
Carbon tetrachloride			<0.050		ug/g		0.05	07-AUG-18
Chlorobenzene			<0.050		ug/g		0.05	07-AUG-18
Chloroform			<0.050		ug/g		0.05	07-AUG-18
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	07-AUG-18
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	07-AUG-18
Dibromochloromethane			<0.050		ug/g		0.05	07-AUG-18
Dichlorodifluoromethane			<0.050		ug/g		0.05	07-AUG-18
Ethylbenzene			<0.018		ug/g		0.018	07-AUG-18
n-Hexane			<0.050		ug/g		0.05	07-AUG-18
Methylene Chloride			<0.050		ug/g		0.05	07-AUG-18
MTBE			<0.050		ug/g		0.05	07-AUG-18
m+p-Xylenes			<0.030		ug/g		0.03	07-AUG-18
Methyl Ethyl Ketone			<0.50		ug/g		0.5	07-AUG-18
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	07-AUG-18
o-Xylene			<0.020		ug/g		0.02	07-AUG-18
Styrene			<0.050		ug/g		0.05	07-AUG-18
Tetrachloroethylene			<0.050		ug/g		0.05	07-AUG-18
Toluene			<0.080		ug/g		0.08	07-AUG-18
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	07-AUG-18
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	07-AUG-18
Trichloroethylene			<0.010		ug/g		0.01	07-AUG-18
Trichlorofluoromethane			<0.050		ug/g		0.05	07-AUG-18
Vinyl chloride			<0.020		ug/g		0.02	07-AUG-18
Surrogate: 1,4-Difluorobenzene			113.3		%		50-140	07-AUG-18
Surrogate: 4-Bromofluorobenzene			111.0		%		50-140	07-AUG-18
WG2840561-5 MS		**L2140662-1**						
1,1,1,2-Tetrachloroethane			105.8		%		50-140	07-AUG-18
1,1,2,2-Tetrachloroethane			101.9		%		50-140	07-AUG-18
1,1,1-Trichloroethane			102.9		%		50-140	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-5 MS		**L2140662-1**						
1,1,2-Trichloroethane			107.8		%		50-140	07-AUG-18
1,1-Dichloroethane			107.0		%		50-140	07-AUG-18
1,1-Dichloroethylene			94.9		%		50-140	07-AUG-18
1,2-Dibromoethane			106.7		%		50-140	07-AUG-18
1,2-Dichlorobenzene			105.6		%		50-140	07-AUG-18
1,2-Dichloroethane			103.8		%		50-140	07-AUG-18
1,2-Dichloropropane			105.3		%		50-140	07-AUG-18
1,3-Dichlorobenzene			103.2		%		50-140	07-AUG-18
1,4-Dichlorobenzene			103.4		%		50-140	07-AUG-18
Acetone			104.0		%		50-140	07-AUG-18
Benzene			107.9		%		50-140	07-AUG-18
Bromodichloromethane			106.2		%		50-140	07-AUG-18
Bromoform			104.1		%		50-140	07-AUG-18
Bromomethane			81.8		%		50-140	07-AUG-18
Carbon tetrachloride			102.5		%		50-140	07-AUG-18
Chlorobenzene			105.5		%		50-140	07-AUG-18
Chloroform			106.1		%		50-140	07-AUG-18
cis-1,2-Dichloroethylene			105.3		%		50-140	07-AUG-18
cis-1,3-Dichloropropene			100.8		%		50-140	07-AUG-18
Dibromochloromethane			105.9		%		50-140	07-AUG-18
Dichlorodifluoromethane			93.9		%		50-140	07-AUG-18
Ethylbenzene			105.7		%		50-140	07-AUG-18
n-Hexane			111.3		%		50-140	07-AUG-18
Methylene Chloride			106.4		%		50-140	07-AUG-18
MTBE			107.4		%		50-140	07-AUG-18
m+p-Xylenes			109.2		%		50-140	07-AUG-18
Methyl Ethyl Ketone			106.6		%		50-140	07-AUG-18
Methyl Isobutyl Ketone			81.0		%		50-140	07-AUG-18
o-Xylene			109.3		%		50-140	07-AUG-18
Styrene			99.4		%		50-140	07-AUG-18
Tetrachloroethylene			105.3		%		50-140	07-AUG-18
Toluene			110.6		%		50-140	07-AUG-18
trans-1,2-Dichloroethylene			101.0		%		50-140	07-AUG-18

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4159969								
WG2840561-5 MS		**L2140662-1**						
trans-1,3-Dichloropropene			100.0		%		50-140	07-AUG-18
Trichloroethylene			108.8		%		50-140	07-AUG-18
Trichlorofluoromethane			109.0		%		50-140	07-AUG-18
Vinyl chloride			95.5		%		50-140	07-AUG-18

Quality Control Report

Workorder: L2140486 Report Date: 14-APR-21

Client: Jacobs Consultancy Canada Inc.
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

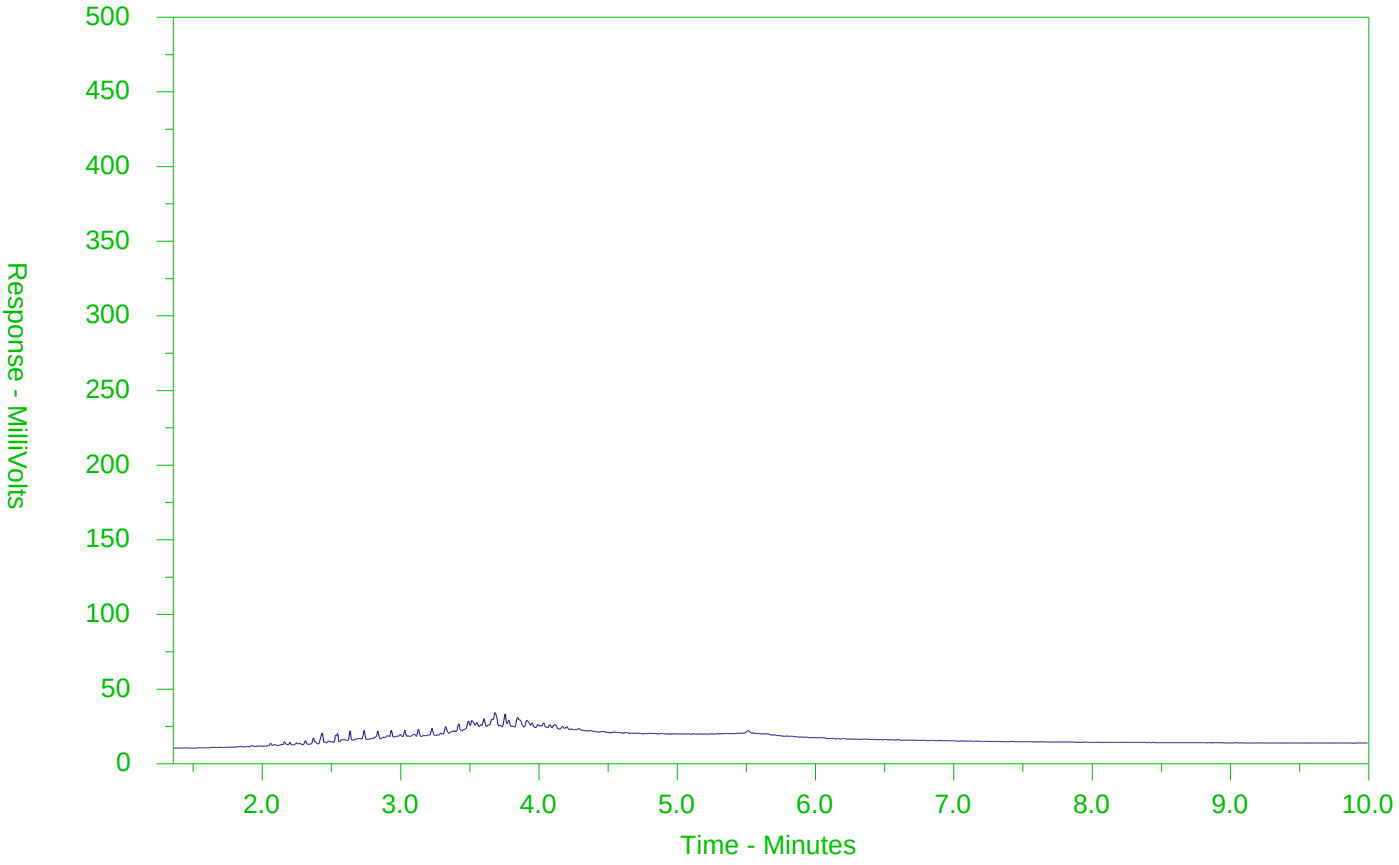
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2140486-4
Client Sample ID: MW18-125S-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

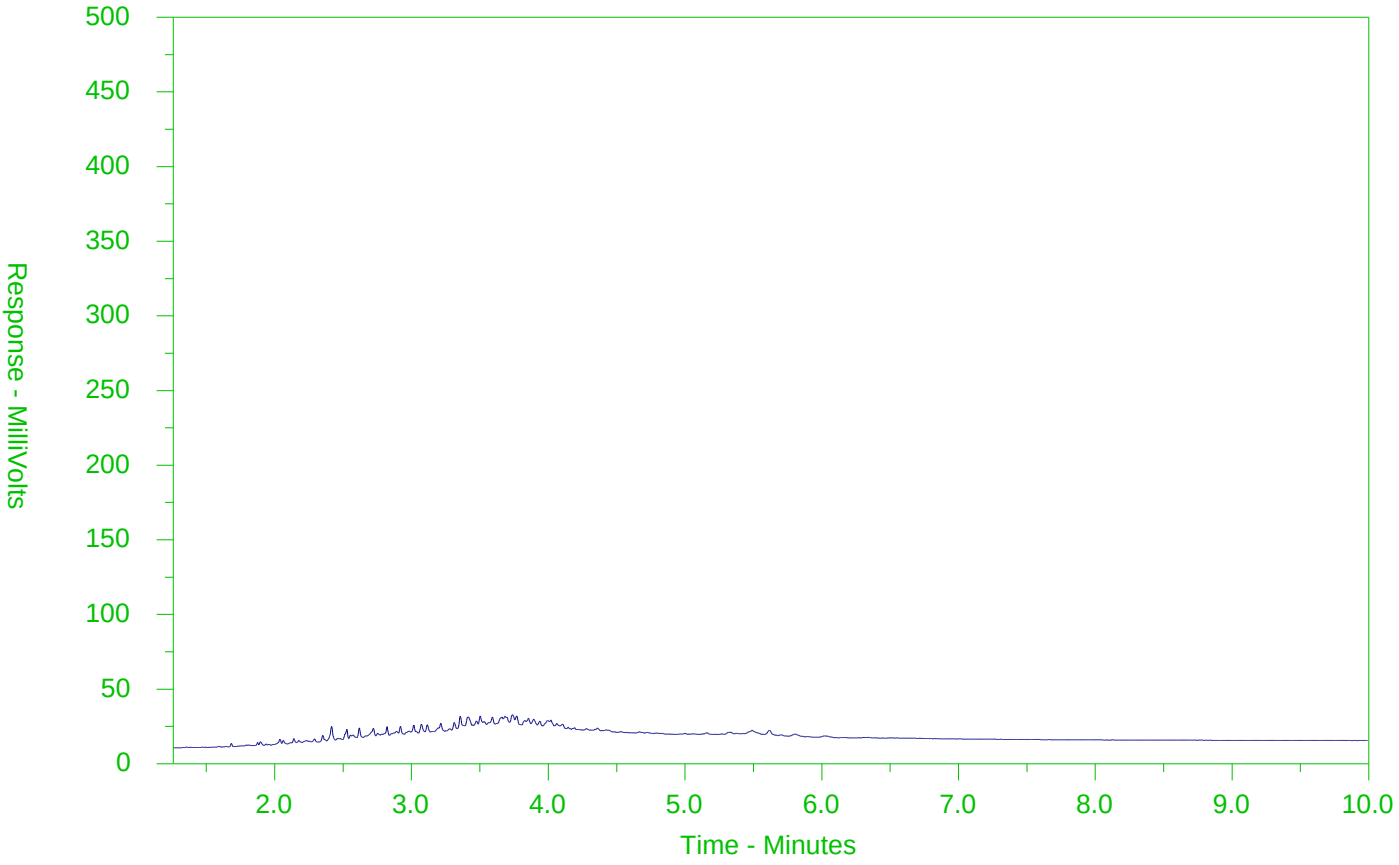
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2140486-7
Client Sample ID: MW18-126D-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2140486-COFC

COC Number: 17 - 626955

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M JACOBS	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	TONIA MCCARTHY	Quality Control (QC) Report with Report: YES NO	4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] (Prepaid)
Phone:	519 579 3555	Compare Results to Criteria on Report - provide details below if box checked	1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply) (Emergency)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St. S. Suite 300	Email 1 or Fax: Tonia.mccarthy@ch2m.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	KITCHENER-ON	Email 2: lucas.ribeiro@ch2m.com	
Postal Code:	N2G 4Y9	Email 3	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2140486 | ALS Contact: | Sa

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	24H	1+ ANALS.	18 ONLY.	PCB	PHC	VOC	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	MW18-122D-1	26-JUL-18									7
2	MW18-121S-1	27-JUL-18									5
3	MW18-125S-1	31-JUL-18									4
4	MW18-125D-2	31-JUL-18									2
5	MW18-125D-3	31-JUL-18									2
6	MW18-127D-1	31-JUL-18									6
7	MW18-127D-2	31-JUL-18									4
8	MW18-127D-3	31-JUL-18									4
9	DUP JUL 31	31-JUL-18									
10	TRIP BLANK JUL 31										

vials don't match
Bottles
126

Drinking Water (DW) Samples (client use)	Special Instructions / Specify Criteria to add on report by click (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Compare O.Reg. 153/04
Are samples for human consumption/ use? YES NO	

CONDITION AS RECEIVED (lab use only)

SIF Observations: Yes No

Ice Packs Ice Cubes Custody seal intact: Yes No

Cooling Initiated

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5.6			9.6		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by: BF	Date: Aug 1, 2018	Time: 16:25	Received by: AE	Date: Aug 1	Time: 16:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: TANIA MCCARTHY
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 02-AUG-18
Report Date: 10-AUG-18 13:42 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2140617

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2140617-1 TCLP						
Sampled By: CLIENT on 01-AUG-18 @ 11:00						
Matrix: SOIL						
Sample Preparation						
Initial pH	9.64		0.10	pH units	04-AUG-18	
Final pH	5.25		0.10	pH units	04-AUG-18	
Physical Tests						
Air Velocity Of Fume Hood	0.70		0.10	m/sec	09-AUG-18	
Burning Rate	N/A		0.010	mm/sec	09-AUG-18	
Ignitability-Class	NON FLAMMABLE			No Unit	09-AUG-18	
Samp Comment	BROWN SOIL			No Unit	09-AUG-18	
Temperature Of Test Material	21.0		1.0	Deg. C	09-AUG-18	
Time To Ignition	N/A		1.0	sec	09-AUG-18	
TCLP Extractables						
Acenaphthene	<0.0050		0.0050	mg/L	09-AUG-18	
Acenaphthylene	<0.0050		0.0050	mg/L	09-AUG-18	
Anthracene	<0.0050		0.0050	mg/L	09-AUG-18	
Aroclor 1242	<0.00020		0.00020	mg/L	09-AUG-18	
Aroclor 1248	<0.00020		0.00020	mg/L	09-AUG-18	
Aroclor 1254	<0.00020		0.00020	mg/L	09-AUG-18	
Aroclor 1260	<0.00020		0.00020	mg/L	09-AUG-18	
Benzo(a)anthracene	<0.0050		0.0050	mg/L	09-AUG-18	
Benzo(a)pyrene	<0.0010		0.0010	mg/L	09-AUG-18	0.001
Benzo(b)fluoranthene	<0.0050		0.0050	mg/L	09-AUG-18	
Benzo(g,h,i)perylene	<0.0050		0.0050	mg/L	09-AUG-18	
Surrogate: 2-Bromobenzotrifluoride	84.1		50-150	%	08-AUG-18	
Chrom. to baseline at nC50	YES			No Unit	08-AUG-18	
Cyanide, Weak Acid Diss	<0.10		0.10	mg/L	08-AUG-18	20
Fluoride (F)	<10		10	mg/L	05-AUG-18	150.0
Nitrate and Nitrite as N	<4.0		4.0	mg/L	05-AUG-18	1000
Nitrate-N	<2.0		2.0	mg/L	05-AUG-18	
Nitrite-N	<2.0		2.0	mg/L	05-AUG-18	
Total PCBs	<0.00040		0.00040	mg/L	09-AUG-18	0.3
Surrogate: 2-Fluorobiphenyl	49.9		40-160	%	09-AUG-18	
TCLP Metals						
Arsenic (As)	<0.050		0.050	mg/L	07-AUG-18	2.5
Barium (Ba)	0.50		0.50	mg/L	07-AUG-18	100
Boron (B)	<2.5		2.5	mg/L	07-AUG-18	500
Cadmium (Cd)	0.0146		0.0050	mg/L	07-AUG-18	0.5
Chromium (Cr)	<0.050		0.050	mg/L	07-AUG-18	5.0
Lead (Pb)	0.197		0.050	mg/L	07-AUG-18	5.0
Mercury (Hg)	<0.00010		0.00010	mg/L	07-AUG-18	0.1
Selenium (Se)	<0.025		0.025	mg/L	07-AUG-18	1.0
Silver (Ag)	<0.0050		0.0050	mg/L	07-AUG-18	5.0
Uranium (U)	<0.25		0.25	mg/L	07-AUG-18	10
TCLP VOCs						
1,1-Dichloroethylene	<0.025		0.025	mg/L	08-AUG-18	1.4
1,2-Dichlorobenzene	<0.025		0.025	mg/L	08-AUG-18	20.0
1,2-Dichloroethane	<0.025		0.025	mg/L	08-AUG-18	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

#1: Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2140617-1 TCLP Sampled By: CLIENT on 01-AUG-18 @ 11:00 Matrix: SOIL						
TCLP VOCs						
1,4-Dichlorobenzene	<0.025		0.025	mg/L	08-AUG-18	0.5
Benzene	<0.025		0.025	mg/L	08-AUG-18	0.5
Carbon tetrachloride	<0.025		0.025	mg/L	08-AUG-18	0.5
Chlorobenzene	<0.025		0.025	mg/L	08-AUG-18	8
Chloroform	<0.10		0.10	mg/L	08-AUG-18	10
Dichloromethane	<0.50		0.50	mg/L	08-AUG-18	5.0
Methyl Ethyl Ketone	<1.0		1.0	mg/L	08-AUG-18	200.0
Tetrachloroethylene	<0.025		0.025	mg/L	08-AUG-18	3
Trichloroethylene	<0.025		0.025	mg/L	08-AUG-18	5
Vinyl chloride	<0.050		0.050	mg/L	08-AUG-18	0.2
Surrogate: 4-Bromofluorobenzene	98.2		70-130	%	08-AUG-18	
Volatile Organic Compounds						
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	08-AUG-18	
Hydrocarbons						
F1 (C6-C10)	<5.0		5.0	mg/L	08-AUG-18	
F1-BTEX	<5.0		5.0	mg/L	08-AUG-18	
F2 (C10-C16)	<0.10		0.10	mg/L	08-AUG-18	
F3 (C16-C34)	<0.25		0.25	mg/L	08-AUG-18	
F4 (C34-C50)	<0.25		0.25	mg/L	08-AUG-18	
Total Hydrocarbons (C6-C50)	<5.0		5.0	mg/L	08-AUG-18	
Polycyclic Aromatic Hydrocarbons						
Benzo(k)fluoranthene	<0.0050		0.0050	mg/L	09-AUG-18	
Chrysene	<0.0050		0.0050	mg/L	09-AUG-18	
Dibenzo(ah)anthracene	<0.0050		0.0050	mg/L	09-AUG-18	
Fluoranthene	<0.0050		0.0050	mg/L	09-AUG-18	
Fluorene	<0.0050		0.0050	mg/L	09-AUG-18	
Indeno(1,2,3-cd)pyrene	<0.0050		0.0050	mg/L	09-AUG-18	
Naphthalene	<0.0050		0.0050	mg/L	09-AUG-18	
Phenanthrene	<0.0050		0.0050	mg/L	09-AUG-18	
Pyrene	<0.0050		0.0050	mg/L	09-AUG-18	
Quinoline	<0.0050		0.0050	mg/L	09-AUG-18	
Surrogate: d10-Acenaphthene	100.0		50-150	%	09-AUG-18	
Surrogate: d12-Chrysene	90.6		50-150	%	09-AUG-18	
Surrogate: d8-Naphthalene	106.8		50-150	%	09-AUG-18	
Surrogate: d10-Phenanthrene	105.7		50-150	%	09-AUG-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

#1: Ontario Ministry of the Environment, General Waste Control Regulation No. 347/90

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
CN-TCLP-WT	Waste	Cyanide for O. Reg 347	APHA 4500CN C E
ETL-TVH,TEH-TCLP-WT	Waste	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001
F-TCLP-WT	Waste	Fluoride (F) for O. Reg 347	APHA 4110 B-Ion Chromatography
F1-TCLP-WT	Waste	O. Reg 347 TCLP leachable F1	SW846 8260
F2-F4-TCLP-WT	Waste	O. Reg 347 TCLP leachable F2-F4	MOE DECPH-E3398/CCME TIER 1
HG-TCLP-WT	Waste	Mercury (CVAA) for O.Reg 347	SW846 7470A
IGNITABILITY-WT	Waste	O. Reg 347 Ignitability	EPA SW846, Method 1030, 1996

Preliminary Screening Test:
Prepare a sample "as received" 250 mm long by 20 mm wide by 10 mm high. Apply the tip of the flame to the end of the sample strip.
If the sample is non-metallic, hold the flame tip on the sample until the sample ignites or for a maximum of 2 minutes. If combustion occurs, begin timing with a stop watch and note whether the sample propagates up to the 200 mm mark within the 2 minute test period.
If the sample is metal or metal alloy powder, hold the flame tip on the sample until the sample ignites or for a maximum of 5 minutes. If combusiton occurs, begin timing with a stop watch and note whether the sample propagates up to the 200 mm mark within the 20 minute test period.
Note: If the waste propagates burning of 200 mm of the test strip within 2 minutes (20 minutes for metals), the material must be evaluated by the burning rate test.
Burning Rate Test:
Refer to section 7.2 of EPA Method 1030. Samples that have a burning rate of greater than 2.2 mm/s are considered to have a positive result for ignitability according to DOT regulations. For metallic samples , the burning rate must be greater than 0.17 mm/s.

LEACH-TCLP-WT	Waste	Leachate Procedure for Reg 347	EPA 1311

Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).

MET-TCLP-WT	Waste	O.Reg 347 TCLP Leachable Metals	EPA 200.8
N2N3-TCLP-WT	Waste	Nitrate/Nitrite-N for O. Reg 347	APHA 4110 B-Ion Chromatography
PAH-TCLP-WT	Waste	PAH for O. Reg 347	SW846 8270 (PAH)

Samples are leached according to TCLP protocol and then the aqueous leachate is extracted and the resulting extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

PCB-TCLP-WT	Waste	PCBs for O. Reg 347	SW846 8270
VOC-TCLP-WT	Waste	VOC for O. Reg 347	SW846 8260

A sample of waste is leached in a zero headspace extractor at 30–2 rpm for 18–2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by headspace technology, followed by GC/MS using internal standard quantitation.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2140617 Report Date: 10-AUG-18

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TCLP-WT	**Waste**							
Batch R4160894								
WG2843452-3 DUP		**L2139951-13**						
Cyanide, Weak Acid Diss		<0.10	<0.10	RPD-NA	mg/L	N/A	50	08-AUG-18
WG2843452-2 LCS								
Cyanide, Weak Acid Diss			96.0		%		70-130	08-AUG-18
WG2843452-1 MB								
Cyanide, Weak Acid Diss			<0.10		mg/L		0.1	08-AUG-18
WG2843452-4 MS		**L2139951-13**						
Cyanide, Weak Acid Diss			95.7		%		50-140	08-AUG-18
F-TCLP-WT	**Waste**							
Batch R4160318								
WG2842860-3 DUP		**L2140826-1**						
Fluoride (F)		<10	<10	RPD-NA	mg/L	N/A	30	05-AUG-18
WG2842860-2 LCS								
Fluoride (F)			91.5		%		70-130	05-AUG-18
WG2842860-1 MB								
Fluoride (F)			<10		mg/L		10	05-AUG-18
WG2842860-4 MS		**L2140826-1**						
Fluoride (F)			86.5		%		50-150	05-AUG-18
F2-F4-TCLP-WT	**Waste**							
Batch R4161129								
WG2842211-1 MB								
Surrogate: 2-Bromobenzotrifluoride			80.9		%		50-150	08-AUG-18
HG-TCLP-WT	**Waste**							
Batch R4160065								
WG2842205-3 DUP		**L2138741-1**						
Mercury (Hg)		<0.00010	<0.00010	RPD-NA	mg/L	N/A	50	07-AUG-18
WG2842205-2 LCS								
Mercury (Hg)			100.0		%		70-130	07-AUG-18
WG2842205-1 MB								
Mercury (Hg)			<0.00010		mg/L		0.0001	07-AUG-18
WG2842205-4 MS		**L2138741-1**						
Mercury (Hg)			91.6		%		50-140	07-AUG-18
MET-TCLP-WT	**Waste**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-WT	**Waste**							
Batch R4160193								
WG2842144-4 DUP		**WG2842144-3**						
Silver (Ag)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	40	07-AUG-18
Arsenic (As)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	07-AUG-18
Boron (B)		<2.5	<2.5	RPD-NA	mg/L	N/A	40	07-AUG-18
Barium (Ba)		<0.50	<0.50	RPD-NA	mg/L	N/A	40	07-AUG-18
Cadmium (Cd)		<0.0050	<0.0050	RPD-NA	mg/L	N/A	40	07-AUG-18
Chromium (Cr)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	07-AUG-18
Lead (Pb)		<0.050	<0.050	RPD-NA	mg/L	N/A	40	07-AUG-18
Selenium (Se)		<0.025	<0.025	RPD-NA	mg/L	N/A	40	07-AUG-18
Uranium (U)		<0.25	<0.25	RPD-NA	mg/L	N/A	40	07-AUG-18
WG2842144-2 LCS								
Silver (Ag)			96.3		%		70-130	07-AUG-18
Arsenic (As)			103.6		%		70-130	07-AUG-18
Boron (B)			96.2		%		70-130	07-AUG-18
Barium (Ba)			109.9		%		70-130	07-AUG-18
Cadmium (Cd)			104.0		%		70-130	07-AUG-18
Chromium (Cr)			101.3		%		70-130	07-AUG-18
Lead (Pb)			102.0		%		70-130	07-AUG-18
Selenium (Se)			100.6		%		70-130	07-AUG-18
Uranium (U)			102.1		%		70-130	07-AUG-18
WG2842144-1 MB								
Silver (Ag)			<0.0050		mg/L		0.005	07-AUG-18
Arsenic (As)			<0.050		mg/L		0.05	07-AUG-18
Boron (B)			<2.5		mg/L		2.5	07-AUG-18
Barium (Ba)			<0.50		mg/L		0.5	07-AUG-18
Cadmium (Cd)			<0.0050		mg/L		0.005	07-AUG-18
Chromium (Cr)			<0.050		mg/L		0.05	07-AUG-18
Lead (Pb)			<0.050		mg/L		0.05	07-AUG-18
Selenium (Se)			<0.025		mg/L		0.025	07-AUG-18
Uranium (U)			<0.25		mg/L		0.25	07-AUG-18
WG2842144-5 MS		**WG2842144-3**						
Silver (Ag)			109.4		%		50-150	07-AUG-18
Arsenic (As)			100.3		%		50-150	07-AUG-18
Boron (B)			92.2		%		50-150	07-AUG-18
Barium (Ba)			102.8		%		50-150	07-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-TCLP-WT	**Waste**							
Batch R4160193								
WG2842144-5 MS		**WG2842144-3**						
Cadmium (Cd)			98.4		%		50-150	07-AUG-18
Chromium (Cr)			94.8		%		50-150	07-AUG-18
Lead (Pb)			97.9		%		50-150	07-AUG-18
Selenium (Se)			98.3		%		50-150	07-AUG-18
Uranium (U)			97.1		%		50-150	07-AUG-18
N2N3-TCLP-WT	**Waste**							
Batch R4160318								
WG2842860-3 DUP		**L2140826-1**						
Nitrate-N		<2.0	<2.0	RPD-NA	mg/L	N/A	30	05-AUG-18
Nitrite-N		<2.0	<2.0	RPD-NA	mg/L	N/A	30	05-AUG-18
WG2842860-2 LCS								
Nitrate-N			98.6		%		70-130	05-AUG-18
Nitrite-N			98.0		%		70-130	05-AUG-18
WG2842860-1 MB								
Nitrate-N			<2.0		mg/L		2	05-AUG-18
Nitrite-N			<2.0		mg/L		2	05-AUG-18
WG2842860-4 MS		**L2140826-1**						
Nitrate-N			101.1		%		50-150	05-AUG-18
Nitrite-N			99.5		%		50-150	05-AUG-18
PAH-TCLP-WT	**Waste**							
Batch R4162253								
WG2842211-5 DUP		**WG2842211-3**						
Acenaphthene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Acenaphthylene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Anthracene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Benzo(a)anthracene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Benzo(a)pyrene		<0.0010	<0.0010	RPD-NA	mg/L	N/A	50	09-AUG-18
Benzo(b)fluoranthene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Benzo(g,h,i)perylene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Benzo(k)fluoranthene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Chrysene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Dibenzo(ah)anthracene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Fluoranthene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Fluorene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TCLP-WT	**Waste**							
Batch R4162253								
WG2842211-5 DUP		**WG2842211-3**						
Indeno(1,2,3-cd)pyrene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Naphthalene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Phenanthrene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Pyrene		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
Quinoline		<0.0050	<0.0050	RPD-NA	mg/L	N/A	50	09-AUG-18
WG2842211-2 LCS								
Acenaphthene			92.1		%		50-130	09-AUG-18
Acenaphthylene			93.9		%		50-130	09-AUG-18
Anthracene			107.8		%		50-130	09-AUG-18
Benzo(a)anthracene			120.2		%		50-140	09-AUG-18
Benzo(a)pyrene			100.3		%		60-140	09-AUG-18
Benzo(b)fluoranthene			112.2		%		50-140	09-AUG-18
Benzo(g,h,i)perylene			106.8		%		50-140	09-AUG-18
Benzo(k)fluoranthene			106.2		%		50-150	09-AUG-18
Chrysene			108.3		%		50-140	09-AUG-18
Dibenzo(ah)anthracene			104.3		%		50-140	09-AUG-18
Fluoranthene			103.6		%		50-150	09-AUG-18
Fluorene			106.4		%		50-150	09-AUG-18
Indeno(1,2,3-cd)pyrene			112.8		%		50-140	09-AUG-18
Naphthalene			90.0		%		50-130	09-AUG-18
Phenanthrene			107.2		%		50-130	09-AUG-18
Pyrene			103.5		%		50-140	09-AUG-18
Quinoline			104.2		%		50-150	09-AUG-18
WG2842211-1 MB								
Acenaphthene			<0.0050		mg/L		0.005	09-AUG-18
Acenaphthylene			<0.0050		mg/L		0.005	09-AUG-18
Anthracene			<0.0050		mg/L		0.005	09-AUG-18
Benzo(a)anthracene			<0.0050		mg/L		0.005	09-AUG-18
Benzo(a)pyrene			<0.0010		mg/L		0.001	09-AUG-18
Benzo(b)fluoranthene			<0.0050		mg/L		0.005	09-AUG-18
Benzo(g,h,i)perylene			<0.0050		mg/L		0.005	09-AUG-18
Benzo(k)fluoranthene			<0.0050		mg/L		0.005	09-AUG-18
Chrysene			<0.0050		mg/L		0.005	09-AUG-18
Dibenzo(ah)anthracene			<0.0050		mg/L		0.005	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-TCLP-WT	**Waste**							
Batch R4162253								
WG2842211-1 MB								
Fluoranthene			<0.0050		mg/L		0.005	09-AUG-18
Fluorene			<0.0050		mg/L		0.005	09-AUG-18
Indeno(1,2,3-cd)pyrene			<0.0050		mg/L		0.005	09-AUG-18
Naphthalene			<0.0050		mg/L		0.005	09-AUG-18
Phenanthrene			<0.0050		mg/L		0.005	09-AUG-18
Pyrene			<0.0050		mg/L		0.005	09-AUG-18
Quinoline			<0.0050		mg/L		0.005	09-AUG-18
Surrogate: d8-Naphthalene			99.2		%		50-150	09-AUG-18
Surrogate: d10-Phenanthrene			98.3		%		50-150	09-AUG-18
Surrogate: d12-Chrysene			61.4		%		50-150	09-AUG-18
Surrogate: d10-Acenaphthene			94.4		%		50-150	09-AUG-18
WG2842211-4 MS		**WG2842211-3**						
Acenaphthene			93.2		%		50-150	09-AUG-18
Acenaphthylene			94.1		%		50-150	09-AUG-18
Anthracene			154.7	MES	%		50-150	09-AUG-18
Benzo(a)anthracene			128.5		%		50-150	09-AUG-18
Benzo(a)pyrene			95.3		%		50-150	09-AUG-18
Benzo(b)fluoranthene			107.6		%		50-150	09-AUG-18
Benzo(g,h,i)perylene			101.1		%		50-150	09-AUG-18
Benzo(k)fluoranthene			101.3		%		50-150	09-AUG-18
Chrysene			120.7		%		50-150	09-AUG-18
Dibenzo(ah)anthracene			98.3		%		50-150	09-AUG-18
Fluoranthene			104.4		%		50-150	09-AUG-18
Fluorene			104.4		%		50-150	09-AUG-18
Indeno(1,2,3-cd)pyrene			107.8		%		50-150	09-AUG-18
Naphthalene			128.4		%		50-150	09-AUG-18
Phenanthrene			147.2		%		50-150	09-AUG-18
Pyrene			104.4		%		50-150	09-AUG-18
Quinoline			111.6		%		50-150	09-AUG-18
PCB-TCLP-WT	**Waste**							
Batch R4162100								
WG2841820-5 DUP		**WG2841820-3**						
Aroclor 1242		<0.00040	<0.00040	RPD-NA	mg/L	N/A	50	09-AUG-18
Aroclor 1248		<0.00040	<0.00040	RPD-NA	mg/L	N/A	50	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-TCLP-WT	**Waste**							
Batch R4162100								
WG2841820-5 DUP		**WG2841820-3**						
Aroclor 1254		<0.00040	<0.00040	RPD-NA	mg/L	N/A	50	09-AUG-18
Aroclor 1260		<0.00040	<0.00040	RPD-NA	mg/L	N/A	50	09-AUG-18
WG2841820-2 LCS								
Aroclor 1242			56.4	LCS-L	%		65-130	09-AUG-18
Aroclor 1248			62.1	LCS-L	%		65-130	09-AUG-18
Aroclor 1254			80.2		%		65-130	09-AUG-18
Aroclor 1260			104.2		%		65-130	09-AUG-18
WG2841820-1 MB								
Aroclor 1242			<0.00020		mg/L		0.0002	09-AUG-18
Aroclor 1248			<0.00020		mg/L		0.0002	09-AUG-18
Aroclor 1254			<0.00020		mg/L		0.0002	09-AUG-18
Aroclor 1260			<0.00020		mg/L		0.0002	09-AUG-18
Surrogate: 2-Fluorobiphenyl			47.4		%		40-160	09-AUG-18
WG2841820-4 MS		**WG2841820-3**						
Aroclor 1242			57.0		%		50-150	09-AUG-18
Aroclor 1254			77.2		%		50-150	09-AUG-18
Aroclor 1260			101.7		%		50-150	09-AUG-18
VOC-TCLP-WT	**Waste**							
Batch R4160059								
WG2835839-1 LCS								
1,1-Dichloroethylene			95.3		%		70-130	07-AUG-18
1,2-Dichlorobenzene			103.8		%		70-130	07-AUG-18
1,2-Dichloroethane			115.3		%		70-130	07-AUG-18
1,4-Dichlorobenzene			102.8		%		70-130	07-AUG-18
Benzene			105.1		%		70-130	07-AUG-18
Carbon tetrachloride			99.1		%		60-140	07-AUG-18
Chlorobenzene			104.5		%		70-130	07-AUG-18
Chloroform			106.2		%		70-130	07-AUG-18
Dichloromethane			109.1		%		70-130	07-AUG-18
Methyl Ethyl Ketone			110.6		%		50-150	07-AUG-18
Tetrachloroethylene			99.6		%		70-130	07-AUG-18
Trichloroethylene			105.3		%		70-130	07-AUG-18
Vinyl chloride			95.3		%		60-130	07-AUG-18
WG2835839-2 MB								

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-TCLP-WT	**Waste**							
Batch R4160059								
WG2835839-2 MB								
1,1-Dichloroethylene			<0.025		mg/L		0.025	07-AUG-18
1,2-Dichlorobenzene			<0.025		mg/L		0.025	07-AUG-18
1,2-Dichloroethane			<0.025		mg/L		0.025	07-AUG-18
1,4-Dichlorobenzene			<0.025		mg/L		0.025	07-AUG-18
Benzene			<0.025		mg/L		0.025	07-AUG-18
Carbon tetrachloride			<0.025		mg/L		0.025	07-AUG-18
Chlorobenzene			<0.025		mg/L		0.025	07-AUG-18
Chloroform			<0.10		mg/L		0.1	07-AUG-18
Dichloromethane			<0.50		mg/L		0.5	07-AUG-18
Methyl Ethyl Ketone			<1.0		mg/L		1	07-AUG-18
Tetrachloroethylene			<0.025		mg/L		0.025	07-AUG-18
Trichloroethylene			<0.025		mg/L		0.025	07-AUG-18
Vinyl chloride			<0.050		mg/L		0.05	07-AUG-18
Surrogate: 1,4-Difluorobenzene			99.4		%		70-130	07-AUG-18
Surrogate: 4-Bromofluorobenzene			97.7		%		70-130	07-AUG-18
WG2835839-4 MS		**WG2835839-3**						
1,1-Dichloroethylene			89.0		%		50-140	08-AUG-18
1,2-Dichlorobenzene			104.8		%		50-140	08-AUG-18
1,2-Dichloroethane			115.7		%		50-140	08-AUG-18
1,4-Dichlorobenzene			104.9		%		50-140	08-AUG-18
Benzene			104.3		%		50-140	08-AUG-18
Carbon tetrachloride			96.0		%		50-140	08-AUG-18
Chlorobenzene			104.4		%		50-140	08-AUG-18
Chloroform			106.4		%		50-140	08-AUG-18
Dichloromethane			107.7		%		50-140	08-AUG-18
Methyl Ethyl Ketone			109.6		%		50-140	08-AUG-18
Tetrachloroethylene			97.1		%		50-140	08-AUG-18
Trichloroethylene			105.6		%		50-140	08-AUG-18
Vinyl chloride			85.5		%		50-140	08-AUG-18

Quality Control Report

Workorder: L2140617 Report Date: 10-AUG-18

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

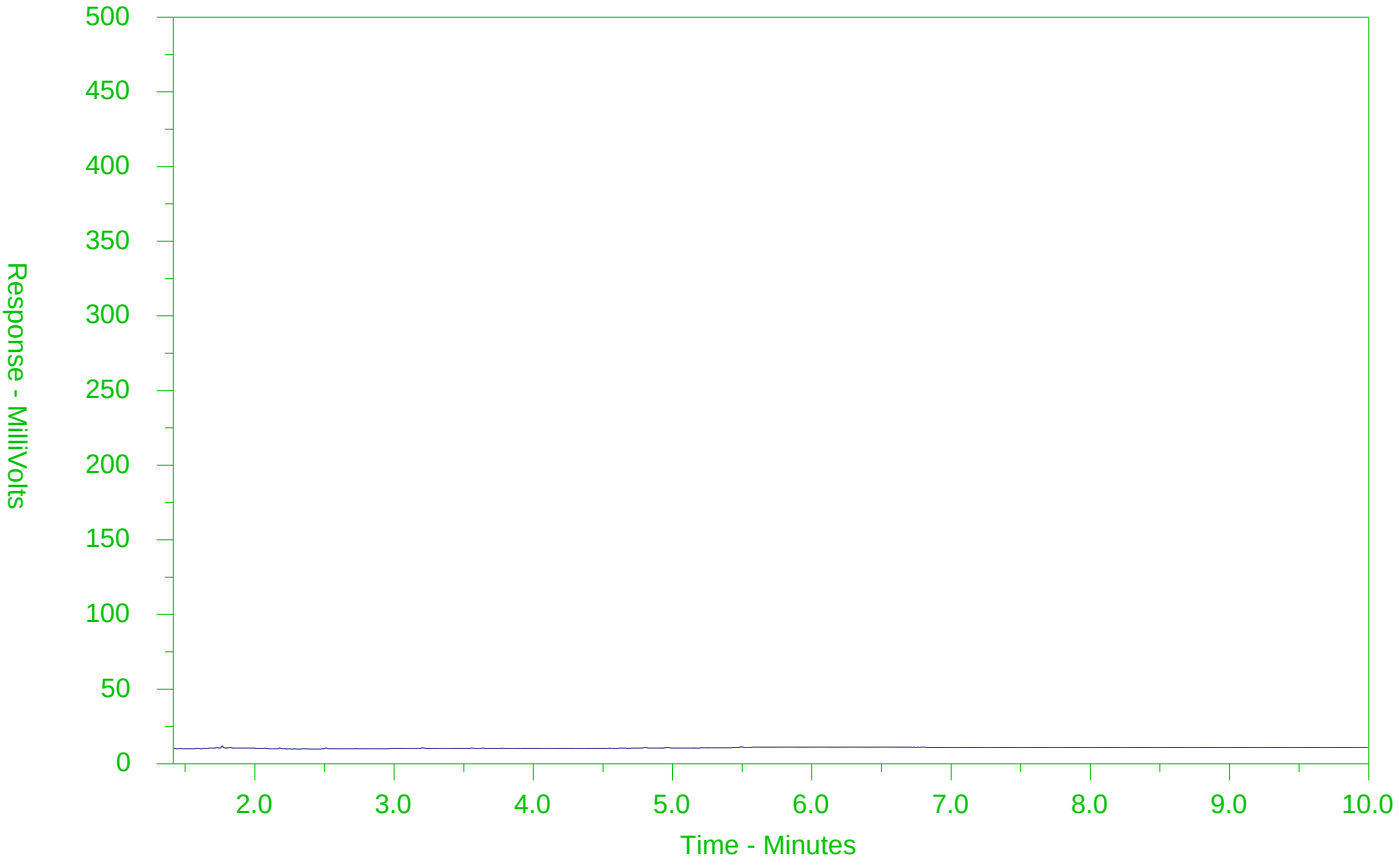
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2140617-1
Client Sample ID: TCLP



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free 1 800 668 9878

L2140617-COFC

COC Number: 17 - 624787

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CHAM JACOBS	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	TANIA MCCARTHY	Quality Control (QC) Report with Report YES NO	4 day [P4-20%]
Phone:	519 579 3508	Compare Results to Criteria on Report - provide details below if box checked	3 day [P3-25%]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	2 day [P2-50%]
Street:	72 VICTORIA ST S Suite 300	Email 1 or Fax Tania.McCarthy@CHAM.com	1 Business day [E-100%]
City/Province:	KITCHENER ON	Email 2 Lucas.Nevis@chm.com	Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
Postal Code:	N2G 4Y9	Email 3	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Invoice To	Same as Report To YES NO	Invoice Distribution	For tests that can not be performed according to the service level selected, you will be contacted.
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	694757	AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2140617	ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	METALS + Conventionals	BTEX	PHC's	VOC's	PCB's	Pentachlorophenol	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	TCLP	01-AUG-18	11:00	Soil	X	X	X	X	X	X			5

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	O. Reg 347
Are samples for human consumption/ use? YES NO	O. Reg 558

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
5.6				9.6			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Lucas Nevis	Date: 2018-AUG-01	Time:	Received by: BF	Date: AUG 1, 2018	Time: 16:25	Received by: AC	Date: Aug 1	Time: 16:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: TANIA MCCARTHY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 03-AUG-18
Report Date: 14-AUG-18 12:51 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2141576

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers:
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-1 MW18-117S Sampled By: CLIENT on 02-AUG-18 @ 10:15 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	1.03		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	1.14		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	39.5		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	52		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.223		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.26		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.69		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.332		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	1.74		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	3.27		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.926		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	5180		500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.077		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	2.07		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	338		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-2 MW18-112D Sampled By: CLIENT on 02-AUG-18 @ 11:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.67		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	32.7		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	109		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	53		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.56		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.239		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	5.50		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	1.39		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.169		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	2.09		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-2 MW18-112D Sampled By: CLIENT on 02-AUG-18 @ 11:50 Matrix: WATER							
Dissolved Metals							
Zinc (Zn)-Dissolved	5.8		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-3 MW18-112S Sampled By: CLIENT on 02-AUG-18 @ 11:51 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.51		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	42.5		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	60.5		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	43		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.26		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	0.42		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	1.04		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	2.18		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	1.51		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.255		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	2.85		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	1.32		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	13.5		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-4 MW18-114S Sampled By: CLIENT on 02-AUG-18 @ 13:45 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.29		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	13.7		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	62.2		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	53		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.291		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.74		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.10		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.127		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	4.23		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	2.01		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.323		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-4 MW18-114S Sampled By: CLIENT on 02-AUG-18 @ 13:45 Matrix: WATER							
Dissolved Metals							
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.042		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	3.14		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	0.65		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	163		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-5 MW18-118S Sampled By: CLIENT on 02-AUG-18 @ 13:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.30		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	18.0		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	41.0		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	67		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.011		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.76		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	0.55		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.061		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	2.07		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	5.27		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.262		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	58200		500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.019		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	1.93		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	154		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-5 MW18-118S Sampled By: CLIENT on 02-AUG-18 @ 13:50 Matrix: WATER							
Volatile Organic Compounds							
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		09-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	<0.50		0.50	ug/L		09-AUG-18	R4161624
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	<0.40		0.40	ug/L		09-AUG-18	R4161624
Xylenes (Total)	<0.50		0.50	ug/L		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		09-AUG-18	R4161624
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Acenaphthylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)pyrene	<0.010		0.010	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-5 MW18-118S Sampled By: CLIENT on 02-AUG-18 @ 13:50 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Chrysene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluorene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		13-AUG-18	
1-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
2-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Naphthalene	<0.050		0.050	ug/L	08-AUG-18	13-AUG-18	R4167489
Phenanthrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Acenaphthene	95.7		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d12-Chrysene	106.2		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d8-Naphthalene	97.6		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Phenanthrene	100.9		60-140	%	08-AUG-18	13-AUG-18	R4167489
L2141576-6 MW18-115S Sampled By: CLIENT on 02-AUG-18 @ 15:10 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.28		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	6.74		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	38.8		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	62		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	1.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	0.48		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.552		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	2.03		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	7.18		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.107		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.016		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	2.64		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	505		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-7 MW18-124S Sampled By: CLIENT on 02-AUG-18 @ 15:15 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-7 MW18-124S Sampled By: CLIENT on 02-AUG-18 @ 15:15 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Acenaphthylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)pyrene	<0.010		0.010	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(b)fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(k)fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Chrysene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluorene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		13-AUG-18	
1-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
2-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Naphthalene	<0.050		0.050	ug/L	08-AUG-18	13-AUG-18	R4167489
Phenanthrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Acenaphthene	93.9		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d12-Chrysene	104.3		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d8-Naphthalene	96.0		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Phenanthrene	96.5		60-140	%	08-AUG-18	13-AUG-18	R4167489
L2141576-8 MW18-126D Sampled By: CLIENT on 02-AUG-18 @ 16:50 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-8 MW18-126D Sampled By: CLIENT on 02-AUG-18 @ 16:50 Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	1.34		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		10-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	0.79		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	1.03		0.50	ug/L		10-AUG-18	R4162513
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	<0.40		0.40	ug/L		09-AUG-18	R4161624
Xylenes (Total)	<0.50		0.50	ug/L		10-AUG-18	
Surrogate: 4-Bromofluorobenzene	97.7		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%		09-AUG-18	R4161624
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		09-AUG-18	R4161624
F1-BTEX	<25		25	ug/L		10-AUG-18	
F2 (C10-C16)	<100		100	ug/L	08-AUG-18	08-AUG-18	R4161842
F3 (C16-C34)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
F4 (C34-C50)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
Total Hydrocarbons (C6-C50)	<370		370	ug/L		10-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161842
Surrogate: 2-Bromobenzotrifluoride	82.5		60-140	%	08-AUG-18	08-AUG-18	R4161842
Surrogate: 3,4-Dichlorotoluene	87.8		60-140	%		09-AUG-18	R4161624
L2141576-9 MW18-125S Sampled By: CLIENT on 02-AUG-18 @ 17:15 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-9 MW18-125S Sampled By: CLIENT on 02-AUG-18 @ 17:15 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	0.69		0.50	ug/L		09-AUG-18	R4161624
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	0.75		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		10-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.55	DLS	0.55	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	0.66		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	0.71		0.50	ug/L		10-AUG-18	R4162513
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	<0.40		0.40	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-9 MW18-125S Sampled By: CLIENT on 02-AUG-18 @ 17:15 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		10-AUG-18	
Surrogate: 4-Bromofluorobenzene	98.3		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		09-AUG-18	R4161624
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		09-AUG-18	R4161624
F1-BTEX	<25		25	ug/L		13-AUG-18	
F2 (C10-C16)	<100		100	ug/L	08-AUG-18	08-AUG-18	R4161842
F2-Naphth	<100		100	ug/L		13-AUG-18	
F3 (C16-C34)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
F3-PAH	<250		250	ug/L		13-AUG-18	
F4 (C34-C50)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
Total Hydrocarbons (C6-C50)	<370		370	ug/L		13-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161842
Surrogate: 2-Bromobenzotrifluoride	83.2		60-140	%	08-AUG-18	08-AUG-18	R4161842
Surrogate: 3,4-Dichlorotoluene	85.3		60-140	%		09-AUG-18	R4161624
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.041	R	0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Acenaphthylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(a)pyrene	<0.010		0.010	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(b)fluoranthene	<2.00	DLQ	2.0	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Benzo(k)fluoranthene	<2.00	DLQ	2.0	ug/L	08-AUG-18	13-AUG-18	R4167489
Chrysene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluoranthene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Fluorene	0.029		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		13-AUG-18	
1-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
2-Methylnaphthalene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Naphthalene	<0.050		0.050	ug/L	08-AUG-18	13-AUG-18	R4167489
Phenanthrene	0.021		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Pyrene	<0.020		0.020	ug/L	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Acenaphthene	96.0		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d12-Chrysene	113.4		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d8-Naphthalene	98.3		60-140	%	08-AUG-18	13-AUG-18	R4167489
Surrogate: d10-Phenanthrene	103.7		60-140	%	08-AUG-18	13-AUG-18	R4167489
Polychlorinated Biphenyls							
Aroclor 1242	0.037	PRAR	0.020	ug/L	14-AUG-18	14-AUG-18	R4166831
Aroclor 1248	<0.020		0.020	ug/L	14-AUG-18	14-AUG-18	R4166831

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-9 MW18-125S Sampled By: CLIENT on 02-AUG-18 @ 17:15 Matrix: WATER							
Polychlorinated Biphenyls							
Aroclor 1254	<0.020		0.020	ug/L	14-AUG-18	14-AUG-18	R4166831
Aroclor 1260	<0.020		0.020	ug/L	14-AUG-18	14-AUG-18	R4166831
Total PCBs	<0.040		0.040	ug/L	14-AUG-18	14-AUG-18	R4166831
Surrogate: 2-fluorobiphenyl	76.6		50-150	%	14-AUG-18	14-AUG-18	R4166831
L2141576-10 MW18-121S Sampled By: CLIENT on 03-AUG-18 @ 09:30 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.54		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	3.24		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	116		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	98		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.139		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.41		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.01		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.156		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	1.50		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	2.83		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.656		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	5800		500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.294		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	1.87		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	217		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-10 MW18-121S Sampled By: CLIENT on 03-AUG-18 @ 09:30 Matrix: WATER							
Volatile Organic Compounds							
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	3.75		0.50	ug/L		09-AUG-18	R4161624
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		09-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	0.62		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	3.64		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	<0.50		0.50	ug/L		09-AUG-18	R4161624
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	0.45		0.40	ug/L		09-AUG-18	R4161624
Xylenes (Total)	<0.50		0.50	ug/L		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	97.9		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%		09-AUG-18	R4161624
L2141576-11 MW18-122D Sampled By: CLIENT on 03-AUG-18 @ 10:00 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-11 MW18-122D Sampled By: CLIENT on 03-AUG-18 @ 10:00 Matrix: WATER							
Volatile Organic Compounds							
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	6.43		0.50	ug/L		09-AUG-18	R4161624
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	1.72		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		09-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	<0.50		0.50	ug/L		09-AUG-18	R4161624
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	<0.40		0.40	ug/L		09-AUG-18	R4161624
Xylenes (Total)	<0.50		0.50	ug/L		09-AUG-18	
Surrogate: 4-Bromofluorobenzene	96.8		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%		09-AUG-18	R4161624
L2141576-12 MW18-127S Sampled By: CLIENT on 03-AUG-18 @ 11:05 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		09-AUG-18	R4161624

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-12 MW18-127S Sampled By: CLIENT on 03-AUG-18 @ 11:05 Matrix: WATER							
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Bromodichloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Bromoform	<5.0		5.0	ug/L		09-AUG-18	R4161624
Bromomethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Carbon tetrachloride	<0.20		0.20	ug/L		09-AUG-18	R4161624
Chlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dibromochloromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
Chloroform	<1.0		1.0	ug/L		09-AUG-18	R4161624
1,2-Dibromoethane	<0.20		0.20	ug/L		09-AUG-18	R4161624
1,2-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,3-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,4-Dichlorobenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Dichlorodifluoromethane	<2.0		2.0	ug/L		09-AUG-18	R4161624
1,1-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,2-Dichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methylene Chloride	<5.0		5.0	ug/L		09-AUG-18	R4161624
1,2-Dichloropropane	<0.50		0.50	ug/L		09-AUG-18	R4161624
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		09-AUG-18	R4161624
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		09-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		09-AUG-18	R4161624
n-Hexane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Methyl Ethyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
Methyl Isobutyl Ketone	<20		20	ug/L		09-AUG-18	R4161624
MTBE	<2.0		2.0	ug/L		09-AUG-18	R4161624
Styrene	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Tetrachloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Toluene	0.57		0.50	ug/L		09-AUG-18	R4161624
1,1,1-Trichloroethane	0.62		0.50	ug/L		09-AUG-18	R4161624
1,1,2-Trichloroethane	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichloroethylene	<0.50		0.50	ug/L		09-AUG-18	R4161624
Trichlorofluoromethane	<5.0		5.0	ug/L		09-AUG-18	R4161624
Vinyl chloride	<0.50		0.50	ug/L		09-AUG-18	R4161624
o-Xylene	<0.30		0.30	ug/L		09-AUG-18	R4161624
m+p-Xylenes	0.42		0.40	ug/L		09-AUG-18	R4161624
Xylenes (Total)	<0.50		0.50	ug/L		09-AUG-18	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-12 MW18-127S Sampled By: CLIENT on 03-AUG-18 @ 11:05 Matrix: WATER							
Volatile Organic Compounds							
Surrogate: 4-Bromofluorobenzene	98.1		70-130	%		09-AUG-18	R4161624
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%		09-AUG-18	R4161624
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		09-AUG-18	R4161624
F1-BTEX	<25		25	ug/L		09-AUG-18	
F2 (C10-C16)	<100		100	ug/L	08-AUG-18	08-AUG-18	R4161842
F3 (C16-C34)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
F4 (C34-C50)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161842
Surrogate: 2-Bromobenzotrifluoride	79.5		60-140	%	08-AUG-18	08-AUG-18	R4161842
Surrogate: 3,4-Dichlorotoluene	88.2		60-140	%		09-AUG-18	R4161624
L2141576-13 MW18-119S Sampled By: CLIENT on 03-AUG-18 @ 11:45 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	1.73		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	1.05		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	50.5		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	90		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.185		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.12		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.09		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.075		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	2.80		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	1.91		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.412		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	7730		500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.159		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	2.83		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	214		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
Volatile Organic Compounds							
Acetone	<30		30	ug/L		08-AUG-18	R4160842
Benzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Bromodichloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Bromoform	<5.0		5.0	ug/L		08-AUG-18	R4160842
Bromomethane	<0.50		0.50	ug/L		08-AUG-18	R4160842

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-13 MW18-119S Sampled By: CLIENT on 03-AUG-18 @ 11:45 Matrix: WATER							
Volatile Organic Compounds							
Carbon tetrachloride	<0.20		0.20	ug/L		08-AUG-18	R4160842
Chlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dibromochloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Chloroform	1.1		1.0	ug/L		08-AUG-18	R4160842
1,2-Dibromoethane	<0.20		0.20	ug/L		08-AUG-18	R4160842
1,2-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,3-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,4-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dichlorodifluoromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
1,1-Dichloroethane	16.1		0.50	ug/L		08-AUG-18	R4160842
1,2-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1-Dichloroethylene	0.77		0.50	ug/L		08-AUG-18	R4160842
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Methylene Chloride	<5.0		5.0	ug/L		08-AUG-18	R4160842
1,2-Dichloropropane	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		10-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
n-Hexane	<0.50	VTHS	0.50	ug/L		10-AUG-18	R4162501
Methyl Ethyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
Methyl Isobutyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
MTBE	<2.0		2.0	ug/L		08-AUG-18	R4160842
Styrene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Tetrachloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Toluene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1-Trichloroethane	19.2		0.50	ug/L		08-AUG-18	R4160842
1,1,2-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichlorofluoromethane	<5.0		5.0	ug/L		08-AUG-18	R4160842
Vinyl chloride	<0.50		0.50	ug/L		08-AUG-18	R4160842
o-Xylene	<0.30		0.30	ug/L		08-AUG-18	R4160842
m+p-Xylenes	<0.40		0.40	ug/L		08-AUG-18	R4160842
Xylenes (Total)	<0.50		0.50	ug/L		10-AUG-18	
Surrogate: 4-Bromofluorobenzene	95.0		70-130	%		08-AUG-18	R4160842
Surrogate: 1,4-Difluorobenzene	101.4		70-130	%		08-AUG-18	R4160842
L2141576-14 MW18-123S Sampled By: CLIENT on 03-AUG-18 @ 12:40 Matrix: WATER							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-14 MW18-123S Sampled By: CLIENT on 03-AUG-18 @ 12:40 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		08-AUG-18	R4160842
Benzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Bromodichloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Bromoform	<5.0		5.0	ug/L		08-AUG-18	R4160842
Bromomethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Carbon tetrachloride	<0.20		0.20	ug/L		08-AUG-18	R4160842
Chlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dibromochloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Chloroform	<1.0		1.0	ug/L		08-AUG-18	R4160842
1,2-Dibromoethane	<0.20		0.20	ug/L		08-AUG-18	R4160842
1,2-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,3-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,4-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dichlorodifluoromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
1,1-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,2-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,2-Dichloroethylene	3.43		0.50	ug/L		08-AUG-18	R4160842
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Methylene Chloride	<5.0		5.0	ug/L		08-AUG-18	R4160842
1,2-Dichloropropane	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		10-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
n-Hexane	<0.50	VTHS	0.50	ug/L		10-AUG-18	R4162501
Methyl Ethyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
Methyl Isobutyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
MTBE	<2.0		2.0	ug/L		08-AUG-18	R4160842
Styrene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Tetrachloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Toluene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichloroethylene	2.64		0.50	ug/L		08-AUG-18	R4160842
Trichlorofluoromethane	<5.0		5.0	ug/L		08-AUG-18	R4160842
Vinyl chloride	<0.50		0.50	ug/L		08-AUG-18	R4160842
o-Xylene	<0.30		0.30	ug/L		08-AUG-18	R4160842
m+p-Xylenes	<0.40		0.40	ug/L		08-AUG-18	R4160842

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-14 MW18-123S Sampled By: CLIENT on 03-AUG-18 @ 12:40 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		10-AUG-18	
Surrogate: 4-Bromofluorobenzene	98.0		70-130	%		08-AUG-18	R4160842
Surrogate: 1,4-Difluorobenzene	101.6		70-130	%		08-AUG-18	R4160842
L2141576-15 MW18-116D Sampled By: CLIENT on 03-AUG-18 @ 13:55 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.57		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	1.19		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	50.3		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	54		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.360		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.63		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	2.07		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	2.00		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	4.52		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	5.67		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.778		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	138000	DLHC	500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.043		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	7.03		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	734		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
Volatile Organic Compounds							
Acetone	<30		30	ug/L		08-AUG-18	R4160842
Benzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Bromodichloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Bromoform	<5.0		5.0	ug/L		08-AUG-18	R4160842
Bromomethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Carbon tetrachloride	<0.20		0.20	ug/L		08-AUG-18	R4160842
Chlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dibromochloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Chloroform	<1.0		1.0	ug/L		08-AUG-18	R4160842
1,2-Dibromoethane	<0.20		0.20	ug/L		08-AUG-18	R4160842
1,2-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,3-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,4-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dichlorodifluoromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-15 MW18-116D Sampled By: CLIENT on 03-AUG-18 @ 13:55 Matrix: WATER							
Volatile Organic Compounds							
1,1-Dichloroethane	1.60		0.50	ug/L		08-AUG-18	R4160842
1,2-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,2-Dichloroethylene	0.71		0.50	ug/L		08-AUG-18	R4160842
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Methylene Chloride	<5.0		5.0	ug/L		08-AUG-18	R4160842
1,2-Dichloropropane	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		10-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
n-Hexane	<0.50	VTHS	0.50	ug/L		10-AUG-18	R4162501
Methyl Ethyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
Methyl Isobutyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
MTBE	<2.0		2.0	ug/L		08-AUG-18	R4160842
Styrene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Tetrachloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Toluene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1-Trichloroethane	0.82		0.50	ug/L		08-AUG-18	R4160842
1,1,2-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichloroethylene	0.85		0.50	ug/L		08-AUG-18	R4160842
Trichlorofluoromethane	<5.0		5.0	ug/L		08-AUG-18	R4160842
Vinyl chloride	<0.50		0.50	ug/L		08-AUG-18	R4160842
o-Xylene	<0.30		0.30	ug/L		08-AUG-18	R4160842
m+p-Xylenes	<0.40		0.40	ug/L		08-AUG-18	R4160842
Xylenes (Total)	<0.50		0.50	ug/L		10-AUG-18	
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%		08-AUG-18	R4160842
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%		08-AUG-18	R4160842
L2141576-16 MW18-116S Sampled By: CLIENT on 03-AUG-18 @ 13:50 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	0.84		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	0.55		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	40.8		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	55		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.635		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-16 MW18-116S Sampled By: CLIENT on 03-AUG-18 @ 13:50 Matrix: WATER							
Dissolved Metals							
Cobalt (Co)-Dissolved	0.14		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	12.5		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	0.159		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	3.42		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	5.33		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.536		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	110000	DLHC	500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	0.233		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	5.50		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	436		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
Volatile Organic Compounds							
Acetone	<30		30	ug/L		13-AUG-18	R4166494
Benzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Bromodichloromethane	<2.0		2.0	ug/L		13-AUG-18	R4166494
Bromoform	<5.0		5.0	ug/L		13-AUG-18	R4166494
Bromomethane	<0.50		0.50	ug/L		13-AUG-18	R4166494
Carbon tetrachloride	<0.20		0.20	ug/L		13-AUG-18	R4166494
Chlorobenzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Dibromochloromethane	<2.0		2.0	ug/L		13-AUG-18	R4166494
Chloroform	<1.0		1.0	ug/L		13-AUG-18	R4166494
1,2-Dibromoethane	<0.20		0.20	ug/L		13-AUG-18	R4166494
1,2-Dichlorobenzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,3-Dichlorobenzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,4-Dichlorobenzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Dichlorodifluoromethane	<2.0		2.0	ug/L		13-AUG-18	R4166494
1,1-Dichloroethane	0.52		0.50	ug/L		13-AUG-18	R4166494
1,2-Dichloroethane	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,1-Dichloroethylene	<0.50		0.50	ug/L		13-AUG-18	R4166494
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		13-AUG-18	R4166494
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Methylene Chloride	<5.0		5.0	ug/L		13-AUG-18	R4166494
1,2-Dichloropropane	<0.50		0.50	ug/L		13-AUG-18	R4166494
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		13-AUG-18	R4166494
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		13-AUG-18	R4166494
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		13-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		13-AUG-18	R4166494
n-Hexane	<0.50		0.50	ug/L		13-AUG-18	R4166494
Methyl Ethyl Ketone	<20		20	ug/L		13-AUG-18	R4166494
Methyl Isobutyl Ketone	<20		20	ug/L		13-AUG-18	R4166494

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-16 MW18-116S Sampled By: CLIENT on 03-AUG-18 @ 13:50 Matrix: WATER							
Volatile Organic Compounds							
MTBE	<2.0		2.0	ug/L		13-AUG-18	R4166494
Styrene	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		13-AUG-18	R4166494
Tetrachloroethylene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Toluene	<0.50		0.50	ug/L		13-AUG-18	R4166494
1,1,1-Trichloroethane	1.07		0.50	ug/L		13-AUG-18	R4166494
1,1,2-Trichloroethane	<0.50		0.50	ug/L		13-AUG-18	R4166494
Trichloroethylene	<0.50		0.50	ug/L		13-AUG-18	R4166494
Trichlorofluoromethane	<5.0		5.0	ug/L		13-AUG-18	R4166494
Vinyl chloride	<0.50		0.50	ug/L		13-AUG-18	R4166494
o-Xylene	<0.30		0.30	ug/L		13-AUG-18	R4166494
m+p-Xylenes	<0.40		0.40	ug/L		13-AUG-18	R4166494
Xylenes (Total)	<0.50		0.50	ug/L		13-AUG-18	
Surrogate: 4-Bromofluorobenzene	99.2		70-130	%		13-AUG-18	R4166494
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%		13-AUG-18	R4166494
L2141576-17 MW18-113S Sampled By: CLIENT on 03-AUG-18 @ 15:40 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	3.07		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	16.4		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	52.5		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	64		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.041		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.51		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	0.48		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	3.78		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	4.46		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	8.58		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.273		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	135000	DLHC	500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	11.8		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	515		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571
L2141576-18 DUP2 Sampled By: CLIENT on 02-AUG-18 @ 16:55							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-18 DUP2 Sampled By: CLIENT on 02-AUG-18 @ 16:55 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		08-AUG-18	R4160842
Benzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Bromodichloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Bromoform	<5.0		5.0	ug/L		08-AUG-18	R4160842
Bromomethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Carbon tetrachloride	<0.20		0.20	ug/L		08-AUG-18	R4160842
Chlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dibromochloromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
Chloroform	<1.0		1.0	ug/L		08-AUG-18	R4160842
1,2-Dibromoethane	<0.20		0.20	ug/L		08-AUG-18	R4160842
1,2-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,3-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,4-Dichlorobenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Dichlorodifluoromethane	<2.0		2.0	ug/L		08-AUG-18	R4160842
1,1-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,2-Dichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,2-Dichloroethylene	1.37		0.50	ug/L		08-AUG-18	R4160842
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Methylene Chloride	<5.0		5.0	ug/L		08-AUG-18	R4160842
1,2-Dichloropropane	<0.50		0.50	ug/L		08-AUG-18	R4160842
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		08-AUG-18	R4160842
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		08-AUG-18	
Ethylbenzene	<0.50		0.50	ug/L		08-AUG-18	R4160842
n-Hexane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Methyl Ethyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
Methyl Isobutyl Ketone	<20		20	ug/L		08-AUG-18	R4160842
MTBE	<2.0		2.0	ug/L		08-AUG-18	R4160842
Styrene	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Tetrachloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Toluene	0.54		0.50	ug/L		08-AUG-18	R4160842
1,1,1-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
1,1,2-Trichloroethane	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichloroethylene	<0.50		0.50	ug/L		08-AUG-18	R4160842
Trichlorofluoromethane	<5.0		5.0	ug/L		08-AUG-18	R4160842
Vinyl chloride	0.99		0.50	ug/L		08-AUG-18	R4160842
o-Xylene	<0.30		0.30	ug/L		08-AUG-18	R4160842
m+p-Xylenes	<0.40		0.40	ug/L		08-AUG-18	R4160842

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2141576-18 DUP2 Sampled By: CLIENT on 02-AUG-18 @ 16:55 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		08-AUG-18	
Surrogate: 4-Bromofluorobenzene	100.2		70-130	%		08-AUG-18	R4160842
Surrogate: 1,4-Difluorobenzene	101.8		70-130	%		08-AUG-18	R4160842
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		08-AUG-18	R4160842
F1-BTEX	<25		25	ug/L		09-AUG-18	
F2 (C10-C16)	<100		100	ug/L	08-AUG-18	08-AUG-18	R4161842
F3 (C16-C34)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
F4 (C34-C50)	<250		250	ug/L	08-AUG-18	08-AUG-18	R4161842
Total Hydrocarbons (C6-C50)	<370		370	ug/L		09-AUG-18	
Chrom. to baseline at nC50	YES				08-AUG-18	08-AUG-18	R4161842
Surrogate: 2-Bromobenzotrifluoride	74.1		60-140	%	08-AUG-18	08-AUG-18	R4161842
Surrogate: 3,4-Dichlorotoluene	82.3		60-140	%		08-AUG-18	R4160842
L2141576-19 DUP3 Sampled By: CLIENT on 03-AUG-18 @ 15:45 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					09-AUG-18	R4161541
Antimony (Sb)-Dissolved	3.04		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Arsenic (As)-Dissolved	15.9		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Barium (Ba)-Dissolved	50.4		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Boron (B)-Dissolved	63		10	ug/L	09-AUG-18	09-AUG-18	R4162571
Cadmium (Cd)-Dissolved	0.041		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Cobalt (Co)-Dissolved	0.49		0.10	ug/L	09-AUG-18	09-AUG-18	R4162571
Copper (Cu)-Dissolved	1.04		0.20	ug/L	09-AUG-18	09-AUG-18	R4162571
Lead (Pb)-Dissolved	2.65		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Molybdenum (Mo)-Dissolved	4.29		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Nickel (Ni)-Dissolved	8.34		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Selenium (Se)-Dissolved	0.262		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	09-AUG-18	09-AUG-18	R4162571
Sodium (Na)-Dissolved	127000	DLHC	500	ug/L	09-AUG-18	09-AUG-18	R4162571
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Uranium (U)-Dissolved	11.2		0.010	ug/L	09-AUG-18	09-AUG-18	R4162571
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	09-AUG-18	09-AUG-18	R4162571
Zinc (Zn)-Dissolved	509		1.0	ug/L	09-AUG-18	09-AUG-18	R4162571

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Dichlorodifluoromethane	LCS-H	L2141576-10, -11, -12, -5, -8, -9
Laboratory Control Sample	n-Hexane	MES	L2141576-16
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2141576-1, -10, -13, -15, -16, -17, -19, -2, -3, -4, -5, -6
Matrix Spike	Boron (B)-Dissolved	MS-B	L2141576-1, -10, -13, -15, -16, -17, -19, -2, -3, -4, -5, -6
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2141576-1, -10, -13, -15, -16, -17, -19, -2, -3, -4, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2141576-1, -10, -13, -15, -16, -17, -19, -2, -3, -4, -5, -6

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DLS	Detection Limit Adjusted: Instrument Sensitivity
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PRAR	PCB Pattern Most Closely Resembles Aroclor Reported
R	The ion abundance ratio(s) did not meet the acceptance criteria. Value is an estimated maximum.
VTHS	Volatile test was conducted on sample with headspace. Results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG

Reference Information

must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270

PAH-511-WT Water PAH-O. Reg 153/04 (July 2011) SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082

Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C

VOC-511-HS-WT Water VOC by GCMS HS O.Reg 153/04 (July 2011) SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2141576 Report Date: 14-AUG-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4160842								
WG2842149-4 DUP		**WG2842149-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	08-AUG-18
WG2842149-1 LCS								
F1 (C6-C10)			116.7		%		80-120	08-AUG-18
WG2842149-2 MB								
F1 (C6-C10)			<25		ug/L		25	08-AUG-18
Surrogate: 3,4-Dichlorotoluene			93.1		%		60-140	08-AUG-18
WG2842149-5 MS		**WG2842149-3**						
F1 (C6-C10)			102.3		%		60-140	08-AUG-18
Batch R4161624								
WG2842526-4 DUP		**WG2842526-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	09-AUG-18
WG2842526-1 LCS								
F1 (C6-C10)			102.8		%		80-120	09-AUG-18
WG2842526-2 MB								
F1 (C6-C10)			<25		ug/L		25	09-AUG-18
Surrogate: 3,4-Dichlorotoluene			98.3		%		60-140	09-AUG-18
WG2842526-5 MS		**WG2842526-3**						
F1 (C6-C10)			97.5		%		60-140	09-AUG-18
F2-F4-511-WT	**Water**							
Batch R4161842								
WG2843301-2 LCS								
F2 (C10-C16)			89.7		%		70-130	08-AUG-18
F3 (C16-C34)			102.2		%		70-130	08-AUG-18
F4 (C34-C50)			93.9		%		70-130	08-AUG-18
WG2843301-3 LCSD		**WG2843301-2**						
F2 (C10-C16)		89.7	95.3		%	6.0	50	08-AUG-18
F3 (C16-C34)		102.2	103.1		%	0.9	50	08-AUG-18
F4 (C34-C50)		93.9	86.4		%	8.3	50	08-AUG-18
WG2843301-1 MB								
F2 (C10-C16)			<100		ug/L		100	08-AUG-18
F3 (C16-C34)			<250		ug/L		250	08-AUG-18
F4 (C34-C50)			<250		ug/L		250	08-AUG-18
Surrogate: 2-Bromobenzotrifluoride			92.2		%		60-140	08-AUG-18
MET-D-UG/L-MS-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4162571								
WG2844499-4 DUP		**WG2844499-3**						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Arsenic (As)-Dissolved		1.6	1.5		ug/L	7.9	20	09-AUG-18
Barium (Ba)-Dissolved		187	192		ug/L	2.5	20	09-AUG-18
Beryllium (Be)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Boron (B)-Dissolved		2060	2020		ug/L	1.8	20	09-AUG-18
Cadmium (Cd)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	09-AUG-18
Chromium (Cr)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Cobalt (Co)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Copper (Cu)-Dissolved		7.8	5.5	J	ug/L	2.3	4	09-AUG-18
Lead (Pb)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	09-AUG-18
Molybdenum (Mo)-Dissolved		47.6	46.6		ug/L	2.2	20	09-AUG-18
Nickel (Ni)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Selenium (Se)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	09-AUG-18
Silver (Ag)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	09-AUG-18
Sodium (Na)-Dissolved		473000	487000		ug/L	2.7	20	09-AUG-18
Thallium (Tl)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	09-AUG-18
Uranium (U)-Dissolved		2.14	2.08		ug/L	3.2	20	09-AUG-18
Vanadium (V)-Dissolved		<5.0	<5.0	RPD-NA	ug/L	N/A	20	09-AUG-18
Zinc (Zn)-Dissolved		11	<10	RPD-NA	ug/L	N/A	20	10-AUG-18
WG2844499-2 LCS								
Antimony (Sb)-Dissolved			93.8		%		80-120	09-AUG-18
Arsenic (As)-Dissolved			91.5		%		80-120	09-AUG-18
Barium (Ba)-Dissolved			95.6		%		80-120	09-AUG-18
Beryllium (Be)-Dissolved			97.4		%		80-120	09-AUG-18
Boron (B)-Dissolved			89.5		%		80-120	09-AUG-18
Cadmium (Cd)-Dissolved			93.7		%		80-120	09-AUG-18
Chromium (Cr)-Dissolved			89.6		%		80-120	09-AUG-18
Cobalt (Co)-Dissolved			90.4		%		80-120	09-AUG-18
Copper (Cu)-Dissolved			90.6		%		80-120	09-AUG-18
Lead (Pb)-Dissolved			111.2		%		80-120	09-AUG-18
Molybdenum (Mo)-Dissolved			103.5		%		80-120	09-AUG-18
Nickel (Ni)-Dissolved			90.0		%		80-120	09-AUG-18
Selenium (Se)-Dissolved			93.2		%		80-120	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4162571								
WG2844499-2 LCS								
Silver (Ag)-Dissolved			103.6		%		80-120	09-AUG-18
Sodium (Na)-Dissolved			86.8		%		80-120	09-AUG-18
Thallium (Tl)-Dissolved			102.2		%		80-120	09-AUG-18
Uranium (U)-Dissolved			113.3		%		80-120	09-AUG-18
Vanadium (V)-Dissolved			92.1		%		80-120	09-AUG-18
Zinc (Zn)-Dissolved			86.8		%		80-120	09-AUG-18
WG2844499-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	09-AUG-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	09-AUG-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	09-AUG-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	09-AUG-18
Boron (B)-Dissolved			<10		ug/L		10	09-AUG-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	09-AUG-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	09-AUG-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	09-AUG-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	09-AUG-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	09-AUG-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	09-AUG-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	09-AUG-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	09-AUG-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	09-AUG-18
Sodium (Na)-Dissolved			<50		ug/L		50	09-AUG-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	09-AUG-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	09-AUG-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	09-AUG-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	09-AUG-18
WG2844499-5 MS		**WG2844499-6**						
Antimony (Sb)-Dissolved			90.3		%		70-130	09-AUG-18
Arsenic (As)-Dissolved			98.2		%		70-130	09-AUG-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	09-AUG-18
Beryllium (Be)-Dissolved			95.1		%		70-130	09-AUG-18
Boron (B)-Dissolved			N/A	MS-B	%		-	09-AUG-18
Cadmium (Cd)-Dissolved			96.3		%		70-130	09-AUG-18
Chromium (Cr)-Dissolved			92.7		%		70-130	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4162571								
WG2844499-5 MS		**WG2844499-6**						
Cobalt (Co)-Dissolved			92.2		%		70-130	09-AUG-18
Copper (Cu)-Dissolved			77.8		%		70-130	09-AUG-18
Lead (Pb)-Dissolved			103.0		%		70-130	09-AUG-18
Molybdenum (Mo)-Dissolved			N/A	MS-B	%		-	09-AUG-18
Nickel (Ni)-Dissolved			90.0		%		70-130	09-AUG-18
Selenium (Se)-Dissolved			96.2		%		70-130	09-AUG-18
Silver (Ag)-Dissolved			87.2		%		70-130	09-AUG-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	09-AUG-18
Thallium (Tl)-Dissolved			94.6		%		70-130	09-AUG-18
Uranium (U)-Dissolved			90.4		%		70-130	09-AUG-18
Vanadium (V)-Dissolved			96.8		%		70-130	09-AUG-18
Zinc (Zn)-Dissolved			80.0		%		70-130	09-AUG-18
PAH-511-WT	**Water**							
Batch R4167489								
WG2843301-2 LCS								
1-Methylnaphthalene			88.2		%		50-140	13-AUG-18
2-Methylnaphthalene			94.6		%		50-140	13-AUG-18
Acenaphthene			92.2		%		50-140	13-AUG-18
Acenaphthylene			93.7		%		50-140	13-AUG-18
Anthracene			108.5		%		50-140	13-AUG-18
Benzo(a)anthracene			131.9		%		50-140	13-AUG-18
Benzo(a)pyrene			101.6		%		50-140	13-AUG-18
Benzo(b)fluoranthene			100.4		%		50-140	13-AUG-18
Benzo(g,h,i)perylene			107.1		%		50-140	13-AUG-18
Benzo(k)fluoranthene			97.0		%		50-140	13-AUG-18
Chrysene			112.5		%		50-140	13-AUG-18
Dibenzo(ah)anthracene			110.3		%		50-140	13-AUG-18
Fluoranthene			106.2		%		50-140	13-AUG-18
Fluorene			97.8		%		50-140	13-AUG-18
Indeno(1,2,3-cd)pyrene			108.7		%		50-140	13-AUG-18
Naphthalene			97.3		%		50-140	13-AUG-18
Phenanthrene			102.8		%		50-140	13-AUG-18
Pyrene			105.8		%		50-140	13-AUG-18
WG2843301-3 LCSD		**WG2843301-2**						

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4167489								
WG2843301-3 LCSD		**WG2843301-2**						
1-Methylnaphthalene		88.2	99.0		%	12	50	13-AUG-18
2-Methylnaphthalene		94.6	100.8		%	6.3	50	13-AUG-18
Acenaphthene		92.2	96.6		%	4.7	50	13-AUG-18
Acenaphthylene		93.7	98.2		%	4.8	50	13-AUG-18
Anthracene		108.5	113.0		%	4.0	50	13-AUG-18
Benzo(a)anthracene		131.9	137.5		%	4.2	50	13-AUG-18
Benzo(a)pyrene		101.6	105.4		%	3.6	50	13-AUG-18
Benzo(b)fluoranthene		100.4	102.6		%	2.1	50	13-AUG-18
Benzo(g,h,i)perylene		107.1	110.1		%	2.7	50	13-AUG-18
Benzo(k)fluoranthene		97.0	99.8		%	2.8	50	13-AUG-18
Chrysene		112.5	116.7		%	3.7	50	13-AUG-18
Dibenzo(ah)anthracene		110.3	117.0		%	5.9	50	13-AUG-18
Fluoranthene		106.2	110.6		%	4.0	50	13-AUG-18
Fluorene		97.8	101.2		%	3.4	50	13-AUG-18
Indeno(1,2,3-cd)pyrene		108.7	112.9		%	3.8	50	13-AUG-18
Naphthalene		97.3	104.2		%	6.9	50	13-AUG-18
Phenanthrene		102.8	105.9		%	3.0	50	13-AUG-18
Pyrene		105.8	110.2		%	4.1	50	13-AUG-18
WG2843301-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	13-AUG-18
2-Methylnaphthalene			<0.020		ug/L		0.02	13-AUG-18
Acenaphthene			<0.020		ug/L		0.02	13-AUG-18
Acenaphthylene			<0.020		ug/L		0.02	13-AUG-18
Anthracene			<0.020		ug/L		0.02	13-AUG-18
Benzo(a)anthracene			<0.020		ug/L		0.02	13-AUG-18
Benzo(a)pyrene			<0.010		ug/L		0.01	13-AUG-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	13-AUG-18
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	13-AUG-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	13-AUG-18
Chrysene			<0.020		ug/L		0.02	13-AUG-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	13-AUG-18
Fluoranthene			<0.020		ug/L		0.02	13-AUG-18
Fluorene			<0.020		ug/L		0.02	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4167489								
WG2843301-1 MB								
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	13-AUG-18
Naphthalene			<0.050		ug/L		0.05	13-AUG-18
Phenanthrene			<0.020		ug/L		0.02	13-AUG-18
Pyrene			<0.020		ug/L		0.02	13-AUG-18
Surrogate: d8-Naphthalene			112.3		%		60-140	13-AUG-18
Surrogate: d10-Phenanthrene			111.9		%		60-140	13-AUG-18
Surrogate: d12-Chrysene			118.5		%		60-140	13-AUG-18
Surrogate: d10-Acenaphthene			108.5		%		60-140	13-AUG-18
PCB-511-WT	**Water**							
Batch R4166831								
WG2846007-2 LCS								
Aroclor 1242			85.6		%		60-140	13-AUG-18
Aroclor 1248			96.1		%		60-140	13-AUG-18
Aroclor 1254			98.7		%		60-140	13-AUG-18
Aroclor 1260			112.4		%		60-140	13-AUG-18
WG2846007-3 LCSD		**WG2846007-2**						
Aroclor 1242		85.6	73.6		%	15	50	13-AUG-18
Aroclor 1248		96.1	96.1		%	0.0	50	13-AUG-18
Aroclor 1254		98.7	84.1		%	16	50	13-AUG-18
Aroclor 1260		112.4	96.8		%	15	50	13-AUG-18
WG2846007-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	13-AUG-18
Aroclor 1248			<0.020		ug/L		0.02	13-AUG-18
Aroclor 1254			<0.020		ug/L		0.02	13-AUG-18
Aroclor 1260			<0.020		ug/L		0.02	13-AUG-18
Surrogate: 2-fluorobiphenyl			90.4		%		50-150	13-AUG-18
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-4 DUP		**WG2842149-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-4 DUP		**WG2842149-3**						
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	08-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	08-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	08-AUG-18
cis-1,2-Dichloroethylene		1.37	1.38		ug/L	0.7	30	08-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	08-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-AUG-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	08-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	08-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Toluene		0.54	0.52		ug/L	3.8	30	08-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	08-AUG-18
Trichloroethylene		<0.50	<0.50		ug/L			08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-4 DUP		**WG2842149-3**						
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	08-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-AUG-18
Vinyl chloride		0.99	0.92		ug/L	7.3	30	08-AUG-18
WG2842149-1 LCS								
1,1,1,2-Tetrachloroethane			103.2		%		70-130	08-AUG-18
1,1,2,2-Tetrachloroethane			100.9		%		70-130	08-AUG-18
1,1,1-Trichloroethane			108.2		%		70-130	08-AUG-18
1,1,2-Trichloroethane			100.5		%		70-130	08-AUG-18
1,1-Dichloroethane			105.2		%		70-130	08-AUG-18
1,1-Dichloroethylene			96.9		%		70-130	08-AUG-18
1,2-Dibromoethane			101.4		%		70-130	08-AUG-18
1,2-Dichlorobenzene			103.8		%		70-130	08-AUG-18
1,2-Dichloroethane			112.1		%		70-130	08-AUG-18
1,2-Dichloropropane			96.8		%		70-130	08-AUG-18
1,3-Dichlorobenzene			103.6		%		70-130	08-AUG-18
1,4-Dichlorobenzene			106.7		%		70-130	08-AUG-18
Acetone			104.0		%		60-140	08-AUG-18
Benzene			103.2		%		70-130	08-AUG-18
Bromodichloromethane			107.2		%		70-130	08-AUG-18
Bromoform			104.3		%		70-130	08-AUG-18
Bromomethane			86.9		%		60-140	08-AUG-18
Carbon tetrachloride			109.4		%		70-130	08-AUG-18
Chlorobenzene			102.0		%		70-130	08-AUG-18
Chloroform			109.0		%		70-130	08-AUG-18
cis-1,2-Dichloroethylene			106.4		%		70-130	08-AUG-18
cis-1,3-Dichloropropene			110.3		%		70-130	08-AUG-18
Dibromochloromethane			104.5		%		70-130	08-AUG-18
Dichlorodifluoromethane			117.9		%		50-140	08-AUG-18
Ethylbenzene			97.0		%		70-130	08-AUG-18
n-Hexane			113.3		%		70-130	08-AUG-18
m+p-Xylenes			101.6		%		70-130	08-AUG-18
Methyl Ethyl Ketone			91.3		%		60-140	08-AUG-18
Methyl Isobutyl Ketone			92.3		%		60-140	08-AUG-18
Methylene Chloride			108.0				70-130	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-1 LCS								
Methylene Chloride			108.0		%		70-130	08-AUG-18
MTBE			105.4		%		70-130	08-AUG-18
o-Xylene			98.2		%		70-130	08-AUG-18
Styrene			101.4		%		70-130	08-AUG-18
Tetrachloroethylene			104.0		%		70-130	08-AUG-18
Toluene			91.0		%		70-130	08-AUG-18
trans-1,2-Dichloroethylene			105.2		%		70-130	08-AUG-18
trans-1,3-Dichloropropene			99.7		%		70-130	08-AUG-18
Trichloroethylene			113.8		%		70-130	08-AUG-18
Trichlorofluoromethane			117.6		%		60-140	08-AUG-18
Vinyl chloride			93.5		%		60-140	08-AUG-18
WG2842149-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	08-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	08-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	08-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	08-AUG-18
Acetone			<30		ug/L		30	08-AUG-18
Benzene			<0.50		ug/L		0.5	08-AUG-18
Bromodichloromethane			<2.0		ug/L		2	08-AUG-18
Bromoform			<5.0		ug/L		5	08-AUG-18
Bromomethane			<0.50		ug/L		0.5	08-AUG-18
Carbon tetrachloride			<0.20		ug/L		0.2	08-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	08-AUG-18
Chloroform			<1.0		ug/L		1	08-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-2 MB								
Dibromochloromethane			<2.0		ug/L		2	08-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	08-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	08-AUG-18
n-Hexane			<0.50		ug/L		0.5	08-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	08-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	08-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	08-AUG-18
Methylene Chloride			<5.0		ug/L		5	08-AUG-18
MTBE			<2.0		ug/L		2	08-AUG-18
o-Xylene			<0.30		ug/L		0.3	08-AUG-18
Styrene			<0.50		ug/L		0.5	08-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	08-AUG-18
Toluene			<0.50		ug/L		0.5	08-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	08-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	08-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	08-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	08-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	08-AUG-18
Surrogate: 1,4-Difluorobenzene			101.4		%		70-130	08-AUG-18
Surrogate: 4-Bromofluorobenzene			92.5		%		70-130	08-AUG-18
WG2842149-5 MS		**WG2842149-3**						
1,1,1,2-Tetrachloroethane			104.7		%		50-140	08-AUG-18
1,1,2,2-Tetrachloroethane			95.7		%		50-140	08-AUG-18
1,1,1-Trichloroethane			112.5		%		50-140	08-AUG-18
1,1,2-Trichloroethane			98.0		%		50-140	08-AUG-18
1,1-Dichloroethane			107.0		%		50-140	08-AUG-18
1,1-Dichloroethylene			97.5		%		50-140	08-AUG-18
1,2-Dibromoethane			97.1		%		50-140	08-AUG-18
1,2-Dichlorobenzene			103.3		%		50-140	08-AUG-18
1,2-Dichloroethane			110.2		%		50-140	08-AUG-18
1,2-Dichloropropane			95.9		%		50-140	08-AUG-18
1,3-Dichlorobenzene			103.7		%		50-140	08-AUG-18
1,4-Dichlorobenzene			106.6		%		50-140	08-AUG-18
Acetone			97.5		%		50-140	08-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4160842								
WG2842149-5 MS		**WG2842149-3**						
Benzene			104.4		%		50-140	08-AUG-18
Bromodichloromethane			108.3		%		50-140	08-AUG-18
Bromoform			101.5		%		50-140	08-AUG-18
Bromomethane			85.7		%		50-140	08-AUG-18
Carbon tetrachloride			114.3		%		50-140	08-AUG-18
Chlorobenzene			102.8		%		50-140	08-AUG-18
Chloroform			111.4		%		50-140	08-AUG-18
cis-1,2-Dichloroethylene			106.4		%		50-140	08-AUG-18
cis-1,3-Dichloropropene			108.1		%		50-140	08-AUG-18
Dibromochloromethane			103.7		%		50-140	08-AUG-18
Dichlorodifluoromethane			109.4		%		50-140	08-AUG-18
Ethylbenzene			96.4		%		50-140	08-AUG-18
n-Hexane			111.2		%		50-140	08-AUG-18
m+p-Xylenes			101.8		%		50-140	08-AUG-18
Methyl Ethyl Ketone			84.7		%		50-140	08-AUG-18
Methyl Isobutyl Ketone			82.3		%		50-140	08-AUG-18
Methylene Chloride			107.3		%		50-140	08-AUG-18
MTBE			105.7		%		50-140	08-AUG-18
o-Xylene			97.5		%		50-140	08-AUG-18
Styrene			98.7		%		50-140	08-AUG-18
Tetrachloroethylene			105.2		%		50-140	08-AUG-18
Toluene			90.1		%		50-140	08-AUG-18
trans-1,2-Dichloroethylene			104.8		%		50-140	08-AUG-18
trans-1,3-Dichloropropene			94.8		%		50-140	08-AUG-18
Trichloroethylene			116.0		%		50-140	08-AUG-18
Trichlorofluoromethane			119.1		%		50-140	08-AUG-18
Vinyl chloride			89.1		%		50-140	08-AUG-18
Batch R4161624								
WG2842526-4 DUP		**WG2842526-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,1,1-Trichloroethane		0.62	0.58		ug/L	6.7	30	09-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,1-Dichloroethane		<0.50	<0.50					

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4161624								
WG2842526-4 DUP		**WG2842526-3**						
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	09-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	09-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	09-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	09-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	09-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	09-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
m+p-Xylenes		0.42	0.43		ug/L	2.4	30	09-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	09-AUG-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	09-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	09-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	09-AUG-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Toluene		0.57	0.56		ug/L	1.8	30	09-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30		ug/L			09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4161624								
WG2842526-4 DUP		**WG2842526-3**						
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	09-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	09-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-AUG-18
WG2842526-1 LCS								
1,1,1,2-Tetrachloroethane			103.6		%		70-130	09-AUG-18
1,1,2,2-Tetrachloroethane			102.5		%		70-130	09-AUG-18
1,1,1-Trichloroethane			107.7		%		70-130	09-AUG-18
1,1,2-Trichloroethane			104.8		%		70-130	09-AUG-18
1,1-Dichloroethane			107.9		%		70-130	09-AUG-18
1,1-Dichloroethylene			108.4		%		70-130	09-AUG-18
1,2-Dibromoethane			104.4		%		70-130	09-AUG-18
1,2-Dichlorobenzene			106.7		%		70-130	09-AUG-18
1,2-Dichloroethane			107.6		%		70-130	09-AUG-18
1,2-Dichloropropane			107.5		%		70-130	09-AUG-18
1,3-Dichlorobenzene			104.3		%		70-130	09-AUG-18
1,4-Dichlorobenzene			105.5		%		70-130	09-AUG-18
Acetone			107.0		%		60-140	09-AUG-18
Benzene			109.4		%		70-130	09-AUG-18
Bromodichloromethane			108.0		%		70-130	09-AUG-18
Bromoform			99.5		%		70-130	09-AUG-18
Bromomethane			94.9		%		60-140	09-AUG-18
Carbon tetrachloride			106.8		%		70-130	09-AUG-18
Chlorobenzene			106.8		%		70-130	09-AUG-18
Chloroform			107.6		%		70-130	09-AUG-18
cis-1,2-Dichloroethylene			107.4		%		70-130	09-AUG-18
cis-1,3-Dichloropropene			107.0		%		70-130	09-AUG-18
Dibromochloromethane			102.7		%		70-130	09-AUG-18
Dichlorodifluoromethane			211.6	LCS-H	%		50-140	09-AUG-18
Ethylbenzene			107.0		%		70-130	09-AUG-18
n-Hexane			125.8		%		70-130	09-AUG-18
m+p-Xylenes			106.0		%		70-130	09-AUG-18
Methyl Ethyl Ketone			103.6		%		60-140	09-AUG-18
Methyl Isobutyl Ketone			105.8				60-140	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4161624								
WG2842526-1 LCS								
Methyl Isobutyl Ketone			105.8		%		60-140	09-AUG-18
Methylene Chloride			107.4		%		70-130	09-AUG-18
MTBE			108.4		%		70-130	09-AUG-18
o-Xylene			104.6		%		70-130	09-AUG-18
Styrene			106.5		%		70-130	09-AUG-18
Tetrachloroethylene			105.1		%		70-130	09-AUG-18
Toluene			106.5		%		70-130	09-AUG-18
trans-1,2-Dichloroethylene			108.5		%		70-130	09-AUG-18
trans-1,3-Dichloropropene			106.0		%		70-130	09-AUG-18
Trichloroethylene			110.7		%		70-130	09-AUG-18
Trichlorofluoromethane			125.9		%		60-140	09-AUG-18
Vinyl chloride			124.2		%		60-140	09-AUG-18
WG2842526-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	09-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	09-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	09-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	09-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	09-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	09-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	09-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	09-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	09-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	09-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	09-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	09-AUG-18
Acetone			<30		ug/L		30	09-AUG-18
Benzene			<0.50		ug/L		0.5	09-AUG-18
Bromodichloromethane			<2.0		ug/L		2	09-AUG-18
Bromoform			<5.0		ug/L		5	09-AUG-18
Bromomethane			<0.50		ug/L		0.5	09-AUG-18
Carbon tetrachloride			<0.20		ug/L		0.2	09-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	09-AUG-18
Chloroform			<1.0		ug/L		1	09-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4161624								
WG2842526-2 MB								
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	09-AUG-18
Dibromochloromethane			<2.0		ug/L		2	09-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	09-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	09-AUG-18
n-Hexane			<0.50		ug/L		0.5	09-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	09-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	09-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	09-AUG-18
Methylene Chloride			<5.0		ug/L		5	09-AUG-18
MTBE			<2.0		ug/L		2	09-AUG-18
o-Xylene			<0.30		ug/L		0.3	09-AUG-18
Styrene			<0.50		ug/L		0.5	09-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	09-AUG-18
Toluene			<0.50		ug/L		0.5	09-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	09-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	09-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	09-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	09-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	09-AUG-18
Surrogate: 1,4-Difluorobenzene			99.4		%		70-130	09-AUG-18
Surrogate: 4-Bromofluorobenzene			98.4		%		70-130	09-AUG-18
WG2842526-5 MS		**WG2842526-3**						
1,1,1,2-Tetrachloroethane			101.7		%		50-140	09-AUG-18
1,1,2,2-Tetrachloroethane			94.2		%		50-140	09-AUG-18
1,1,1-Trichloroethane			108.2		%		50-140	09-AUG-18
1,1,2-Trichloroethane			98.2		%		50-140	09-AUG-18
1,1-Dichloroethane			106.0		%		50-140	09-AUG-18
1,1-Dichloroethylene			106.3		%		50-140	09-AUG-18
1,2-Dibromoethane			94.4		%		50-140	09-AUG-18
1,2-Dichlorobenzene			105.9		%		50-140	09-AUG-18
1,2-Dichloroethane			98.4		%		50-140	09-AUG-18
1,2-Dichloropropane			103.0		%		50-140	09-AUG-18
1,3-Dichlorobenzene			107.2		%		50-140	09-AUG-18
1,4-Dichlorobenzene			107.2		%		50-140	09-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4161624								
WG2842526-5 MS		**WG2842526-3**						
Acetone			91.4		%		50-140	09-AUG-18
Benzene			107.8		%		50-140	09-AUG-18
Bromodichloromethane			102.7		%		50-140	09-AUG-18
Bromoform			90.4		%		50-140	09-AUG-18
Bromomethane			82.3		%		50-140	09-AUG-18
Carbon tetrachloride			107.7		%		50-140	09-AUG-18
Chlorobenzene			106.7		%		50-140	09-AUG-18
Chloroform			105.8		%		50-140	09-AUG-18
cis-1,2-Dichloroethylene			105.4		%		50-140	09-AUG-18
cis-1,3-Dichloropropene			97.0		%		50-140	09-AUG-18
Dibromochloromethane			96.0		%		50-140	09-AUG-18
Dichlorodifluoromethane			122.8		%		50-140	09-AUG-18
Ethylbenzene			110.6		%		50-140	09-AUG-18
n-Hexane			133.7		%		50-140	09-AUG-18
m+p-Xylenes			110.5		%		50-140	09-AUG-18
Methyl Ethyl Ketone			85.6		%		50-140	09-AUG-18
Methyl Isobutyl Ketone			88.1		%		50-140	09-AUG-18
Methylene Chloride			101.2		%		50-140	09-AUG-18
MTBE			110.3		%		50-140	09-AUG-18
o-Xylene			107.2		%		50-140	09-AUG-18
Styrene			105.6		%		50-140	09-AUG-18
Tetrachloroethylene			110.2		%		50-140	09-AUG-18
Toluene			110.2		%		50-140	09-AUG-18
trans-1,2-Dichloroethylene			107.6		%		50-140	09-AUG-18
trans-1,3-Dichloropropene			93.4		%		50-140	09-AUG-18
Trichloroethylene			111.8		%		50-140	09-AUG-18
Trichlorofluoromethane			118.5		%		50-140	09-AUG-18
Vinyl chloride			105.9		%		50-140	09-AUG-18
Batch R4162501								
WG2841271-1 LCS								
n-Hexane			80.0		%		70-130	09-AUG-18
WG2841271-2 MB								
n-Hexane			<0.50		ug/L		0.5	10-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4162513								
WG2842152-1 LCS								
Vinyl chloride			107.6		%		60-140	10-AUG-18
WG2842152-2 MB								
Vinyl chloride			<0.50		ug/L		0.5	10-AUG-18
Batch R4166494								
WG2843292-4 DUP		**WG2843292-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	13-AUG-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	13-AUG-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-AUG-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-AUG-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	13-AUG-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	13-AUG-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-AUG-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-AUG-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-AUG-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	13-AUG-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4166494								
WG2843292-4 DUP		**WG2843292-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	13-AUG-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-AUG-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-AUG-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-AUG-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Toluene		0.62	0.60		ug/L	3.3	30	13-AUG-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-AUG-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-AUG-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-AUG-18
WG2843292-1 LCS								
1,1,1,2-Tetrachloroethane			100.6		%		70-130	13-AUG-18
1,1,2,2-Tetrachloroethane			96.1		%		70-130	13-AUG-18
1,1,1-Trichloroethane			104.5		%		70-130	13-AUG-18
1,1,2-Trichloroethane			101.1		%		70-130	13-AUG-18
1,1-Dichloroethane			108.3		%		70-130	13-AUG-18
1,1-Dichloroethylene			103.9		%		70-130	13-AUG-18
1,2-Dibromoethane			99.5		%		70-130	13-AUG-18
1,2-Dichlorobenzene			105.6		%		70-130	13-AUG-18
1,2-Dichloroethane			102.4		%		70-130	13-AUG-18
1,2-Dichloropropane			101.4		%		70-130	13-AUG-18
1,3-Dichlorobenzene			107.2		%		70-130	13-AUG-18
1,4-Dichlorobenzene			108.1		%		70-130	13-AUG-18
Acetone			101.1		%		60-140	13-AUG-18
Benzene			106.5		%		70-130	13-AUG-18
Bromodichloromethane			102.6		%		70-130	13-AUG-18
Bromoform			95.4		%		70-130	13-AUG-18
Bromomethane			87.9		%		60-140	13-AUG-18
Carbon tetrachloride			105.7		%		70-130	13-AUG-18
Chlorobenzene			107.0		%		70-130	13-AUG-18
Chloroform			105.4		%		70-130	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4166494								
WG2843292-1 LCS								
cis-1,2-Dichloroethylene			105.2		%		70-130	13-AUG-18
cis-1,3-Dichloropropene			106.0		%		70-130	13-AUG-18
Dibromochloromethane			99.6		%		70-130	13-AUG-18
Dichlorodifluoromethane			122.5		%		50-140	13-AUG-18
Ethylbenzene			104.6		%		70-130	13-AUG-18
n-Hexane			130.3	MES	%		70-130	13-AUG-18
m+p-Xylenes			105.2		%		70-130	13-AUG-18
Methyl Ethyl Ketone			95.2		%		60-140	13-AUG-18
Methyl Isobutyl Ketone			86.6		%		60-140	13-AUG-18
Methylene Chloride			106.0		%		70-130	13-AUG-18
MTBE			109.8		%		70-130	13-AUG-18
o-Xylene			102.6		%		70-130	13-AUG-18
Styrene			102.2		%		70-130	13-AUG-18
Tetrachloroethylene			111.2		%		70-130	13-AUG-18
Toluene			104.0		%		70-130	13-AUG-18
trans-1,2-Dichloroethylene			108.8		%		70-130	13-AUG-18
trans-1,3-Dichloropropene			103.1		%		70-130	13-AUG-18
Trichloroethylene			110.7		%		70-130	13-AUG-18
Trichlorofluoromethane			117.3		%		60-140	13-AUG-18
Vinyl chloride			105.1		%		60-140	13-AUG-18
WG2843292-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	13-AUG-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	13-AUG-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	13-AUG-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	13-AUG-18
1,1-Dichloroethane			<0.50		ug/L		0.5	13-AUG-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	13-AUG-18
1,2-Dibromoethane			<0.20		ug/L		0.2	13-AUG-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	13-AUG-18
1,2-Dichloroethane			<0.50		ug/L		0.5	13-AUG-18
1,2-Dichloropropane			<0.50		ug/L		0.5	13-AUG-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	13-AUG-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	13-AUG-18
Acetone			<30		ug/L		30	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4166494								
WG2843292-2 MB								
Benzene			<0.50		ug/L		0.5	13-AUG-18
Bromodichloromethane			<2.0		ug/L		2	13-AUG-18
Bromoform			<5.0		ug/L		5	13-AUG-18
Bromomethane			<0.50		ug/L		0.5	13-AUG-18
Carbon tetrachloride			<0.20		ug/L		0.2	13-AUG-18
Chlorobenzene			<0.50		ug/L		0.5	13-AUG-18
Chloroform			<1.0		ug/L		1	13-AUG-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	13-AUG-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	13-AUG-18
Dibromochloromethane			<2.0		ug/L		2	13-AUG-18
Dichlorodifluoromethane			<2.0		ug/L		2	13-AUG-18
Ethylbenzene			<0.50		ug/L		0.5	13-AUG-18
n-Hexane			<0.50		ug/L		0.5	13-AUG-18
m+p-Xylenes			<0.40		ug/L		0.4	13-AUG-18
Methyl Ethyl Ketone			<20		ug/L		20	13-AUG-18
Methyl Isobutyl Ketone			<20		ug/L		20	13-AUG-18
Methylene Chloride			<5.0		ug/L		5	13-AUG-18
MTBE			<2.0		ug/L		2	13-AUG-18
o-Xylene			<0.30		ug/L		0.3	13-AUG-18
Styrene			<0.50		ug/L		0.5	13-AUG-18
Tetrachloroethylene			<0.50		ug/L		0.5	13-AUG-18
Toluene			<0.50		ug/L		0.5	13-AUG-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	13-AUG-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	13-AUG-18
Trichloroethylene			<0.50		ug/L		0.5	13-AUG-18
Trichlorofluoromethane			<5.0		ug/L		5	13-AUG-18
Vinyl chloride			<0.50		ug/L		0.5	13-AUG-18
Surrogate: 1,4-Difluorobenzene			100.8		%		70-130	13-AUG-18
Surrogate: 4-Bromofluorobenzene			98.2		%		70-130	13-AUG-18
WG2843292-5 MS		**WG2843292-3**						
1,1,1,2-Tetrachloroethane			102.2		%		50-140	13-AUG-18
1,1,2,2-Tetrachloroethane			105.2		%		50-140	13-AUG-18
1,1,1-Trichloroethane			101.2		%		50-140	13-AUG-18
1,1,2-Trichloroethane			108.2		%		50-140	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4166494								
WG2843292-5 MS		**WG2843292-3**						
1,1-Dichloroethane			108.5		%		50-140	13-AUG-18
1,1-Dichloroethylene			97.6		%		50-140	13-AUG-18
1,2-Dibromoethane			107.8		%		50-140	13-AUG-18
1,2-Dichlorobenzene			105.6		%		50-140	13-AUG-18
1,2-Dichloroethane			109.3		%		50-140	13-AUG-18
1,2-Dichloropropane			105.9		%		50-140	13-AUG-18
1,3-Dichlorobenzene			103.9		%		50-140	13-AUG-18
1,4-Dichlorobenzene			105.4		%		50-140	13-AUG-18
Acetone			104.7		%		50-140	13-AUG-18
Benzene			107.3		%		50-140	13-AUG-18
Bromodichloromethane			107.5		%		50-140	13-AUG-18
Bromoform			102.7		%		50-140	13-AUG-18
Bromomethane			86.2		%		50-140	13-AUG-18
Carbon tetrachloride			101.1		%		50-140	13-AUG-18
Chlorobenzene			107.0		%		50-140	13-AUG-18
Chloroform			107.1		%		50-140	13-AUG-18
cis-1,2-Dichloroethylene			107.0		%		50-140	13-AUG-18
cis-1,3-Dichloropropene			117.2		%		50-140	13-AUG-18
Dibromochloromethane			104.4		%		50-140	13-AUG-18
Dichlorodifluoromethane			101.5		%		50-140	13-AUG-18
Ethylbenzene			101.0		%		50-140	13-AUG-18
n-Hexane			120.3		%		50-140	13-AUG-18
m+p-Xylenes			101.7		%		50-140	13-AUG-18
Methyl Ethyl Ketone			110.4		%		50-140	13-AUG-18
Methyl Isobutyl Ketone			97.0		%		50-140	13-AUG-18
Methylene Chloride			108.6		%		50-140	13-AUG-18
MTBE			109.8		%		50-140	13-AUG-18
o-Xylene			101.1		%		50-140	13-AUG-18
Styrene			102.3		%		50-140	13-AUG-18
Tetrachloroethylene			104.5		%		50-140	13-AUG-18
Toluene			101.6		%		50-140	13-AUG-18
trans-1,2-Dichloroethylene			105.0		%		50-140	13-AUG-18
trans-1,3-Dichloropropene			112.3		%		50-140	13-AUG-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4166494								
WG2843292-5 MS		**WG2843292-3**						
Trichloroethylene			108.6		%		50-140	13-AUG-18
Trichlorofluoromethane			107.9		%		50-140	13-AUG-18
Vinyl chloride			95.2		%		50-140	13-AUG-18

Quality Control Report

Workorder: L2141576 Report Date: 14-AUG-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: TANIA MCCARTHY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

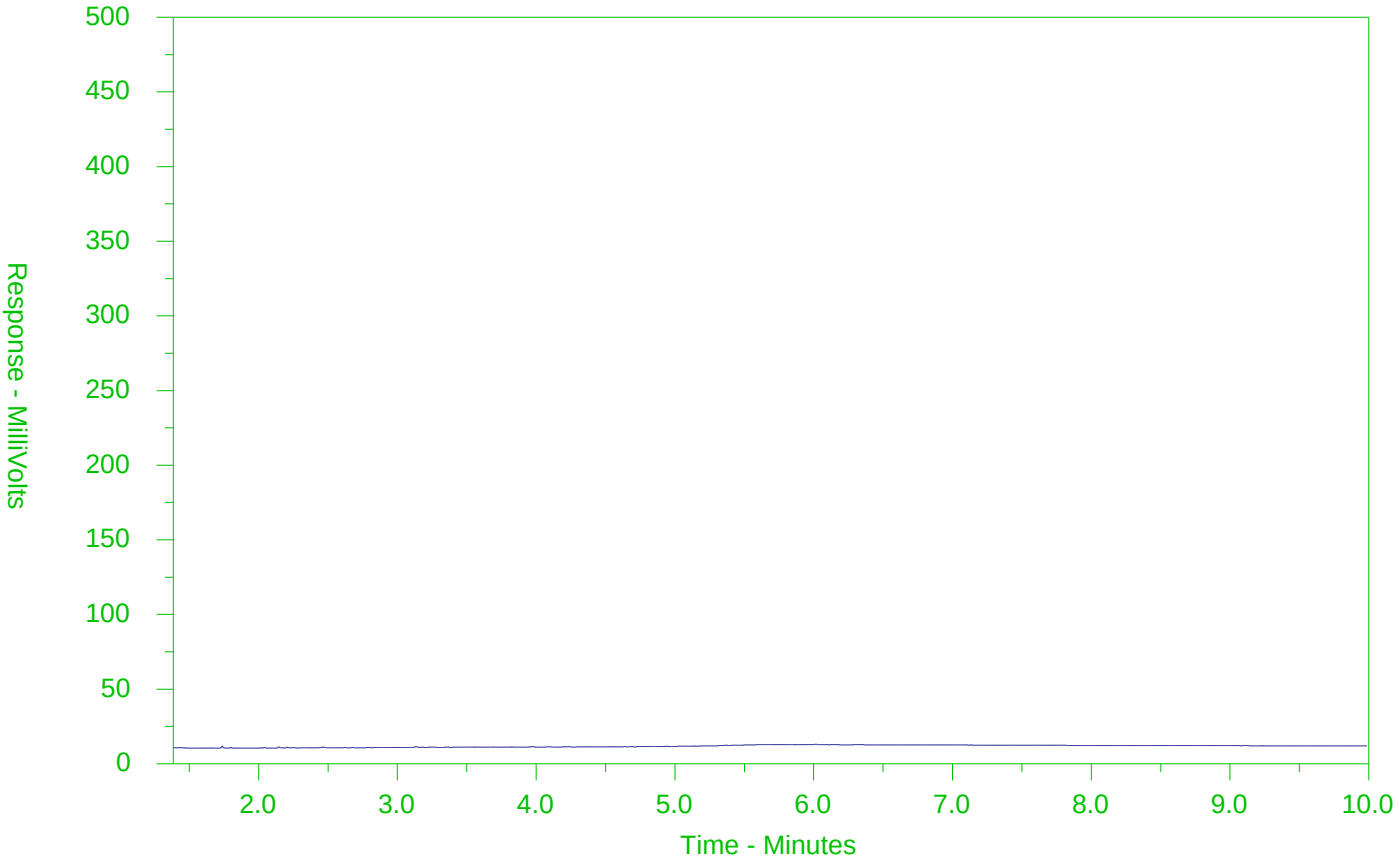
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141576-8
Client Sample ID: MW18-126D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

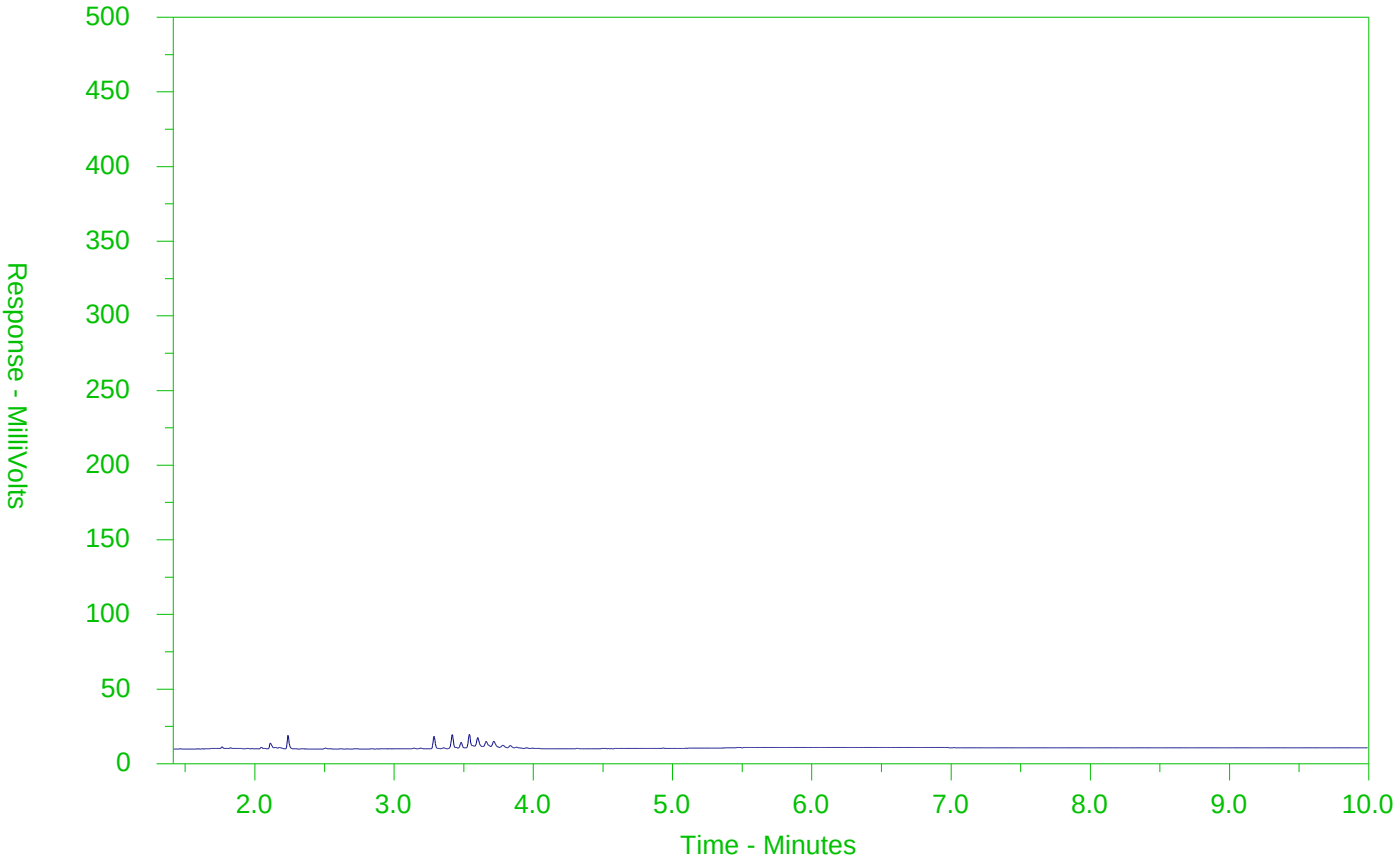
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141576-9
Client Sample ID: MW18-125S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

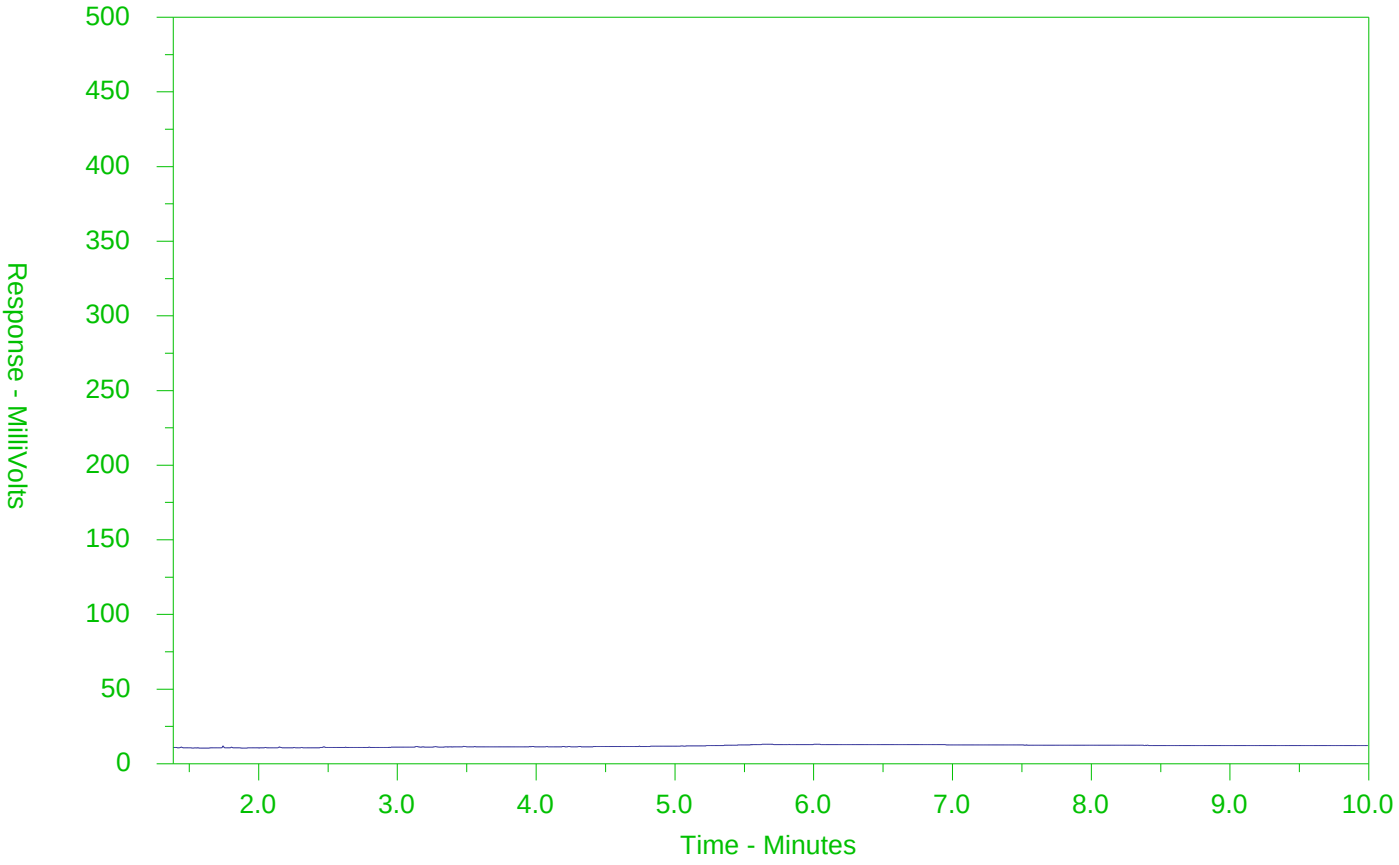
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141576-12
Client Sample ID: MW18-127S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

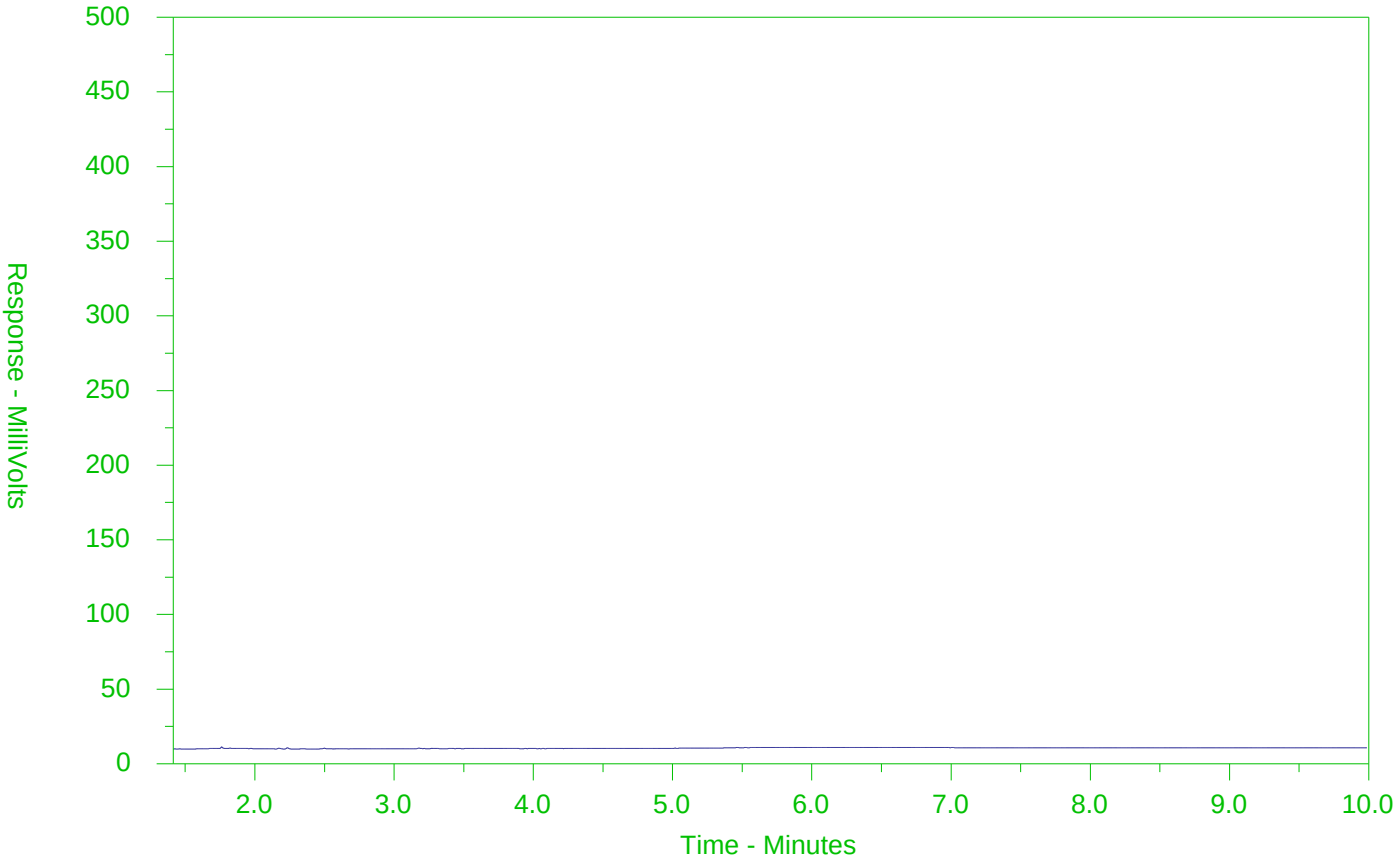
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2141576-18
Client Sample ID: DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
←Diesel/Jet Fuels→			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2141576-COFC

COC Number: 15 -

Page 1 of 2

Report To	Contact and company name below will appear on the final report
Company:	CH2M Hill
Contact:	Tania McCarthy
Phone:	519 579 3500
	Company address below will appear on the final report
Street:	72 Victoria Street South, Suite 300
City/Province:	Kitchener
Postal Code:	N2G 4Y9
Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	CH2M Hill
Contact:	Accounts Payable

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Tania McCarthy@jacobs.com
Email 2	Ed.Taves@jacobs.com
Email 3	amy.casey@jacobs.com
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	Accounts Payable
Email 2	

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply			
Regular [R]	☑ Standard TAT if received by 3 pm - business days - no surcharges apply		
PRIORITY (Business Days)	4 day [P4] ☐	EMERGENCY	1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		
Date and Time Required for all E&P TATs:			
For tests that can not be performed according to the service level selected, you will be contacted.			

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q68850	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2141576	ALS Contact: Mathy	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F1-FA-511-P-WT	MET-HYD-RS11-WT	MET-RS11-D-MS-WT	PAH-511-WT	PCB-511-WT	VOC-511-HS-WT	VOC-RS11-F1-FA-P-WT	BAP-LABFILTER-511-WT B(	Number of Containers
1	MW18-130S DUP C 1175	02-008-18	10:15	W			X						
2	MW18-112D		11:50			X							
3	MW18-112S		11:51			X							
4	MW18-114S		13:45			X							
5	MW18-118S		13:50				X	X		X			
6	MW18-115S		15:10			X							
7	MW18-124S		15:15					X					
8	MW18-126D		16:50		X					X			
9	MW18-125S		17:15		X			X	X	X			
10	MW18-121S	03-008-18	09:30				X			X			
11	MW18-122D	↓	10:00							X			
12	MW18-127S	↓	11:05	↓	X					X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C	
			3.1°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: A. Casey	Date: 8/3/18	Time:	Received by:	Date:	Time:	Received by:	Date: 03-Aug-18	Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of this white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

Chain of Custody (CC
Request F

Canada Toll Free: 1 8

www.alsglobal.com

L2141576-COFC

COC Number 15 -

Report To	Contact and company name below will appear on the final report	Select Report For	Regular	4 day [P4] ☐	1 Business day [E1] ☐
Company:	CH2M Hill	Quality Control (QC)		3 day [P3] ☐	Same Day, Weekend or Statutory holiday [E0] ☐
Contact:	Tania McCarthy	☐ Compare Results to Ch		2 day [P2] ☐	
Phone:	519 578 3500	Select Distribution:		Date and Time Required for all E&P TATs:	
	Company address below will appear on the final report	Email 1 or Fax: Tania.M		For tests that can not be performed according to the service level selected, you will be contacted.	
Street:	72 Victoria Street South, Suite 300	Email 2			
City/Province:	Kitchener	Email 3			
Postal Code:	N2G 4Y9				
Invoice To	Same as Report To ☐ YES ☐ NO	Select Invoice Distribution			
	Copy of Invoice with Report ☐ YES ☐ NO	Email 1 or Fax	☐ EMAIL ☐ MAIL ☐ FAX		
Company:	CH2M Hill	Email 2	Accounts Payable		
Contact:	Accounts Payable				

Project Information

ALS Account # / Quote #:	Q68850
Job #:	694757
PO / AFE:	
LSD:	
ALS Lab Work Order # (lab use only):	L2141570
ALS Contact:	Matty
Sampler:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification - (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F1-F4-511-P-WT	MET-HYD-R511-WT	MET-R511-D-MS-WT	PAH-511-WT	PCB-511-WT	VOC-511-HS-WT	VOC-R511,F1-F4-P-WT	BAP-LABFILTER-511-WT B(	Number of Containers
13	MW18-119	03-008-18	11:45	W						X			
14	MW18-123		12:40							X			
15	MW18-116		13:55							X			
16	MW18-116		13:50				X						
17	MW18-113		15:40				X						
18	DUP2												
19	DUP3	03-008-18	16:55		X					X			
		03-008-18	15:45										

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human drinking water use? ☐ YES ☐ NO

Special Instructions / Specify (e.g. ... on the drop-down list below)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURE °C	FINAL COOLER TEMPERATURE °C
	3.1 °C

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
[illegible] Dany Cadieux	3/8/18						03-Aug-18	16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

OCTOBER 2016 FRONT

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 17-OCT-18
Report Date: 26-OCT-18 14:49 (MT)
Version: FINAL REV. 2

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2182846

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-728110
Legal Site Desc:

Comments: 26-OCT-18:
BAP lab filter added to first sample. Results included.

Mathy Mahadeva
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-1	OW25						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 15:5						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	<0.020		0.020	ug/L	22-OCT-18	4.1
	Acenaphthylene	<0.020		0.020	ug/L	22-OCT-18	1
	Anthracene	<0.020		0.020	ug/L	22-OCT-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	22-OCT-18	1
	Benzo(a)pyrene	0.034		0.010	ug/L	22-OCT-18	*0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	22-OCT-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Chrysene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	22-OCT-18	0.2
	Fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.41
	Fluorene	<0.020		0.020	ug/L	22-OCT-18	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	22-OCT-18	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	22-OCT-18	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	22-OCT-18	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	22-OCT-18	3.2
	Naphthalene	<0.050		0.050	ug/L	22-OCT-18	7
	Phenanthrene	<0.020		0.020	ug/L	22-OCT-18	1
	Pyrene	<0.020		0.020	ug/L	22-OCT-18	4.1
	Surrogate: d10-Acenaphthene	88.3		60-140	%	22-OCT-18	
	Surrogate: d12-Chrysene	97.5		60-140	%	22-OCT-18	
	Surrogate: d8-Naphthalene	77.6		60-140	%	22-OCT-18	
	Surrogate: d10-Phenanthrene	94.4		60-140	%	22-OCT-18	
Semi-Volatile Organics							
	Benzo(a)pyrene-lab filtered	<0.015	DLM	0.015	ug/L	25-OCT-18	**0.01
	Surrogate: d12-Chrysene	89.2		60-140	%	25-OCT-18	
L2182846-2	OW31-S						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 10:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	64		30	ug/L	22-OCT-18	2700
	Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
	Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
	Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
	Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-2	OW31-S						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 10:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	cis-1,2-Dichloroethylene	1.69		0.50	ug/L	22-OCT-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
	n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
	MTBE	<2.0		2.0	ug/L	22-OCT-18	15
	Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Toluene	38.5		0.50	ug/L	22-OCT-18	*24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
	Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
	o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
	m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
	Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
	Surrogate: 4-Bromofluorobenzene	97.9		70-130	%	22-OCT-18	
	Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	22-OCT-18	
L2182846-3	OW31-M						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 14:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	22-OCT-18	2700
	Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
	Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
	Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
	Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-3	OW31-M						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 14:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
	1,1-Dichloroethane	0.57		0.50	ug/L	22-OCT-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	cis-1,2-Dichloroethylene	1.89		0.50	ug/L	22-OCT-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
	n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
	MTBE	<2.0		2.0	ug/L	22-OCT-18	15
	Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Toluene	1.39		0.50	ug/L	22-OCT-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
	Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
	o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
	m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
	Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
	Surrogate: 4-Bromofluorobenzene	99.0		70-130	%	22-OCT-18	
	Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	22-OCT-18	
L2182846-4	OW31-E						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 17:1						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	22-OCT-18	2700
	Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
	Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
	Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
	Chloroform	<1.0		1.0	ug/L	22-OCT-18	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-4	OW31-E						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 17:1						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
	1,1-Dichloroethane	0.58		0.50	ug/L	22-OCT-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	cis-1,2-Dichloroethylene	2.01		0.50	ug/L	22-OCT-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
	n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
	MTBE	<2.0		2.0	ug/L	22-OCT-18	15
	Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Toluene	0.79		0.50	ug/L	22-OCT-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
	Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
	o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
	m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
	Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
	Surrogate: 4-Bromofluorobenzene	98.5		70-130	%	22-OCT-18	
	Surrogate: 1,4-Difluorobenzene	98.8		70-130	%	22-OCT-18	
L2182846-5	MW18-128D						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 13:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	22-OCT-18	2700
	Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
	Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
	Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-5	MW18-128D						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 13:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
	Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
	1,1-Dichloroethane	1.13		0.50	ug/L	22-OCT-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	cis-1,2-Dichloroethylene	3.80		0.50	ug/L	22-OCT-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
	n-Hexane	0.72		0.50	ug/L	22-OCT-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
	MTBE	<2.0		2.0	ug/L	22-OCT-18	15
	Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Toluene	<0.50		0.50	ug/L	22-OCT-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
	Trichloroethylene	0.85		0.50	ug/L	22-OCT-18	*0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
	Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
	o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
	m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
	Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
	Surrogate: 4-Bromofluorobenzene	97.6		70-130	%	22-OCT-18	
	Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	22-OCT-18	
L2182846-6	MW18-130D						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 13:2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	22-OCT-18	2700
	Benzene	0.74		0.50	ug/L	22-OCT-18	*0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2182846-6 MW18-130D						
Sampled By: M.S. & V.P. on 17-OCT-18 @ 13:2(						
Matrix: WATER						
Volatile Organic Compounds						
Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
cis-1,2-Dichloroethylene	42.2		0.50	ug/L	22-OCT-18	*1.6
trans-1,2-Dichloroethylene	1.42		0.50	ug/L	22-OCT-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
MTBE	<2.0		2.0	ug/L	22-OCT-18	15
Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Toluene	<0.50		0.50	ug/L	22-OCT-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
Vinyl chloride	5.41		0.50	ug/L	22-OCT-18	*0.5
o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
Surrogate: 4-Bromofluorobenzene	99.2		70-130	%	22-OCT-18	
Surrogate: 1,4-Difluorobenzene	99.3		70-130	%	22-OCT-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	22-OCT-18	420
F1-BTEX	<25		25	ug/L	22-OCT-18	420
F2 (C10-C16)	<100		100	ug/L	18-OCT-18	150
F3 (C16-C34)	<250		250	ug/L	18-OCT-18	500

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2182846-6	MW18-130D									
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 13:2(									
Matrix:	WATER						#1			
Hydrocarbons										
F4 (C34-C50)		<250		250	ug/L	18-OCT-18	500			
Total Hydrocarbons (C6-C50)		<370		370	ug/L	22-OCT-18				
Chrom. to baseline at nC50		YES			No Unit	18-OCT-18				
Surrogate: 2-Bromobenzotrifluoride		94.9		60-140	%	18-OCT-18				
Surrogate: 3,4-Dichlorotoluene		84.5		60-140	%	22-OCT-18				
L2182846-7	MW18-131S									
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 17:0									
Matrix:	WATER						#1			
Volatile Organic Compounds										
Acetone		<30	OWP	30	ug/L	22-OCT-18	2700			
Benzene		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
Bromodichloromethane		<2.0	OWP	2.0	ug/L	22-OCT-18	16			
Bromoform		<5.0	OWP	5.0	ug/L	22-OCT-18	5			
Bromomethane		<0.50	OWP	0.50	ug/L	22-OCT-18	0.89			
Carbon tetrachloride		<0.20	OWP	0.20	ug/L	22-OCT-18	0.2			
Chlorobenzene		<0.50	OWP	0.50	ug/L	22-OCT-18	30			
Dibromochloromethane		<2.0	OWP	2.0	ug/L	22-OCT-18	25			
Chloroform		<1.0	OWP	1.0	ug/L	22-OCT-18	2			
1,2-Dibromoethane		<0.20	OWP	0.20	ug/L	22-OCT-18	0.2			
1,2-Dichlorobenzene		<0.50	OWP	0.50	ug/L	22-OCT-18	3			
1,3-Dichlorobenzene		<0.50	OWP	0.50	ug/L	22-OCT-18	59			
1,4-Dichlorobenzene		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
Dichlorodifluoromethane		<2.0	OWP	2.0	ug/L	22-OCT-18	590			
1,1-Dichloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	5			
1,2-Dichloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
1,1-Dichloroethylene		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
cis-1,2-Dichloroethylene		2.43	OWP	0.50	ug/L	22-OCT-18	*1.6			
trans-1,2-Dichloroethylene		<0.50	OWP	0.50	ug/L	22-OCT-18	1.6			
Methylene Chloride		<5.0	OWP	5.0	ug/L	22-OCT-18	26			
1,2-Dichloropropane		<0.50	OWP	0.50	ug/L	22-OCT-18	0.58			
cis-1,3-Dichloropropene		<0.30	OWP	0.30	ug/L	22-OCT-18				
trans-1,3-Dichloropropene		<0.30	OWP	0.30	ug/L	22-OCT-18				
1,3-Dichloropropene (cis & trans)		<0.50		0.50	ug/L	22-OCT-18	0.5			
Ethylbenzene		<0.50	OWP	0.50	ug/L	22-OCT-18	2.4			
n-Hexane		<0.50	OWP	0.50	ug/L	22-OCT-18	5			
Methyl Ethyl Ketone		<20	OWP	20	ug/L	22-OCT-18	1800			
Methyl Isobutyl Ketone		<20	OWP	20	ug/L	22-OCT-18	640			
MTBE		<2.0	OWP	2.0	ug/L	22-OCT-18	15			
Styrene		<0.50	OWP	0.50	ug/L	22-OCT-18	5.4			
1,1,1,2-Tetrachloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	1.1			
1,1,2,2-Tetrachloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
Tetrachloroethylene		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			
Toluene		<0.50	OWP	0.50	ug/L	22-OCT-18	24			
1,1,1-Trichloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	23			
1,1,2-Trichloroethane		<0.50	OWP	0.50	ug/L	22-OCT-18	0.5			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-7	MW18-131S						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 17:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Trichloroethylene	4.70	OWP	0.50	ug/L	22-OCT-18	*0.5
	Trichlorofluoromethane	<5.0	OWP	5.0	ug/L	22-OCT-18	150
	Vinyl chloride	<0.50	OWP	0.50	ug/L	22-OCT-18	0.5
	o-Xylene	<0.30	OWP	0.30	ug/L	22-OCT-18	
	m+p-Xylenes	<0.40	OWP	0.40	ug/L	22-OCT-18	
	Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
	Surrogate: 4-Bromofluorobenzene	99.0		70-130	%	22-OCT-18	
	Surrogate: 1,4-Difluorobenzene	98.7		70-130	%	22-OCT-18	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	0.077		0.020	ug/L	22-OCT-18	4.1
	Acenaphthylene	<0.020		0.020	ug/L	22-OCT-18	1
	Anthracene	<0.020		0.020	ug/L	22-OCT-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	22-OCT-18	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	22-OCT-18	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	22-OCT-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Chrysene	<0.020		0.020	ug/L	22-OCT-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	22-OCT-18	0.2
	Fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.41
	Fluorene	0.097		0.020	ug/L	22-OCT-18	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	22-OCT-18	0.2
	1+2-Methylnaphthalenes	0.263		0.028	ug/L	22-OCT-18	3.2
	1-Methylnaphthalene	0.263		0.020	ug/L	22-OCT-18	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	22-OCT-18	3.2
	Naphthalene	0.088		0.050	ug/L	22-OCT-18	7
	Phenanthrene	0.099		0.020	ug/L	22-OCT-18	1
	Pyrene	<0.020		0.020	ug/L	22-OCT-18	4.1
	Surrogate: d10-Acenaphthene	87.4		60-140	%	22-OCT-18	
	Surrogate: d12-Chrysene	90.6		60-140	%	22-OCT-18	
	Surrogate: d8-Naphthalene	90.0		60-140	%	22-OCT-18	
	Surrogate: d10-Phenanthrene	93.8		60-140	%	22-OCT-18	
L2182846-8	MW18-132D						
Sampled By:	M.S. & V.P. on 17-OCT-18 @ 11:1						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	22-OCT-18	2700
	Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
	Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
	Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
	Chloroform	<1.0		1.0	ug/L	22-OCT-18	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2182846-8 MW18-132D						
Sampled By: M.S. & V.P. on 17-OCT-18 @ 11:1(						
Matrix: WATER						
Volatile Organic Compounds						
1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
cis-1,2-Dichloroethylene	19.0		0.50	ug/L	22-OCT-18	*1.6
trans-1,2-Dichloroethylene	0.54		0.50	ug/L	22-OCT-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
MTBE	<2.0		2.0	ug/L	22-OCT-18	15
Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Toluene	<0.50		0.50	ug/L	22-OCT-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
Vinyl chloride	4.41		0.50	ug/L	22-OCT-18	*0.5
o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
Surrogate: 4-Bromofluorobenzene	98.7		70-130	%	22-OCT-18	
Surrogate: 1,4-Difluorobenzene	98.7		70-130	%	22-OCT-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	22-OCT-18	420
F1-BTEX	<25		25	ug/L	22-OCT-18	420
F2 (C10-C16)	<100		100	ug/L	18-OCT-18	150
F3 (C16-C34)	<250		250	ug/L	18-OCT-18	500
F4 (C34-C50)	<250		250	ug/L	18-OCT-18	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	22-OCT-18	
Chrom. to baseline at nC50	YES			No Unit	18-OCT-18	
Surrogate: 2-Bromobenzotrifluoride	97.9		60-140	%	18-OCT-18	
Surrogate: 3,4-Dichlorotoluene	80.8		60-140	%	22-OCT-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2182846-9 MW18-133D						
Sampled By: M.S. & V.P. on 17-OCT-18 @ 13:2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	22-OCT-18	2700
Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
1,1-Dichloroethane	1.27		0.50	ug/L	22-OCT-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
cis-1,2-Dichloroethylene	3.63		0.50	ug/L	22-OCT-18	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
MTBE	<2.0		2.0	ug/L	22-OCT-18	15
Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Toluene	<0.50		0.50	ug/L	22-OCT-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%	22-OCT-18	
Surrogate: 1,4-Difluorobenzene	98.6		70-130	%	22-OCT-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2182846-10 TRIP BLANK						
Sampled By: M.S. & V.P. on 17-OCT-18						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	22-OCT-18	2700
Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
MTBE	<2.0		2.0	ug/L	22-OCT-18	15
Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Toluene	<0.50		0.50	ug/L	22-OCT-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
Vinyl chloride	<0.50		0.50	ug/L	22-OCT-18	0.5
o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
Surrogate: 4-Bromofluorobenzene	99.3		70-130	%	22-OCT-18	
Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	22-OCT-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	22-OCT-18	420

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-10 TRIP BLANK Sampled By: M.S. & V.P. on 17-OCT-18 Matrix: WATER						#1
Hydrocarbons						
F1-BTEX	<25		25	ug/L	22-OCT-18	420
Surrogate: 3,4-Dichlorotoluene	93.2		60-140	%	22-OCT-18	
L2182846-11 DUP1 Sampled By: M.S. & V.P. on 17-OCT-18 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	22-OCT-18	2700
Benzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	22-OCT-18	16
Bromoform	<5.0		5.0	ug/L	22-OCT-18	5
Bromomethane	<0.50		0.50	ug/L	22-OCT-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	22-OCT-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	22-OCT-18	30
Dibromochloromethane	<2.0		2.0	ug/L	22-OCT-18	25
Chloroform	<1.0		1.0	ug/L	22-OCT-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	22-OCT-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	22-OCT-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	22-OCT-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
cis-1,2-Dichloroethylene	19.3		0.50	ug/L	22-OCT-18	*1.6
trans-1,2-Dichloroethylene	0.54		0.50	ug/L	22-OCT-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	22-OCT-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	22-OCT-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	22-OCT-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	22-OCT-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	22-OCT-18	2.4
n-Hexane	<0.50		0.50	ug/L	22-OCT-18	5
Methyl Ethyl Ketone	<20		20	ug/L	22-OCT-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	22-OCT-18	640
MTBE	<2.0		2.0	ug/L	22-OCT-18	15
Styrene	<0.50		0.50	ug/L	22-OCT-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Toluene	<0.50		0.50	ug/L	22-OCT-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	22-OCT-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	22-OCT-18	150
Vinyl chloride	4.51		0.50	ug/L	22-OCT-18	*0.5

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2182846-11 DUP1						
Sampled By: M.S. & V.P. on 17-OCT-18						
Matrix: WATER						#1
Volatile Organic Compounds						
o-Xylene	<0.30		0.30	ug/L	22-OCT-18	
m+p-Xylenes	<0.40		0.40	ug/L	22-OCT-18	
Xylenes (Total)	<0.50		0.50	ug/L	22-OCT-18	72
Surrogate: 4-Bromofluorobenzene	97.2		70-130	%	22-OCT-18	
Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	22-OCT-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	22-OCT-18	420
F1-BTEX	<25		25	ug/L	22-OCT-18	420
F2 (C10-C16)	<100		100	ug/L	18-OCT-18	150
F3 (C16-C34)	<250		250	ug/L	18-OCT-18	500
F4 (C34-C50)	<250		250	ug/L	18-OCT-18	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	22-OCT-18	
Chrom. to baseline at nC50	YES			No Unit	18-OCT-18	
Surrogate: 2-Bromobenzotrifluoride	93.1		60-140	%	18-OCT-18	
Surrogate: 3,4-Dichlorotoluene	80.8		60-140	%	22-OCT-18	
L2182846-12 DUP2						
Sampled By: M.S. & V.P. on 17-OCT-18						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	22-OCT-18	4.1
Acenaphthylene	<0.020		0.020	ug/L	22-OCT-18	1
Anthracene	<0.020		0.020	ug/L	22-OCT-18	1
Benzo(a)anthracene	<0.020		0.020	ug/L	22-OCT-18	1
Benzo(a)pyrene	<0.010		0.010	ug/L	22-OCT-18	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	22-OCT-18	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.1
Chrysene	<0.020		0.020	ug/L	22-OCT-18	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	22-OCT-18	0.2
Fluoranthene	<0.020		0.020	ug/L	22-OCT-18	0.41
Fluorene	<0.020		0.020	ug/L	22-OCT-18	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	22-OCT-18	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	22-OCT-18	3.2
1-Methylnaphthalene	<0.020		0.020	ug/L	22-OCT-18	3.2
2-Methylnaphthalene	<0.020		0.020	ug/L	22-OCT-18	3.2
Naphthalene	<0.050		0.050	ug/L	22-OCT-18	7
Phenanthrene	<0.020		0.020	ug/L	22-OCT-18	1
Pyrene	<0.020		0.020	ug/L	22-OCT-18	4.1
Surrogate: d10-Acenaphthene	92.7		60-140	%	22-OCT-18	
Surrogate: d12-Chrysene	98.5		60-140	%	22-OCT-18	
Surrogate: d8-Naphthalene	96.3		60-140	%	22-OCT-18	
Surrogate: d10-Phenanthrene	97.4		60-140	%	22-OCT-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
BAP-LABFILTER-511-WT	Water	B(a)P-lab filtered-153/04 (July 2011)	SW846 8270 (511)

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

Reference Information

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-728110

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2182846 Report Date: 26-OCT-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BAP-LABFILTER-511-WT	**Water**							
Batch R4300307								
WG2912373-2 LCS								
Benzo(a)pyrene-lab filtered			107.4		%		50-140	25-OCT-18
WG2912373-3 LCSD		**WG2912373-2**						
Benzo(a)pyrene-lab filtered		107.4	101.2		%	6.0	50	25-OCT-18
WG2912373-1 MB								
Benzo(a)pyrene-lab filtered			<0.010		ug/L		0.01	25-OCT-18
Surrogate: d12-Chrysene			97.6		%		60-140	25-OCT-18
F1-HS-511-WT	**Water**							
Batch R4290107								
WG2908062-4 DUP		**WG2908062-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	22-OCT-18
WG2908062-1 LCS								
F1 (C6-C10)			94.9		%		80-120	22-OCT-18
WG2908062-2 MB								
F1 (C6-C10)			<25		ug/L		25	22-OCT-18
Surrogate: 3,4-Dichlorotoluene			89.4		%		60-140	22-OCT-18
WG2908062-5 MS		**WG2908062-3**						
F1 (C6-C10)			85.9		%		60-140	22-OCT-18
F2-F4-511-WT	**Water**							
Batch R4287943								
WG2906689-2 LCS								
F2 (C10-C16)			105.4		%		70-130	18-OCT-18
F3 (C16-C34)			103.8		%		70-130	18-OCT-18
F4 (C34-C50)			111.0		%		70-130	18-OCT-18
WG2906689-3 LCSD		**WG2906689-2**						
F2 (C10-C16)		105.4	106.1		%	0.7	50	18-OCT-18
F3 (C16-C34)		103.8	105.8		%	1.9	50	18-OCT-18
F4 (C34-C50)		111.0	111.6		%	0.5	50	18-OCT-18
WG2906689-1 MB								
F2 (C10-C16)			<100		ug/L		100	18-OCT-18
F3 (C16-C34)			<250		ug/L		250	18-OCT-18
F4 (C34-C50)			<250		ug/L		250	18-OCT-18
Surrogate: 2-Bromobenzotrifluoride			97.5		%		60-140	18-OCT-18
PAH-511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4290582								
WG2906689-2 LCS								
1-Methylnaphthalene			86.9		%		50-140	22-OCT-18
2-Methylnaphthalene			87.8		%		50-140	22-OCT-18
Acenaphthene			85.5		%		50-140	22-OCT-18
Acenaphthylene			89.8		%		50-140	22-OCT-18
Anthracene			98.2		%		50-140	22-OCT-18
Benzo(a)anthracene			109.1		%		50-140	22-OCT-18
Benzo(a)pyrene			90.1		%		50-140	22-OCT-18
Benzo(b)fluoranthene			89.0		%		50-140	22-OCT-18
Benzo(g,h,i)perylene			92.6		%		50-140	22-OCT-18
Benzo(k)fluoranthene			89.4		%		50-140	22-OCT-18
Chrysene			103.0		%		50-140	22-OCT-18
Dibenzo(ah)anthracene			99.1		%		50-140	22-OCT-18
Fluoranthene			97.3		%		50-140	22-OCT-18
Fluorene			94.3		%		50-140	22-OCT-18
Indeno(1,2,3-cd)pyrene			112.2		%		50-140	22-OCT-18
Naphthalene			84.2		%		50-140	22-OCT-18
Phenanthrene			94.5		%		50-140	22-OCT-18
Pyrene			97.1		%		50-140	22-OCT-18
WG2906689-3 LCSD		**WG2906689-2**						
1-Methylnaphthalene		86.9	85.6		%	1.5	50	22-OCT-18
2-Methylnaphthalene		87.8	87.7		%	0.1	50	22-OCT-18
Acenaphthene		85.5	82.8		%	3.2	50	22-OCT-18
Acenaphthylene		89.8	88.3		%	1.6	50	22-OCT-18
Anthracene		98.2	95.8		%	2.5	50	22-OCT-18
Benzo(a)anthracene		109.1	104.1		%	4.7	50	22-OCT-18
Benzo(a)pyrene		90.1	88.1		%	2.2	50	22-OCT-18
Benzo(b)fluoranthene		89.0	86.3		%	3.1	50	22-OCT-18
Benzo(g,h,i)perylene		92.6	91.2		%	1.6	50	22-OCT-18
Benzo(k)fluoranthene		89.4	87.0		%	2.7	50	22-OCT-18
Chrysene		103.0	99.5		%	3.4	50	22-OCT-18
Dibenzo(ah)anthracene		99.1	95.9		%	3.3	50	22-OCT-18
Fluoranthene		97.3	95.3		%	2.1	50	22-OCT-18
Fluorene		94.3	92.6		%	1.8	50	22-OCT-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4290582								
WG2906689-3 LCSD		**WG2906689-2**						
Indeno(1,2,3-cd)pyrene		112.2	110.4		%	1.7	50	22-OCT-18
Naphthalene		84.2	83.5		%	0.8	50	22-OCT-18
Phenanthrene		94.5	92.2		%	2.5	50	22-OCT-18
Pyrene		97.1	93.0		%	4.3	50	22-OCT-18
WG2906689-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	22-OCT-18
2-Methylnaphthalene			<0.020		ug/L		0.02	22-OCT-18
Acenaphthene			<0.020		ug/L		0.02	22-OCT-18
Acenaphthylene			<0.020		ug/L		0.02	22-OCT-18
Anthracene			<0.020		ug/L		0.02	22-OCT-18
Benzo(a)anthracene			<0.020		ug/L		0.02	22-OCT-18
Benzo(a)pyrene			<0.010		ug/L		0.01	22-OCT-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	22-OCT-18
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	22-OCT-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	22-OCT-18
Chrysene			<0.020		ug/L		0.02	22-OCT-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	22-OCT-18
Fluoranthene			<0.020		ug/L		0.02	22-OCT-18
Fluorene			<0.020		ug/L		0.02	22-OCT-18
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	22-OCT-18
Naphthalene			<0.050		ug/L		0.05	22-OCT-18
Phenanthrene			<0.020		ug/L		0.02	22-OCT-18
Pyrene			<0.020		ug/L		0.02	22-OCT-18
Surrogate: d8-Naphthalene			91.7		%		60-140	22-OCT-18
Surrogate: d10-Phenanthrene			101.2		%		60-140	22-OCT-18
Surrogate: d12-Chrysene			95.0		%		60-140	22-OCT-18
Surrogate: d10-Acenaphthene			89.4		%		60-140	22-OCT-18
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-4 DUP		**WG2908062-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-4 DUP		**WG2908062-3**						
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	22-OCT-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	22-OCT-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	22-OCT-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	22-OCT-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	22-OCT-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	22-OCT-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	22-OCT-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	22-OCT-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	22-OCT-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	22-OCT-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	22-OCT-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	22-OCT-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	22-OCT-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	22-OCT-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	22-OCT-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
trans-1,3-Dichloropropene		<0.30	<0.30		ug/L			22-OCT-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-4 DUP		**WG2908062-3**						
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	22-OCT-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	22-OCT-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	22-OCT-18
WG2908062-1 LCS								
1,1,1,2-Tetrachloroethane			109.6		%		70-130	22-OCT-18
1,1,2,2-Tetrachloroethane			102.2		%		70-130	22-OCT-18
1,1,1-Trichloroethane			113.9		%		70-130	22-OCT-18
1,1,2-Trichloroethane			111.4		%		70-130	22-OCT-18
1,1-Dichloroethane			116.7		%		70-130	22-OCT-18
1,1-Dichloroethylene			111.3		%		70-130	22-OCT-18
1,2-Dibromoethane			119.9		%		70-130	22-OCT-18
1,2-Dichlorobenzene			110.6		%		70-130	22-OCT-18
1,2-Dichloroethane			117.4		%		70-130	22-OCT-18
1,2-Dichloropropane			111.6		%		70-130	22-OCT-18
1,3-Dichlorobenzene			110.2		%		70-130	22-OCT-18
1,4-Dichlorobenzene			111.5		%		70-130	22-OCT-18
Acetone			121.2		%		60-140	22-OCT-18
Benzene			112.5		%		70-130	22-OCT-18
Bromodichloromethane			116.3		%		70-130	22-OCT-18
Bromoform			119.3		%		70-130	22-OCT-18
Bromomethane			94.1		%		60-140	22-OCT-18
Carbon tetrachloride			113.0		%		70-130	22-OCT-18
Chlorobenzene			109.3		%		70-130	22-OCT-18
Chloroform			115.9		%		70-130	22-OCT-18
cis-1,2-Dichloroethylene			112.8		%		70-130	22-OCT-18
cis-1,3-Dichloropropene			112.4		%		70-130	22-OCT-18
Dibromochloromethane			112.1		%		70-130	22-OCT-18
Dichlorodifluoromethane			143.1	MES	%		50-140	22-OCT-18
Ethylbenzene			106.6		%		70-130	22-OCT-18
n-Hexane			108.4		%		70-130	22-OCT-18
m+p-Xylenes			107.3		%		70-130	22-OCT-18
Methyl Ethyl Ketone			128.7		%		60-140	22-OCT-18
Methyl Isobutyl Ketone			117.8				60-140	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-1 LCS								
Methyl Isobutyl Ketone			117.8		%		60-140	22-OCT-18
Methylene Chloride			118.8		%		70-130	22-OCT-18
MTBE			109.2		%		70-130	22-OCT-18
o-Xylene			106.5		%		70-130	22-OCT-18
Styrene			110.1		%		70-130	22-OCT-18
Tetrachloroethylene			109.5		%		70-130	22-OCT-18
Toluene			106.9		%		70-130	22-OCT-18
trans-1,2-Dichloroethylene			116.0		%		70-130	22-OCT-18
trans-1,3-Dichloropropene			108.6		%		70-130	22-OCT-18
Trichloroethylene			116.8		%		70-130	22-OCT-18
Trichlorofluoromethane			126.1		%		60-140	22-OCT-18
Vinyl chloride			115.9		%		60-140	22-OCT-18
WG2908062-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	22-OCT-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	22-OCT-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	22-OCT-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	22-OCT-18
1,1-Dichloroethane			<0.50		ug/L		0.5	22-OCT-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	22-OCT-18
1,2-Dibromoethane			<0.20		ug/L		0.2	22-OCT-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	22-OCT-18
1,2-Dichloroethane			<0.50		ug/L		0.5	22-OCT-18
1,2-Dichloropropane			<0.50		ug/L		0.5	22-OCT-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	22-OCT-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	22-OCT-18
Acetone			<30		ug/L		30	22-OCT-18
Benzene			<0.50		ug/L		0.5	22-OCT-18
Bromodichloromethane			<2.0		ug/L		2	22-OCT-18
Bromoform			<5.0		ug/L		5	22-OCT-18
Bromomethane			<0.50		ug/L		0.5	22-OCT-18
Carbon tetrachloride			<0.20		ug/L		0.2	22-OCT-18
Chlorobenzene			<0.50		ug/L		0.5	22-OCT-18
Chloroform			<1.0		ug/L		1	22-OCT-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	22-OCT-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-2 MB								
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	22-OCT-18
Dibromochloromethane			<2.0		ug/L		2	22-OCT-18
Dichlorodifluoromethane			<2.0		ug/L		2	22-OCT-18
Ethylbenzene			<0.50		ug/L		0.5	22-OCT-18
n-Hexane			<0.50		ug/L		0.5	22-OCT-18
m+p-Xylenes			<0.40		ug/L		0.4	22-OCT-18
Methyl Ethyl Ketone			<20		ug/L		20	22-OCT-18
Methyl Isobutyl Ketone			<20		ug/L		20	22-OCT-18
Methylene Chloride			<5.0		ug/L		5	22-OCT-18
MTBE			<2.0		ug/L		2	22-OCT-18
o-Xylene			<0.30		ug/L		0.3	22-OCT-18
Styrene			<0.50		ug/L		0.5	22-OCT-18
Tetrachloroethylene			<0.50		ug/L		0.5	22-OCT-18
Toluene			<0.50		ug/L		0.5	22-OCT-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	22-OCT-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	22-OCT-18
Trichloroethylene			<0.50		ug/L		0.5	22-OCT-18
Trichlorofluoromethane			<5.0		ug/L		5	22-OCT-18
Vinyl chloride			<0.50		ug/L		0.5	22-OCT-18
Surrogate: 1,4-Difluorobenzene			99.0		%		70-130	22-OCT-18
Surrogate: 4-Bromofluorobenzene			99.5		%		70-130	22-OCT-18
WG2908062-5 MS		**WG2908062-3**						
1,1,1,2-Tetrachloroethane			110.1		%		50-140	22-OCT-18
1,1,2,2-Tetrachloroethane			103.5		%		50-140	22-OCT-18
1,1,1-Trichloroethane			113.6		%		50-140	22-OCT-18
1,1,2-Trichloroethane			114.6		%		50-140	22-OCT-18
1,1-Dichloroethane			118.5		%		50-140	22-OCT-18
1,1-Dichloroethylene			109.2		%		50-140	22-OCT-18
1,2-Dibromoethane			124.4		%		50-140	22-OCT-18
1,2-Dichlorobenzene			109.4		%		50-140	22-OCT-18
1,2-Dichloroethane			122.6		%		50-140	22-OCT-18
1,2-Dichloropropane			114.8		%		50-140	22-OCT-18
1,3-Dichlorobenzene			106.5		%		50-140	22-OCT-18
1,4-Dichlorobenzene			108.5		%		50-140	22-OCT-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4290107								
WG2908062-5 MS		**WG2908062-3**						
Acetone			133.2		%		50-140	22-OCT-18
Benzene			113.6		%		50-140	22-OCT-18
Bromodichloromethane			120.2		%		50-140	22-OCT-18
Bromoform			122.1		%		50-140	22-OCT-18
Bromomethane			91.3		%		50-140	22-OCT-18
Carbon tetrachloride			112.2		%		50-140	22-OCT-18
Chlorobenzene			108.4		%		50-140	22-OCT-18
Chloroform			118.1		%		50-140	22-OCT-18
cis-1,2-Dichloroethylene			114.6		%		50-140	22-OCT-18
cis-1,3-Dichloropropene			110.1		%		50-140	22-OCT-18
Dibromochloromethane			114.5		%		50-140	22-OCT-18
Dichlorodifluoromethane			131.1		%		50-140	22-OCT-18
Ethylbenzene			102.2		%		50-140	22-OCT-18
n-Hexane			104.6		%		50-140	22-OCT-18
m+p-Xylenes			103.1		%		50-140	22-OCT-18
Methyl Ethyl Ketone			130.8		%		50-140	22-OCT-18
Methyl Isobutyl Ketone			124.3		%		50-140	22-OCT-18
Methylene Chloride			122.4		%		50-140	22-OCT-18
MTBE			108.5		%		50-140	22-OCT-18
o-Xylene			102.9		%		50-140	22-OCT-18
Styrene			106.4		%		50-140	22-OCT-18
Tetrachloroethylene			105.2		%		50-140	22-OCT-18
Toluene			103.9		%		50-140	22-OCT-18
trans-1,2-Dichloroethylene			114.1		%		50-140	22-OCT-18
trans-1,3-Dichloropropene			103.5		%		50-140	22-OCT-18
Trichloroethylene			117.7		%		50-140	22-OCT-18
Trichlorofluoromethane			122.3		%		50-140	22-OCT-18
Vinyl chloride			109.9		%		50-140	22-OCT-18

Quality Control Report

Workorder: L2182846 Report Date: 26-OCT-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

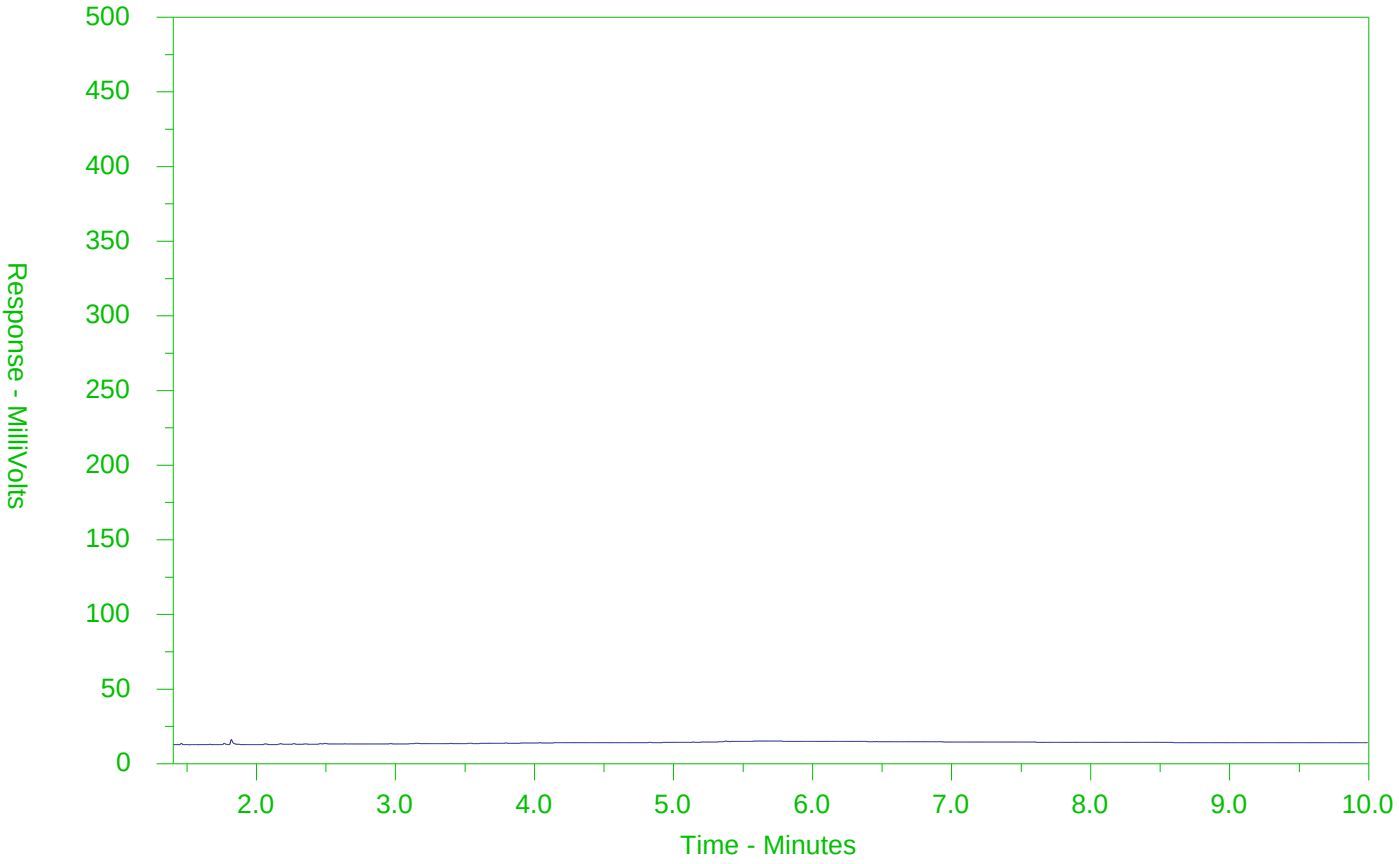
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2182846-6
Client Sample ID: MW18-130D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

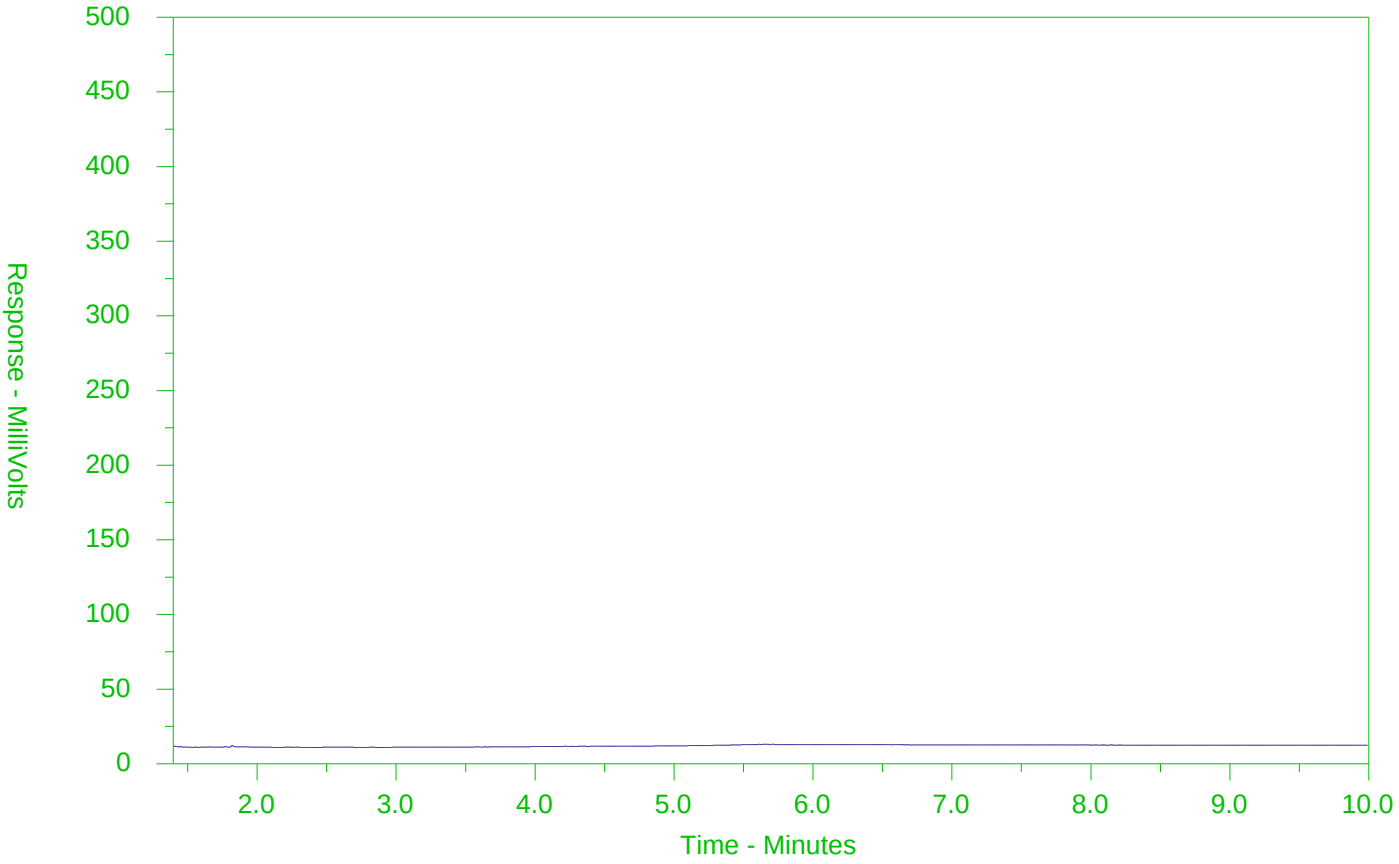
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2182846-8
Client Sample ID: MW18-132D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

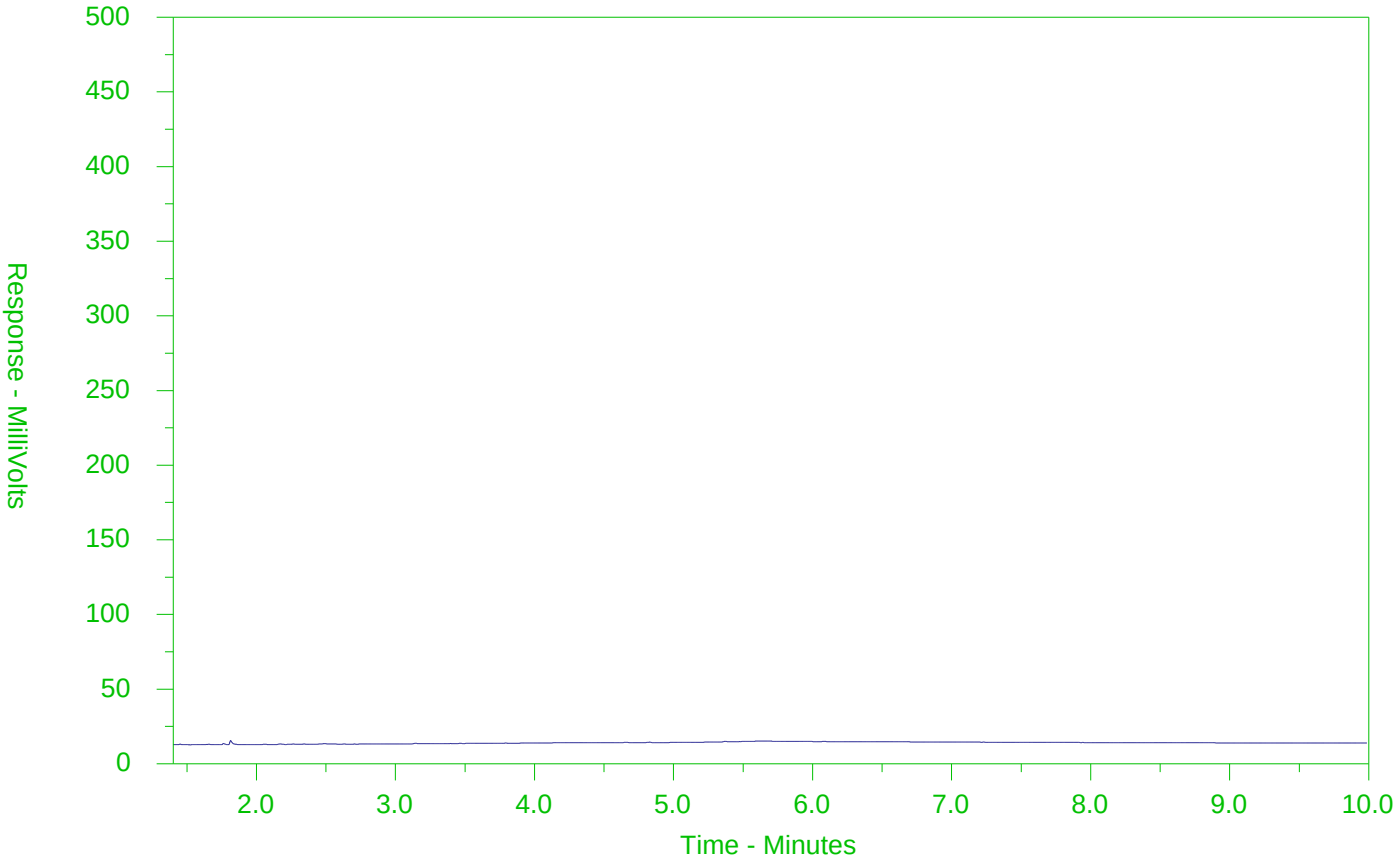
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2182846-11
Client Sample ID: DUP1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

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Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2182846-COFC

COC Number: 17 - 728110
Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Required - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M. Shay / T. McCarthy	Quality Control (QC) Report with Report: YES NO	PRIORITY (Business Days): 4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh mm
Street:		Email 1 or Fax	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2	
Postal Code:		Email 3	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): LA1888466 (7C-28)
ALS Contact: Matthy
Sampler: M. Shay / V. Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	PAH	PHCs + BTEX	VOCs	VOCs + FI	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1	OW25	17-Oct-18	1550	Water	X						2
2	OW31-S		1007				X				2
3	OW31-M		1405				X				2
4	OW31-E		1715				X				2
5	MW18-128D		1300				X				2
6	MW18-130D		1326			X	X				4
7	MW18-131S		1705		X		X				4
8	MW18-132D		1110			X	X				4
9	MW18-133D		1325				X				2
10	Trip Blank		—					X			2
11	DUP1		—			X	X				4
12	DUP2		—		X						2

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? NO	
Are samples for human consumption/ use? NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2.4°C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Vidu Peters	Date: 2018/10/17	Time: 19:25	Received by:	Date:	Time:	Received by:	Date: 17-Oct-18	Time: 18:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: ED TAVES / LUCAS RIBEIRO
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 22-NOV-18
Report Date: 26-NOV-18 14:03 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2200634

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-728707
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2200634-1 MW-112 G Sampled By: CLIENT on 22-NOV-18 @ 16:30 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					23-NOV-18	R4353634
Antimony (Sb)-Dissolved	3.5	DLHC	1.0	ug/L	23-NOV-18	23-NOV-18	R4355208
Arsenic (As)-Dissolved	2.5	DLHC	1.0	ug/L	23-NOV-18	23-NOV-18	R4355208
Selenium (Se)-Dissolved	2.70	DLHC	0.50	ug/L	23-NOV-18	23-NOV-18	R4355208
Volatile Organic Compounds							
Acetone	<30		30	ug/L		23-NOV-18	R4353750
Benzene	0.86		0.50	ug/L		23-NOV-18	R4353750
Bromodichloromethane	7.3		2.0	ug/L		23-NOV-18	R4353750
Bromoform	<5.0		5.0	ug/L		23-NOV-18	R4353750
Bromomethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
Carbon tetrachloride	<0.20		0.20	ug/L		23-NOV-18	R4353750
Chlorobenzene	<0.50		0.50	ug/L		23-NOV-18	R4353750
Dibromochloromethane	7.4		2.0	ug/L		23-NOV-18	R4353750
Chloroform	5.8		1.0	ug/L		23-NOV-18	R4353750
1,2-Dibromoethane	<0.20		0.20	ug/L		23-NOV-18	R4353750
1,2-Dichlorobenzene	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,3-Dichlorobenzene	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,4-Dichlorobenzene	<0.50		0.50	ug/L		23-NOV-18	R4353750
Dichlorodifluoromethane	<2.0		2.0	ug/L		23-NOV-18	R4353750
1,1-Dichloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,2-Dichloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,1-Dichloroethylene	<0.50		0.50	ug/L		23-NOV-18	R4353750
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-NOV-18	R4353750
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		23-NOV-18	R4353750
Methylene Chloride	<5.0		5.0	ug/L		23-NOV-18	R4353750
1,2-Dichloropropane	<0.50		0.50	ug/L		23-NOV-18	R4353750
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		23-NOV-18	R4353750
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		23-NOV-18	R4353750
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-NOV-18	
Ethylbenzene	<0.50		0.50	ug/L		23-NOV-18	R4353750
n-Hexane	<0.50		0.50	ug/L		23-NOV-18	R4353750
Methyl Ethyl Ketone	<20		20	ug/L		23-NOV-18	R4353750
Methyl Isobutyl Ketone	<20		20	ug/L		23-NOV-18	R4353750
MTBE	<2.0		2.0	ug/L		23-NOV-18	R4353750
Styrene	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
Tetrachloroethylene	<0.50		0.50	ug/L		23-NOV-18	R4353750
Toluene	1.74		0.50	ug/L		23-NOV-18	R4353750
1,1,1-Trichloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750
1,1,2-Trichloroethane	<0.50		0.50	ug/L		23-NOV-18	R4353750

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2200634-1 MW-112 G Sampled By: CLIENT on 22-NOV-18 @ 16:30 Matrix: WATER							
Volatile Organic Compounds							
Trichloroethylene	<0.50		0.50	ug/L		23-NOV-18	R4353750
Trichlorofluoromethane	<5.0		5.0	ug/L		23-NOV-18	R4353750
Vinyl chloride	<0.50		0.50	ug/L		23-NOV-18	R4353750
o-Xylene	0.48		0.30	ug/L		23-NOV-18	R4353750
m+p-Xylenes	0.87		0.40	ug/L		23-NOV-18	R4353750
Xylenes (Total)	1.35		0.50	ug/L		23-NOV-18	
Surrogate: 4-Bromofluorobenzene	95.2		70-130	%		23-NOV-18	R4353750
Surrogate: 1,4-Difluorobenzene	103.2		70-130	%		23-NOV-18	R4353750

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-728707

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2200634 Report Date: 26-NOV-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4355208								
WG2937461-4 DUP		**WG2937461-3**						
Antimony (Sb)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	23-NOV-18
Arsenic (As)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	23-NOV-18
Selenium (Se)-Dissolved		16.5	14.7		ug/L	12	20	23-NOV-18
WG2937461-2 LCS								
Antimony (Sb)-Dissolved			98.4		%		80-120	23-NOV-18
Arsenic (As)-Dissolved			104.6		%		80-120	23-NOV-18
Selenium (Se)-Dissolved			103.8		%		80-120	23-NOV-18
WG2937461-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	23-NOV-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	23-NOV-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	23-NOV-18
WG2937461-5 MS		**WG2937461-6**						
Antimony (Sb)-Dissolved			95.3		%		70-130	23-NOV-18
Arsenic (As)-Dissolved			97.9		%		70-130	23-NOV-18
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-4 DUP		**WG2934704-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-NOV-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	23-NOV-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-NOV-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-NOV-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-4 DUP		**WG2934704-3**						
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-NOV-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	23-NOV-18
cis-1,2-Dichloroethylene		12.4	12.0		ug/L	3.4	30	23-NOV-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-NOV-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-NOV-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-NOV-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	23-NOV-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-NOV-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-NOV-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-NOV-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-NOV-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-NOV-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-NOV-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-NOV-18
Vinyl chloride		3.85	3.73		ug/L	3.2	30	23-NOV-18
WG2934704-1 LCS								
1,1,1,2-Tetrachloroethane			106.1		%		70-130	23-NOV-18
1,1,2,2-Tetrachloroethane			97.8		%		70-130	23-NOV-18
1,1,1-Trichloroethane			107.9		%		70-130	23-NOV-18
1,1,2-Trichloroethane			108.0		%		70-130	23-NOV-18
1,1-Dichloroethane			112.4		%		70-130	23-NOV-18
1,1-Dichloroethylene			107.7		%		70-130	23-NOV-18
1,2-Dibromoethane			107.5		%		70-130	23-NOV-18
1,2-Dichlorobenzene			107.8		%		70-130	23-NOV-18
1,2-Dichloroethane			107.6		%		70-130	23-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-1 LCS								
1,2-Dichloropropane			107.0		%		70-130	23-NOV-18
1,3-Dichlorobenzene			110.1		%		70-130	23-NOV-18
1,4-Dichlorobenzene			108.1		%		70-130	23-NOV-18
Acetone			119.8		%		60-140	23-NOV-18
Benzene			110.3		%		70-130	23-NOV-18
Bromodichloromethane			104.1		%		70-130	23-NOV-18
Bromoform			95.4		%		70-130	23-NOV-18
Bromomethane			96.3		%		60-140	23-NOV-18
Carbon tetrachloride			106.6		%		70-130	23-NOV-18
Chlorobenzene			108.3		%		70-130	23-NOV-18
Chloroform			105.5		%		70-130	23-NOV-18
cis-1,2-Dichloroethylene			105.0		%		70-130	23-NOV-18
cis-1,3-Dichloropropene			100.7		%		70-130	23-NOV-18
Dibromochloromethane			104.1		%		70-130	23-NOV-18
Dichlorodifluoromethane			131.1		%		50-140	23-NOV-18
Ethylbenzene			109.4		%		70-130	23-NOV-18
n-Hexane			102.2		%		70-130	23-NOV-18
m+p-Xylenes			107.8		%		70-130	23-NOV-18
Methyl Ethyl Ketone			102.0		%		60-140	23-NOV-18
Methyl Isobutyl Ketone			102.3		%		60-140	23-NOV-18
Methylene Chloride			108.5		%		70-130	23-NOV-18
MTBE			110.6		%		70-130	23-NOV-18
o-Xylene			106.8		%		70-130	23-NOV-18
Styrene			106.0		%		70-130	23-NOV-18
Tetrachloroethylene			111.1		%		70-130	23-NOV-18
Toluene			110.7		%		70-130	23-NOV-18
trans-1,2-Dichloroethylene			106.1		%		70-130	23-NOV-18
trans-1,3-Dichloropropene			102.9		%		70-130	23-NOV-18
Trichloroethylene			107.8		%		70-130	23-NOV-18
Trichlorofluoromethane			116.8		%		60-140	23-NOV-18
Vinyl chloride			87.8		%		60-140	23-NOV-18
WG2934704-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	23-NOV-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	23-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-2 MB								
1,1,1-Trichloroethane			<0.50		ug/L		0.5	23-NOV-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	23-NOV-18
1,1-Dichloroethane			<0.50		ug/L		0.5	23-NOV-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	23-NOV-18
1,2-Dibromoethane			<0.20		ug/L		0.2	23-NOV-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	23-NOV-18
1,2-Dichloroethane			<0.50		ug/L		0.5	23-NOV-18
1,2-Dichloropropane			<0.50		ug/L		0.5	23-NOV-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	23-NOV-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	23-NOV-18
Acetone			<30		ug/L		30	23-NOV-18
Benzene			<0.50		ug/L		0.5	23-NOV-18
Bromodichloromethane			<2.0		ug/L		2	23-NOV-18
Bromoform			<5.0		ug/L		5	23-NOV-18
Bromomethane			<0.50		ug/L		0.5	23-NOV-18
Carbon tetrachloride			<0.20		ug/L		0.2	23-NOV-18
Chlorobenzene			<0.50		ug/L		0.5	23-NOV-18
Chloroform			<1.0		ug/L		1	23-NOV-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-NOV-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	23-NOV-18
Dibromochloromethane			<2.0		ug/L		2	23-NOV-18
Dichlorodifluoromethane			<2.0		ug/L		2	23-NOV-18
Ethylbenzene			<0.50		ug/L		0.5	23-NOV-18
n-Hexane			<0.50		ug/L		0.5	23-NOV-18
m+p-Xylenes			<0.40		ug/L		0.4	23-NOV-18
Methyl Ethyl Ketone			<20		ug/L		20	23-NOV-18
Methyl Isobutyl Ketone			<20		ug/L		20	23-NOV-18
Methylene Chloride			<5.0		ug/L		5	23-NOV-18
MTBE			<2.0		ug/L		2	23-NOV-18
o-Xylene			<0.30		ug/L		0.3	23-NOV-18
Styrene			<0.50		ug/L		0.5	23-NOV-18
Tetrachloroethylene			<0.50		ug/L		0.5	23-NOV-18
Toluene			<0.50		ug/L		0.5	23-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-2 MB								
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-NOV-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	23-NOV-18
Trichloroethylene			<0.50		ug/L		0.5	23-NOV-18
Trichlorofluoromethane			<5.0		ug/L		5	23-NOV-18
Vinyl chloride			<0.50		ug/L		0.5	23-NOV-18
Surrogate: 1,4-Difluorobenzene			102.7		%		70-130	23-NOV-18
Surrogate: 4-Bromofluorobenzene			94.9		%		70-130	23-NOV-18
WG2934704-5 MS		**WG2934704-3**						
1,1,1,2-Tetrachloroethane			104.9		%		50-140	23-NOV-18
1,1,2,2-Tetrachloroethane			96.9		%		50-140	23-NOV-18
1,1,1-Trichloroethane			107.5		%		50-140	23-NOV-18
1,1,2-Trichloroethane			104.0		%		50-140	23-NOV-18
1,1-Dichloroethane			107.1		%		50-140	23-NOV-18
1,1-Dichloroethylene			105.7		%		50-140	23-NOV-18
1,2-Dibromoethane			101.9		%		50-140	23-NOV-18
1,2-Dichlorobenzene			108.2		%		50-140	23-NOV-18
1,2-Dichloroethane			103.4		%		50-140	23-NOV-18
1,2-Dichloropropane			104.9		%		50-140	23-NOV-18
1,3-Dichlorobenzene			112.2		%		50-140	23-NOV-18
1,4-Dichlorobenzene			111.0		%		50-140	23-NOV-18
Acetone			107.5		%		50-140	23-NOV-18
Benzene			109.7		%		50-140	23-NOV-18
Bromodichloromethane			102.4		%		50-140	23-NOV-18
Bromoform			92.6		%		50-140	23-NOV-18
Bromomethane			88.1		%		50-140	23-NOV-18
Carbon tetrachloride			106.6		%		50-140	23-NOV-18
Chlorobenzene			108.6		%		50-140	23-NOV-18
Chloroform			104.2		%		50-140	23-NOV-18
cis-1,2-Dichloroethylene			102.7		%		50-140	23-NOV-18
cis-1,3-Dichloropropene			98.2		%		50-140	23-NOV-18
Dibromochloromethane			100.9		%		50-140	23-NOV-18
Dichlorodifluoromethane			92.4		%		50-140	23-NOV-18
Ethylbenzene			110.2		%		50-140	23-NOV-18
n-Hexane			99.4		%		50-140	23-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4353750								
WG2934704-5 MS		**WG2934704-3**						
m+p-Xylenes			109.7		%		50-140	23-NOV-18
Methyl Ethyl Ketone			92.1		%		50-140	23-NOV-18
Methyl Isobutyl Ketone			98.0		%		50-140	23-NOV-18
Methylene Chloride			104.4		%		50-140	23-NOV-18
MTBE			111.6		%		50-140	23-NOV-18
o-Xylene			107.4		%		50-140	23-NOV-18
Styrene			106.8		%		50-140	23-NOV-18
Tetrachloroethylene			112.7		%		50-140	23-NOV-18
Toluene			109.9		%		50-140	23-NOV-18
trans-1,2-Dichloroethylene			107.9		%		50-140	23-NOV-18
trans-1,3-Dichloropropene			97.9		%		50-140	23-NOV-18
Trichloroethylene			109.4		%		50-140	23-NOV-18
Trichlorofluoromethane			111.6		%		50-140	23-NOV-18
Vinyl chloride			78.9		%		50-140	23-NOV-18

Quality Control Report

Workorder: L2200634 Report Date: 26-NOV-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES / LUCAS RIBEIRO

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2200634-COFC

COC Number: 17 - 728707

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Requested - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CIMM / JACOBS	Select Report Format: PDF EXCEL DIGITAL	Regular (R) Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	LUCAS THOMSEN /PM: GLEN TAVES	Quality Control (QC) Report with Report YES NO	PRIORITY (Business days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:	647 417 7770 / ATLANTA	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution EMAIL MAIL FAX	
Street:		Email 1 or Fax: lucas.thomsen@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	WATERLOO / KITCHENER	Email 2	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:		Email 3	

Invoice To		Invoice Distribution
	Same as Report To YES NO	Select Invoice Distribution: EMAIL MAIL FAX
	Copy of Invoice with Report YES NO	
Company:		Email 1 or Fax
Contact		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE		Requisitioner:	
LSD:		Location	
ALS Lab Work Order # (lab use only):	L2200634	ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC	As, Se, Sb (Metals)	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
1.	MW-116	22-NOV-18	16:30	WATER	X	X			

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes	No
Ice Packs	Ice Cubes	Custody seal intact	Yes	No
Cooling Initiated				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7.8C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: L Ribeiro	Date: 22-Nov-2018	Time:	Received by:	Date:	Time:	Received by:	Date: 22/NOV/2018	Time: 17:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: Amy Casey
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 29-NOV-18
Report Date: 30-NOV-18 14:19 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2203734

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 17-728964
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2203734-1 MW18-112G Sampled By: CLIENT on 29-NOV-18 @ 16:00 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		30-NOV-18	R4366459
Benzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Bromodichloromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
Bromoform	<5.0		5.0	ug/L		30-NOV-18	R4366459
Bromomethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Carbon tetrachloride	<0.20		0.20	ug/L		30-NOV-18	R4366459
Chlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Dibromochloromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
Chloroform	<1.0		1.0	ug/L		30-NOV-18	R4366459
1,2-Dibromoethane	<0.20		0.20	ug/L		30-NOV-18	R4366459
1,2-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,3-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,4-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Dichlorodifluoromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
1,1-Dichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,2-Dichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1-Dichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
cis-1,2-Dichloroethylene	2.22		0.50	ug/L		30-NOV-18	R4366459
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Methylene Chloride	<5.0		5.0	ug/L		30-NOV-18	R4366459
1,2-Dichloropropane	<0.50		0.50	ug/L		30-NOV-18	R4366459
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		30-NOV-18	R4366459
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		30-NOV-18	R4366459
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		30-NOV-18	
Ethylbenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
n-Hexane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Methyl Ethyl Ketone	<20		20	ug/L		30-NOV-18	R4366459
Methyl Isobutyl Ketone	<20		20	ug/L		30-NOV-18	R4366459
MTBE	<2.0		2.0	ug/L		30-NOV-18	R4366459
Styrene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Tetrachloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Toluene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,1-Trichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,2-Trichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Trichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Trichlorofluoromethane	<5.0		5.0	ug/L		30-NOV-18	R4366459
Vinyl chloride	<0.50		0.50	ug/L		30-NOV-18	R4366459
o-Xylene	<0.30		0.30	ug/L		30-NOV-18	R4366459
m+p-Xylenes	<0.40		0.40	ug/L		30-NOV-18	R4366459

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2203734-1 MW18-112G Sampled By: CLIENT on 29-NOV-18 @ 16:00 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		30-NOV-18	
Surrogate: 4-Bromofluorobenzene	94.8		70-130	%		30-NOV-18	R4366459
Surrogate: 1,4-Difluorobenzene	105.3		70-130	%		30-NOV-18	R4366459
L2203734-2 TRIP BLANK Sampled By: CLIENT on 29-NOV-18 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		30-NOV-18	R4366459
Benzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Bromodichloromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
Bromoform	<5.0		5.0	ug/L		30-NOV-18	R4366459
Bromomethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Carbon tetrachloride	<0.20		0.20	ug/L		30-NOV-18	R4366459
Chlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Dibromochloromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
Chloroform	<1.0		1.0	ug/L		30-NOV-18	R4366459
1,2-Dibromoethane	<0.20		0.20	ug/L		30-NOV-18	R4366459
1,2-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,3-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,4-Dichlorobenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Dichlorodifluoromethane	<2.0		2.0	ug/L		30-NOV-18	R4366459
1,1-Dichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,2-Dichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1-Dichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Methylene Chloride	<5.0		5.0	ug/L		30-NOV-18	R4366459
1,2-Dichloropropane	<0.50		0.50	ug/L		30-NOV-18	R4366459
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		30-NOV-18	R4366459
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		30-NOV-18	R4366459
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		30-NOV-18	
Ethylbenzene	<0.50		0.50	ug/L		30-NOV-18	R4366459
n-Hexane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Methyl Ethyl Ketone	<20		20	ug/L		30-NOV-18	R4366459
Methyl Isobutyl Ketone	<20		20	ug/L		30-NOV-18	R4366459
MTBE	<2.0		2.0	ug/L		30-NOV-18	R4366459
Styrene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Tetrachloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Toluene	<0.50		0.50	ug/L		30-NOV-18	R4366459
1,1,1-Trichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2203734-2 TRIP BLANK Sampled By: CLIENT on 29-NOV-18 Matrix: WATER							
Volatile Organic Compounds							
1,1,2-Trichloroethane	<0.50		0.50	ug/L		30-NOV-18	R4366459
Trichloroethylene	<0.50		0.50	ug/L		30-NOV-18	R4366459
Trichlorofluoromethane	<5.0		5.0	ug/L		30-NOV-18	R4366459
Vinyl chloride	<0.50		0.50	ug/L		30-NOV-18	R4366459
o-Xylene	<0.30		0.30	ug/L		30-NOV-18	R4366459
m+p-Xylenes	<0.40		0.40	ug/L		30-NOV-18	R4366459
Xylenes (Total)	<0.50		0.50	ug/L		30-NOV-18	
Surrogate: 4-Bromofluorobenzene	93.9		70-130	%		30-NOV-18	R4366459
Surrogate: 1,4-Difluorobenzene	104.7		70-130	%		30-NOV-18	R4366459

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Dichlorodifluoromethane	LCS-H	L2203734-1, -2
Laboratory Control Sample	Trichlorofluoromethane	MES	L2203734-1, -2

Qualifiers for Sample Submission Listed:

Qualifier	Description
CINT	Cooling initiated. Samples were received packed with ice or ice packs and were sampled the same day as received.

Sample Parameter Qualifier key listed:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-728964

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2203734 Report Date: 30-NOV-18

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4366459								
WG2941369-4 DUP		**WG2941369-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	30-NOV-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	30-NOV-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	30-NOV-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	30-NOV-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	30-NOV-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	30-NOV-18
cis-1,2-Dichloroethylene		2.22	2.06		ug/L	7.5	30	30-NOV-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	30-NOV-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	30-NOV-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	30-NOV-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	30-NOV-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	30-NOV-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	30-NOV-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	30-NOV-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	30-NOV-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	30-NOV-18
Styrene		<0.50	<0.50		ug/L			30-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4366459								
WG2941369-4 DUP		**WG2941369-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	30-NOV-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	30-NOV-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	30-NOV-18
WG2941369-1 LCS								
1,1,1,2-Tetrachloroethane			108.9		%		70-130	30-NOV-18
1,1,2,2-Tetrachloroethane			94.3		%		70-130	30-NOV-18
1,1,1-Trichloroethane			124.5		%		70-130	30-NOV-18
1,1,2-Trichloroethane			100.0		%		70-130	30-NOV-18
1,1-Dichloroethane			112.7		%		70-130	30-NOV-18
1,1-Dichloroethylene			120.2		%		70-130	30-NOV-18
1,2-Dibromoethane			99.97		%		70-130	30-NOV-18
1,2-Dichlorobenzene			112.2		%		70-130	30-NOV-18
1,2-Dichloroethane			109.9		%		70-130	30-NOV-18
1,2-Dichloropropane			102.8		%		70-130	30-NOV-18
1,3-Dichlorobenzene			116.3		%		70-130	30-NOV-18
1,4-Dichlorobenzene			115.5		%		70-130	30-NOV-18
Acetone			88.1		%		60-140	30-NOV-18
Benzene			113.5		%		70-130	30-NOV-18
Bromodichloromethane			112.1		%		70-130	30-NOV-18
Bromoform			96.2		%		70-130	30-NOV-18
Bromomethane			104.3		%		60-140	30-NOV-18
Carbon tetrachloride			126.6		%		70-130	30-NOV-18
Chlorobenzene			109.6		%		70-130	30-NOV-18
Chloroform			113.6		%		70-130	30-NOV-18
cis-1,2-Dichloroethylene			110.7		%		70-130	30-NOV-18
cis-1,3-Dichloropropene			106.4		%		70-130	30-NOV-18
Dibromochloromethane			105.1		%		70-130	30-NOV-18
Dichlorodifluoromethane			158.3	LCS-H	%		50-140	30-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4366459								
WG2941369-1 LCS								
Ethylbenzene			108.9		%		70-130	30-NOV-18
n-Hexane			108.9		%		70-130	30-NOV-18
m+p-Xylenes			111.8		%		70-130	30-NOV-18
Methyl Ethyl Ketone			82.7		%		60-140	30-NOV-18
Methyl Isobutyl Ketone			79.7		%		60-140	30-NOV-18
Methylene Chloride			109.3		%		70-130	30-NOV-18
MTBE			113.9		%		70-130	30-NOV-18
o-Xylene			105.2		%		70-130	30-NOV-18
Styrene			104.4		%		70-130	30-NOV-18
Tetrachloroethylene			121.6		%		70-130	30-NOV-18
Toluene			108.4		%		70-130	30-NOV-18
trans-1,2-Dichloroethylene			114.9		%		70-130	30-NOV-18
trans-1,3-Dichloropropene			100.7		%		70-130	30-NOV-18
Trichloroethylene			119.7		%		70-130	30-NOV-18
Trichlorofluoromethane			144.9	MES	%		60-140	30-NOV-18
Vinyl chloride			97.8		%		60-140	30-NOV-18
WG2941369-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	30-NOV-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	30-NOV-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	30-NOV-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	30-NOV-18
1,1-Dichloroethane			<0.50		ug/L		0.5	30-NOV-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	30-NOV-18
1,2-Dibromoethane			<0.20		ug/L		0.2	30-NOV-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	30-NOV-18
1,2-Dichloroethane			<0.50		ug/L		0.5	30-NOV-18
1,2-Dichloropropane			<0.50		ug/L		0.5	30-NOV-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	30-NOV-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	30-NOV-18
Acetone			<30		ug/L		30	30-NOV-18
Benzene			<0.50		ug/L		0.5	30-NOV-18
Bromodichloromethane			<2.0		ug/L		2	30-NOV-18
Bromoform			<5.0		ug/L		5	30-NOV-18
Bromomethane			<0.50		ug/L		0.5	30-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4366459								
WG2941369-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	30-NOV-18
Chlorobenzene			<0.50		ug/L		0.5	30-NOV-18
Chloroform			<1.0		ug/L		1	30-NOV-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	30-NOV-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	30-NOV-18
Dibromochloromethane			<2.0		ug/L		2	30-NOV-18
Dichlorodifluoromethane			<2.0		ug/L		2	30-NOV-18
Ethylbenzene			<0.50		ug/L		0.5	30-NOV-18
n-Hexane			<0.50		ug/L		0.5	30-NOV-18
m+p-Xylenes			<0.40		ug/L		0.4	30-NOV-18
Methyl Ethyl Ketone			<20		ug/L		20	30-NOV-18
Methyl Isobutyl Ketone			<20		ug/L		20	30-NOV-18
Methylene Chloride			<5.0		ug/L		5	30-NOV-18
MTBE			<2.0		ug/L		2	30-NOV-18
o-Xylene			<0.30		ug/L		0.3	30-NOV-18
Styrene			<0.50		ug/L		0.5	30-NOV-18
Tetrachloroethylene			<0.50		ug/L		0.5	30-NOV-18
Toluene			<0.50		ug/L		0.5	30-NOV-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	30-NOV-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	30-NOV-18
Trichloroethylene			<0.50		ug/L		0.5	30-NOV-18
Trichlorofluoromethane			<5.0		ug/L		5	30-NOV-18
Vinyl chloride			<0.50		ug/L		0.5	30-NOV-18
Surrogate: 1,4-Difluorobenzene			104.5		%		70-130	30-NOV-18
Surrogate: 4-Bromofluorobenzene			93.5		%		70-130	30-NOV-18
WG2941369-5 MS		**WG2941369-3**						
1,1,1,2-Tetrachloroethane			107.9		%		50-140	30-NOV-18
1,1,2,2-Tetrachloroethane			91.5		%		50-140	30-NOV-18
1,1,1-Trichloroethane			123.9		%		50-140	30-NOV-18
1,1,2-Trichloroethane			98.7		%		50-140	30-NOV-18
1,1-Dichloroethane			112.6		%		50-140	30-NOV-18
1,1-Dichloroethylene			118.2		%		50-140	30-NOV-18
1,2-Dibromoethane			98.1		%		50-140	30-NOV-18
1,2-Dichlorobenzene			111.5		%		50-140	30-NOV-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4366459								
WG2941369-5 MS		**WG2941369-3**						
1,2-Dichloroethane			109.0		%		50-140	30-NOV-18
1,2-Dichloropropane			102.6		%		50-140	30-NOV-18
1,3-Dichlorobenzene			115.5		%		50-140	30-NOV-18
1,4-Dichlorobenzene			116.2		%		50-140	30-NOV-18
Acetone			86.4		%		50-140	30-NOV-18
Benzene			113.4		%		50-140	30-NOV-18
Bromodichloromethane			111.4		%		50-140	30-NOV-18
Bromoform			94.4		%		50-140	30-NOV-18
Bromomethane			99.6		%		50-140	30-NOV-18
Carbon tetrachloride			125.8		%		50-140	30-NOV-18
Chlorobenzene			109.0		%		50-140	30-NOV-18
Chloroform			113.3		%		50-140	30-NOV-18
cis-1,2-Dichloroethylene			109.9		%		50-140	30-NOV-18
cis-1,3-Dichloropropene			103.4		%		50-140	30-NOV-18
Dibromochloromethane			102.7		%		50-140	30-NOV-18
Dichlorodifluoromethane			139.0		%		50-140	30-NOV-18
Ethylbenzene			108.0		%		50-140	30-NOV-18
n-Hexane			105.7		%		50-140	30-NOV-18
m+p-Xylenes			111.0		%		50-140	30-NOV-18
Methyl Ethyl Ketone			76.5		%		50-140	30-NOV-18
Methyl Isobutyl Ketone			77.9		%		50-140	30-NOV-18
Methylene Chloride			108.8		%		50-140	30-NOV-18
MTBE			112.1		%		50-140	30-NOV-18
o-Xylene			104.5		%		50-140	30-NOV-18
Styrene			102.9		%		50-140	30-NOV-18
Tetrachloroethylene			120.4		%		50-140	30-NOV-18
Toluene			107.9		%		50-140	30-NOV-18
trans-1,2-Dichloroethylene			114.0		%		50-140	30-NOV-18
trans-1,3-Dichloropropene			95.7		%		50-140	30-NOV-18
Trichloroethylene			119.6		%		50-140	30-NOV-18
Trichlorofluoromethane			140.0		%		50-140	30-NOV-18
Vinyl chloride			93.1		%		50-140	30-NOV-18

Quality Control Report

Workorder: L2203734 Report Date: 30-NOV-18

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Amy Casey

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2203734-COFC

COC Number: 17 - 728964

Page of

Report To	Contact and company name below will appear on the final report	Report Format / Di	Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: [X] PDF [X] EXCEL [ ] EDD (DIGITAL)	Regular [R] [ ] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Amy Casey	Quality Control (QC) Report with Report [ ] YES [ ] NO	PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]
Phone:	519-803-7283	[ ] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] [X]; Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] [ ]
	Company address below will appear on the final report	Select Distribution: [ ] EMAIL [ ] MAIL [ ] FAX	
Street:	72 Victoria St	Email 1 or Fax amy.casey@jacobs.com	Date and Time Required for all E&P TATs:
City/Province:	Kitchener	Email 2 michael.shirley@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2M 2N2	Email 3	

Invoice To		Invoice Distribution
	Same as Report To [X] YES [ ] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX
	Copy of Invoice with Report [ ] YES [ ] NO	
Company:		Email 1 or Fax
Contact:		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2203734	ALS Contact:	Sampler:

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

VOC's

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC's	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW18-112G	29-11-18	16:00	W	X			2
	Trip blank				X			2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [ ] NO	
Are samples for human consumption/ use? [ ] YES [ ] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	[ ]	SIF Observations	Yes [ ]	No	[ ]
Ice Packs [ ]	Ice Cubes [X]	Custody seal intact	Yes [ ]	No	[ ]
Cooling Initiated	[ ]				

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				12.5			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	11/29/18	17:00					Nov 29/18	18:80

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: AMY CASEY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 03-DEC-18
Report Date: 23-JAN-19 13:26 (MT)
Version: FINAL REV. 3

Client Phone: 519-803-2283

Certificate of Analysis

Lab Work Order #: L2204937

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-666267
Legal Site Desc:

Comments:

23-JAN-19:
PEHT qualifier is not valid. Sample results were re-uploaded on JAN-23-19 to satisfy Reg. 153/04 list. Samples were analyzed on DEC-4-2018 within holding time.

DEC-20-18:
Sample ID change.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2204937-1 MW18-112G Sampled By: A. CASEY on 03-DEC-18 @ 16:15 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30	PEHT	30	ug/L		23-JAN-19	R4462537
Benzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Bromodichloromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Bromoform	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
Bromomethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Carbon tetrachloride	<0.20	PEHT	0.20	ug/L		23-JAN-19	R4462537
Chlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Dibromochloromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Chloroform	<1.0	PEHT	1.0	ug/L		23-JAN-19	R4462537
1,2-Dibromoethane	<0.20	PEHT	0.20	ug/L		23-JAN-19	R4462537
1,2-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,3-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,4-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Dichlorodifluoromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
1,1-Dichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,2-Dichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1-Dichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
cis-1,2-Dichloroethylene	1.55	PEHT	0.50	ug/L		23-JAN-19	R4462537
trans-1,2-Dichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Methylene Chloride	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
1,2-Dichloropropane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
cis-1,3-Dichloropropene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
trans-1,3-Dichloropropene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-JAN-19	
Ethylbenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
n-Hexane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Methyl Ethyl Ketone	<20	PEHT	20	ug/L		23-JAN-19	R4462537
Methyl Isobutyl Ketone	<20	PEHT	20	ug/L		23-JAN-19	R4462537
MTBE	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Styrene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,1,2-Tetrachloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,2,2-Tetrachloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Tetrachloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Toluene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,1-Trichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,2-Trichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Trichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Trichlorofluoromethane	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
Vinyl chloride	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
o-Xylene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
m+p-Xylenes	<0.40	PEHT	0.40	ug/L		23-JAN-19	R4462537

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2204937-1 MW18-112G Sampled By: A. CASEY on 03-DEC-18 @ 16:15 Matrix: WATER							
Volatile Organic Compounds							
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%		23-JAN-19	R4462537
Surrogate: 1,4-Difluorobenzene	103.1		70-130	%		23-JAN-19	R4462537
L2204937-2 TRIP BLANK Sampled By: A. CASEY on 03-DEC-18 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30	PEHT	30	ug/L		23-JAN-19	R4462537
Benzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Bromodichloromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Bromoform	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
Bromomethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Carbon tetrachloride	<0.20	PEHT	0.20	ug/L		23-JAN-19	R4462537
Chlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Dibromochloromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Chloroform	<1.0	PEHT	1.0	ug/L		23-JAN-19	R4462537
1,2-Dibromoethane	<0.20	PEHT	0.20	ug/L		23-JAN-19	R4462537
1,2-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,3-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,4-Dichlorobenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Dichlorodifluoromethane	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
1,1-Dichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,2-Dichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1-Dichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
cis-1,2-Dichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
trans-1,2-Dichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Methylene Chloride	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
1,2-Dichloropropane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
cis-1,3-Dichloropropene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
trans-1,3-Dichloropropene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		23-JAN-19	
Ethylbenzene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
n-Hexane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Methyl Ethyl Ketone	<20	PEHT	20	ug/L		23-JAN-19	R4462537
Methyl Isobutyl Ketone	<20	PEHT	20	ug/L		23-JAN-19	R4462537
MTBE	<2.0	PEHT	2.0	ug/L		23-JAN-19	R4462537
Styrene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,1,2-Tetrachloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,2,2-Tetrachloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Tetrachloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Toluene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,1-Trichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
1,1,2-Trichloroethane	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2204937-2 TRIP BLANK Sampled By: A. CASEY on 03-DEC-18 Matrix: WATER							
Volatile Organic Compounds							
Trichloroethylene	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
Trichlorofluoromethane	<5.0	PEHT	5.0	ug/L		23-JAN-19	R4462537
Vinyl chloride	<0.50	PEHT	0.50	ug/L		23-JAN-19	R4462537
o-Xylene	<0.30	PEHT	0.30	ug/L		23-JAN-19	R4462537
m+p-Xylenes	<0.40	PEHT	0.40	ug/L		23-JAN-19	R4462537
Surrogate: 4-Bromofluorobenzene	96.5		70-130	%		23-JAN-19	R4462537
Surrogate: 1,4-Difluorobenzene	103.0		70-130	%		23-JAN-19	R4462537

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
THM-SUM-PPB-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION
Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.			
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260
Liquid samples are analyzed by headspace GC/MSD.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
Aqueous samples are analyzed by headspace-GC/MS.			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-666267

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4462537								
WG2967049-4 DUP		**WG2967049-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-JAN-19
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	23-JAN-19
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-JAN-19
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-JAN-19
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-JAN-19
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	23-JAN-19
cis-1,2-Dichloroethylene		1.39	1.35		ug/L	2.9	30	23-JAN-19
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-JAN-19
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-JAN-19
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-JAN-19
Ethylbenzene		1.02	1.01		ug/L	1.0	30	23-JAN-19
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
m+p-Xylenes		6.58	6.52		ug/L	0.9	30	23-JAN-19
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-JAN-19
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	23-JAN-19
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-JAN-19
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	23-JAN-19
o-Xylene		1.45	1.43		ug/L	1.4	30	23-JAN-19
Styrene		<0.50	<0.50		ug/L			23-JAN-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4462537								
WG2967049-4 DUP		**WG2967049-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
Toluene		4.48	4.51		ug/L	0.7	30	23-JAN-19
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	23-JAN-19
Trichloroethylene		10.8	10.8		ug/L	0.1	30	23-JAN-19
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-JAN-19
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-JAN-19
WG2967049-1 LCS								
1,1,1,2-Tetrachloroethane			90.9		%		70-130	23-JAN-19
1,1,2,2-Tetrachloroethane			88.5		%		70-130	23-JAN-19
1,1,1-Trichloroethane			106.5		%		70-130	23-JAN-19
1,1,2-Trichloroethane			90.9		%		70-130	23-JAN-19
1,1-Dichloroethane			100.6		%		70-130	23-JAN-19
1,1-Dichloroethylene			103.7		%		70-130	23-JAN-19
1,2-Dibromoethane			90.8		%		70-130	23-JAN-19
1,2-Dichlorobenzene			97.1		%		70-130	23-JAN-19
1,2-Dichloroethane			94.5		%		70-130	23-JAN-19
1,2-Dichloropropane			95.2		%		70-130	23-JAN-19
1,3-Dichlorobenzene			101.8		%		70-130	23-JAN-19
1,4-Dichlorobenzene			101.2		%		70-130	23-JAN-19
Acetone			95.6		%		60-140	23-JAN-19
Benzene			99.6		%		70-130	23-JAN-19
Bromodichloromethane			93.5		%		70-130	23-JAN-19
Bromoform			84.6		%		70-130	23-JAN-19
Bromomethane			129.9		%		60-140	23-JAN-19
Carbon tetrachloride			108.0		%		70-130	23-JAN-19
Chlorobenzene			95.9		%		70-130	23-JAN-19
Chloroform			96.0		%		70-130	23-JAN-19
cis-1,2-Dichloroethylene			95.2		%		70-130	23-JAN-19
cis-1,3-Dichloropropene			98.0		%		70-130	23-JAN-19
Dibromochloromethane			90.0		%		70-130	23-JAN-19
Dichlorodifluoromethane			109.9		%		50-140	23-JAN-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4462537								
WG2967049-1 LCS								
Ethylbenzene			105.1		%		70-130	23-JAN-19
n-Hexane			111.1		%		70-130	23-JAN-19
m+p-Xylenes			105.6		%		70-130	23-JAN-19
Methyl Ethyl Ketone			92.2		%		60-140	23-JAN-19
Methyl Isobutyl Ketone			84.3		%		60-140	23-JAN-19
Methylene Chloride			97.1		%		70-130	23-JAN-19
MTBE			97.2		%		70-130	23-JAN-19
o-Xylene			101.5		%		70-130	23-JAN-19
Styrene			94.8		%		70-130	23-JAN-19
Tetrachloroethylene			109.9		%		70-130	23-JAN-19
Toluene			98.5		%		70-130	23-JAN-19
trans-1,2-Dichloroethylene			104.4		%		70-130	23-JAN-19
trans-1,3-Dichloropropene			97.2		%		70-130	23-JAN-19
Trichloroethylene			99.2		%		70-130	23-JAN-19
Trichlorofluoromethane			117.8		%		60-140	23-JAN-19
Vinyl chloride			91.4		%		60-140	23-JAN-19
WG2967049-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	23-JAN-19
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	23-JAN-19
1,1,1-Trichloroethane			<0.50		ug/L		0.5	23-JAN-19
1,1,2-Trichloroethane			<0.50		ug/L		0.5	23-JAN-19
1,1-Dichloroethane			<0.50		ug/L		0.5	23-JAN-19
1,1-Dichloroethylene			<0.50		ug/L		0.5	23-JAN-19
1,2-Dibromoethane			<0.20		ug/L		0.2	23-JAN-19
1,2-Dichlorobenzene			<0.50		ug/L		0.5	23-JAN-19
1,2-Dichloroethane			<0.50		ug/L		0.5	23-JAN-19
1,2-Dichloropropane			<0.50		ug/L		0.5	23-JAN-19
1,3-Dichlorobenzene			<0.50		ug/L		0.5	23-JAN-19
1,4-Dichlorobenzene			<0.50		ug/L		0.5	23-JAN-19
Acetone			<30		ug/L		30	23-JAN-19
Benzene			<0.50		ug/L		0.5	23-JAN-19
Bromodichloromethane			<2.0		ug/L		2	23-JAN-19
Bromoform			<5.0		ug/L		5	23-JAN-19
Bromomethane			<0.50		ug/L		0.5	23-JAN-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4462537								
WG2967049-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	23-JAN-19
Chlorobenzene			<0.50		ug/L		0.5	23-JAN-19
Chloroform			<1.0		ug/L		1	23-JAN-19
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-JAN-19
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	23-JAN-19
Dibromochloromethane			<2.0		ug/L		2	23-JAN-19
Dichlorodifluoromethane			<2.0		ug/L		2	23-JAN-19
Ethylbenzene			<0.50		ug/L		0.5	23-JAN-19
n-Hexane			<0.50		ug/L		0.5	23-JAN-19
m+p-Xylenes			<0.40		ug/L		0.4	23-JAN-19
Methyl Ethyl Ketone			<20		ug/L		20	23-JAN-19
Methyl Isobutyl Ketone			<20		ug/L		20	23-JAN-19
Methylene Chloride			<5.0		ug/L		5	23-JAN-19
MTBE			<2.0		ug/L		2	23-JAN-19
o-Xylene			<0.30		ug/L		0.3	23-JAN-19
Styrene			<0.50		ug/L		0.5	23-JAN-19
Tetrachloroethylene			<0.50		ug/L		0.5	23-JAN-19
Toluene			<0.50		ug/L		0.5	23-JAN-19
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	23-JAN-19
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	23-JAN-19
Trichloroethylene			<0.50		ug/L		0.5	23-JAN-19
Trichlorofluoromethane			<5.0		ug/L		5	23-JAN-19
Vinyl chloride			<0.50		ug/L		0.5	23-JAN-19
Surrogate: 1,4-Difluorobenzene			103.6		%		70-130	23-JAN-19
Surrogate: 4-Bromofluorobenzene			96.1		%		70-130	23-JAN-19
WG2967049-5 MS		**WG2967049-3**						
1,1,1,2-Tetrachloroethane			90.6		%		50-140	23-JAN-19
1,1,2,2-Tetrachloroethane			87.0		%		50-140	23-JAN-19
1,1,1-Trichloroethane			104.9		%		50-140	23-JAN-19
1,1,2-Trichloroethane			92.0		%		50-140	23-JAN-19
1,1-Dichloroethane			100.7		%		50-140	23-JAN-19
1,1-Dichloroethylene			101.0		%		50-140	23-JAN-19
1,2-Dibromoethane			92.3		%		50-140	23-JAN-19
1,2-Dichlorobenzene			98.1		%		50-140	23-JAN-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4462537								
WG2967049-5 MS		**WG2967049-3**						
1,2-Dichloroethane			97.4		%		50-140	23-JAN-19
1,2-Dichloropropane			96.6		%		50-140	23-JAN-19
1,3-Dichlorobenzene			102.3		%		50-140	23-JAN-19
1,4-Dichlorobenzene			102.0		%		50-140	23-JAN-19
Acetone			98.8		%		50-140	23-JAN-19
Benzene			100.0		%		50-140	23-JAN-19
Bromodichloromethane			95.4		%		50-140	23-JAN-19
Bromoform			84.8		%		50-140	23-JAN-19
Bromomethane			126.3		%		50-140	23-JAN-19
Carbon tetrachloride			106.4		%		50-140	23-JAN-19
Chlorobenzene			95.8		%		50-140	23-JAN-19
Chloroform			97.0		%		50-140	23-JAN-19
cis-1,2-Dichloroethylene			96.1		%		50-140	23-JAN-19
cis-1,3-Dichloropropene			101.1		%		50-140	23-JAN-19
Dibromochloromethane			90.5		%		50-140	23-JAN-19
Dichlorodifluoromethane			97.1		%		50-140	23-JAN-19
Ethylbenzene			103.2		%		50-140	23-JAN-19
n-Hexane			105.9		%		50-140	23-JAN-19
m+p-Xylenes			103.9		%		50-140	23-JAN-19
Methyl Ethyl Ketone			91.2		%		50-140	23-JAN-19
Methyl Isobutyl Ketone			85.4		%		50-140	23-JAN-19
Methylene Chloride			98.9		%		50-140	23-JAN-19
MTBE			96.9		%		50-140	23-JAN-19
o-Xylene			100.3		%		50-140	23-JAN-19
Styrene			93.9		%		50-140	23-JAN-19
Tetrachloroethylene			106.8		%		50-140	23-JAN-19
Toluene			97.2		%		50-140	23-JAN-19
trans-1,2-Dichloroethylene			103.5		%		50-140	23-JAN-19
trans-1,3-Dichloropropene			94.9		%		50-140	23-JAN-19
Trichloroethylene			98.2		%		50-140	23-JAN-19
Trichlorofluoromethane			113.4		%		50-140	23-JAN-19
Vinyl chloride			86.9		%		50-140	23-JAN-19

Quality Control Report

Workorder: L2204937 Report Date: 23-JAN-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2204937 Report Date: 23-JAN-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Volatile Organic Compounds							
VOC by GCMS HS O.Reg 153/04 (July 2011)							
	1	03-DEC-18 16:15	23-JAN-19 11:34	14	51	days	EHT
	2	03-DEC-18	23-JAN-19 11:35	14	51	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2204937 were received on 03-DEC-18 17:35.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2204937-COFC

COC Number: 17 - 666267

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Requirement
Company:	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular (Standard TAT if received by 3 pm - business days - no surcharges apply)
Contact:	Amy Casey	Quality Control (QC) Report with Report: YES NO	PRIORITY (Business Days): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
Phone:	519 803 2283	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%]; Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	
Street:	72 Victoria St	Email 1 or Fax: amy.casey@jacobs.com	Date and Time Required for all E&P TATs: EOD Dec 4 2018
City/Province:	Kitchener ON	Email 2: katherine.appleby@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2M 2N2	Email 3: Michael.shiry@jacobs.com jenny.mannisto@jacobs.com	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	L2299157	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2204937 ALS Contact: Mathy M. Sampler: A. Casey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below: VOCs	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW18-122G	03-DEC-18	16:15	W	X			2
	TRIP BLANK			W	X			2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			8.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
A. Casey	03/12/18						Dec 3/2018	5:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: AMY CASEY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 04-DEC-18
Report Date: 05-DEC-18 12:55 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2205658

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 17-666268
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2205658-1 MW17-100I Sampled By: CLIENT on 15-NOV-18 @ 15:10 Matrix: SOIL							
Physical Tests							
pH	7.79		0.10	pH units		05-DEC-18	R4374328
L2205658-2 MW17-100II Sampled By: CLIENT on 15-NOV-18 @ 15:20 Matrix: SOIL							
Physical Tests							
pH	7.78		0.10	pH units		05-DEC-18	R4374328

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-666268

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Soil**							
Batch R4374328								
WG2946138-1 DUP		**L2204896-4**						
pH		7.59	7.59	J	pH units	0.00	0.3	05-DEC-18
WG2946640-1 LCS								
pH			6.99		pH units		6.9-7.1	05-DEC-18

Quality Control Report

Workorder: L2205658 Report Date: 05-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2205658-COFC

COC Number: 17 - 666268

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: ☐ PDF ☒ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Amy Casey	Quality Control (QC) Report with Report: ☐ YES ☐ NO	Priority (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	519-803-2283	☐ Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%] ☒ / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs:
Street:	72 Victoria St	Email 1 or Fax: amy.casey@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2	
Postal Code:	N2M 2N7	Email 3	
Invoice To	Same as Report To ☒ YES ☐ NO	Invoice Distribution	
	Copy of Invoice with Report ☐ YES ☐ NO	Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2205658	ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW17-100i	15-Dec-18	15:10	S	X			
	MW17-100ii	15-Dec-18	15:20	S	X			
	MW17-204i	16-Dec-18	10:00	S		X		
	MW17-204ii	16-Dec-18	10:00	S		X		
	Dup 1	16-Dec-18	10:00	S		X		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☒	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					
INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			1.3		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Amy Casey-Alen	Date:	Time:	Received by:	Date:	Time:	Received by:	Date: 4 Dec 18	Time: 1725

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 12-DEC-18
Report Date: 14-DEC-18 08:42 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2209635

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-20181212
Legal Site Desc:

Mathy Mahadeva
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2209635-1 MW18-115D						
Sampled By: VP on 12-DEC-18 @ 12:00						
Matrix: WATER						
Dissolved Metals						
Dissolved Metals Filtration Location	FIELD			No Unit	13-DEC-18	
Antimony (Sb)-Dissolved	0.12		0.10	ug/L	13-DEC-18	6
Arsenic (As)-Dissolved	0.80		0.10	ug/L	13-DEC-18	25
Barium (Ba)-Dissolved	51.9		0.10	ug/L	13-DEC-18	1000
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	13-DEC-18	4
Boron (B)-Dissolved	70		10	ug/L	13-DEC-18	5000
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	13-DEC-18	2.1
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	13-DEC-18	50
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	13-DEC-18	3.8
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	13-DEC-18	69
Lead (Pb)-Dissolved	<0.050		0.050	ug/L	13-DEC-18	10
Molybdenum (Mo)-Dissolved	10.2		0.050	ug/L	13-DEC-18	70
Nickel (Ni)-Dissolved	1.02		0.50	ug/L	13-DEC-18	100
Selenium (Se)-Dissolved	5.83		0.050	ug/L	13-DEC-18	10
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	13-DEC-18	1.2
Sodium (Na)-Dissolved	127000	DLHC	500	ug/L	13-DEC-18	490000
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	13-DEC-18	2
Uranium (U)-Dissolved	3.91		0.010	ug/L	13-DEC-18	20
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	13-DEC-18	6.2
Zinc (Zn)-Dissolved	<1.0		1.0	ug/L	13-DEC-18	890
Volatile Organic Compounds						
Acetone	<30		30	ug/L	14-DEC-18	2700
Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2209635-1 MW18-115D						
Sampled By: VP on 12-DEC-18 @ 12:00						
Matrix: WATER						
Volatile Organic Compounds						
n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
MTBE	<2.0		2.0	ug/L	14-DEC-18	15
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	14-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
Surrogate: 4-Bromofluorobenzene	96.0		70-130	%	14-DEC-18	
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	14-DEC-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-20181212

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-4 DUP		**WG2952810-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Arsenic (As)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Barium (Ba)-Dissolved		56.8	57.9		ug/L	1.9	20	13-DEC-18
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Boron (B)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	13-DEC-18
Cadmium (Cd)-Dissolved		<0.0050	<0.0050	RPD-NA	ug/L	N/A	20	13-DEC-18
Chromium (Cr)-Dissolved		0.81	0.83		ug/L	3.1	20	13-DEC-18
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Copper (Cu)-Dissolved		0.66	0.68		ug/L	2.6	20	13-DEC-18
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	13-DEC-18
Molybdenum (Mo)-Dissolved		0.076	0.073		ug/L	2.8	20	13-DEC-18
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	13-DEC-18
Selenium (Se)-Dissolved		0.164	0.139		ug/L	16	20	13-DEC-18
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	13-DEC-18
Sodium (Na)-Dissolved		2020	2010		ug/L	0.2	20	13-DEC-18
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	13-DEC-18
Uranium (U)-Dissolved		0.193	0.186		ug/L	3.7	20	13-DEC-18
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	13-DEC-18
Zinc (Zn)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	13-DEC-18
WG2952810-2 LCS								
Antimony (Sb)-Dissolved			101.2		%		80-120	13-DEC-18
Arsenic (As)-Dissolved			103.4		%		80-120	13-DEC-18
Barium (Ba)-Dissolved			102.2		%		80-120	13-DEC-18
Beryllium (Be)-Dissolved			98.3		%		80-120	13-DEC-18
Boron (B)-Dissolved			99.8		%		80-120	13-DEC-18
Cadmium (Cd)-Dissolved			100.0		%		80-120	13-DEC-18
Chromium (Cr)-Dissolved			100.9		%		80-120	13-DEC-18
Cobalt (Co)-Dissolved			99.9		%		80-120	13-DEC-18
Copper (Cu)-Dissolved			111.3		%		80-120	13-DEC-18
Lead (Pb)-Dissolved			101.1		%		80-120	13-DEC-18
Molybdenum (Mo)-Dissolved			100.6		%		80-120	13-DEC-18
Nickel (Ni)-Dissolved			101.2		%		80-120	13-DEC-18
Selenium (Se)-Dissolved			102.2		%		80-120	13-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-2 LCS								
Silver (Ag)-Dissolved			103.7		%		80-120	13-DEC-18
Sodium (Na)-Dissolved			100.7		%		80-120	13-DEC-18
Thallium (Tl)-Dissolved			100.3		%		80-120	13-DEC-18
Uranium (U)-Dissolved			100.7		%		80-120	13-DEC-18
Vanadium (V)-Dissolved			102.9		%		80-120	13-DEC-18
Zinc (Zn)-Dissolved			100.4		%		80-120	13-DEC-18
WG2952810-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Boron (B)-Dissolved			<10		ug/L		10	13-DEC-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	13-DEC-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	13-DEC-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Sodium (Na)-Dissolved			<50		ug/L		50	13-DEC-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	13-DEC-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	13-DEC-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	13-DEC-18
WG2952810-5 MS		**WG2952810-6**						
Antimony (Sb)-Dissolved			98.9		%		70-130	13-DEC-18
Arsenic (As)-Dissolved			105.4		%		70-130	13-DEC-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Beryllium (Be)-Dissolved			99.7		%		70-130	13-DEC-18
Boron (B)-Dissolved			99.2		%		70-130	13-DEC-18
Cadmium (Cd)-Dissolved			101.4		%		70-130	13-DEC-18
Chromium (Cr)-Dissolved			100.5		%		70-130	13-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-5 MS		**WG2952810-6**						
Cobalt (Co)-Dissolved			96.8		%		70-130	13-DEC-18
Copper (Cu)-Dissolved			96.7		%		70-130	13-DEC-18
Lead (Pb)-Dissolved			99.0		%		70-130	13-DEC-18
Molybdenum (Mo)-Dissolved			99.1		%		70-130	13-DEC-18
Nickel (Ni)-Dissolved			97.7		%		70-130	13-DEC-18
Selenium (Se)-Dissolved			105.6		%		70-130	13-DEC-18
Silver (Ag)-Dissolved			102.5		%		70-130	13-DEC-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Thallium (Tl)-Dissolved			97.9		%		70-130	13-DEC-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Vanadium (V)-Dissolved			103.0		%		70-130	13-DEC-18
Zinc (Zn)-Dissolved			102.7		%		70-130	13-DEC-18
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-4 DUP		**WG2951925-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	14-DEC-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-4 DUP		**WG2951925-3**						
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-DEC-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
WG2951925-1 LCS								
1,1,1,2-Tetrachloroethane			109.2		%		70-130	14-DEC-18
1,1,2,2-Tetrachloroethane			126.0		%		70-130	14-DEC-18
1,1,1-Trichloroethane			104.8		%		70-130	14-DEC-18
1,1,2-Trichloroethane			118.2		%		70-130	14-DEC-18
1,1-Dichloroethane			112.5		%		70-130	14-DEC-18
1,1-Dichloroethylene			105.9		%		70-130	14-DEC-18
1,2-Dibromoethane			117.8		%		70-130	14-DEC-18
1,2-Dichlorobenzene			109.9		%		70-130	14-DEC-18
1,2-Dichloroethane			120.4		%		70-130	14-DEC-18
1,2-Dichloropropane			114.4		%		70-130	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-1 LCS								
1,3-Dichlorobenzene			106.2		%		70-130	14-DEC-18
1,4-Dichlorobenzene			107.3		%		70-130	14-DEC-18
Acetone			138.4		%		60-140	14-DEC-18
Benzene			114.0		%		70-130	14-DEC-18
Bromodichloromethane			114.0		%		70-130	14-DEC-18
Bromoform			118.1		%		70-130	14-DEC-18
Bromomethane			97.8		%		60-140	14-DEC-18
Carbon tetrachloride			102.2		%		70-130	14-DEC-18
Chlorobenzene			108.1		%		70-130	14-DEC-18
Chloroform			111.0		%		70-130	14-DEC-18
cis-1,2-Dichloroethylene			105.9		%		70-130	14-DEC-18
cis-1,3-Dichloropropene			117.2		%		70-130	14-DEC-18
Dibromochloromethane			111.1		%		70-130	14-DEC-18
Dichlorodifluoromethane			131.3		%		50-140	14-DEC-18
Ethylbenzene			97.2		%		70-130	14-DEC-18
n-Hexane			99.0		%		70-130	14-DEC-18
m+p-Xylenes			95.2		%		70-130	14-DEC-18
Methyl Ethyl Ketone			147.1	MES	%		60-140	14-DEC-18
Methyl Isobutyl Ketone			137.1		%		60-140	14-DEC-18
Methylene Chloride			122.4		%		70-130	14-DEC-18
MTBE			110.7		%		70-130	14-DEC-18
o-Xylene			97.2		%		70-130	14-DEC-18
Styrene			107.8		%		70-130	14-DEC-18
Tetrachloroethylene			101.5		%		70-130	14-DEC-18
Toluene			101.4		%		70-130	14-DEC-18
trans-1,2-Dichloroethylene			108.7		%		70-130	14-DEC-18
trans-1,3-Dichloropropene			113.8		%		70-130	14-DEC-18
Trichloroethylene			108.3		%		70-130	14-DEC-18
Trichlorofluoromethane			105.5		%		60-140	14-DEC-18
Vinyl chloride			86.4		%		60-140	14-DEC-18
WG2951925-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-2 MB								
1,1,2-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	14-DEC-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	14-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Acetone			<30		ug/L		30	14-DEC-18
Benzene			<0.50		ug/L		0.5	14-DEC-18
Bromodichloromethane			<2.0		ug/L		2	14-DEC-18
Bromoform			<5.0		ug/L		5	14-DEC-18
Bromomethane			<0.50		ug/L		0.5	14-DEC-18
Carbon tetrachloride			<0.20		ug/L		0.2	14-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Chloroform			<1.0		ug/L		1	14-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Dibromochloromethane			<2.0		ug/L		2	14-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	14-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	14-DEC-18
n-Hexane			<0.50		ug/L		0.5	14-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	14-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	14-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	14-DEC-18
Methylene Chloride			<5.0		ug/L		5	14-DEC-18
MTBE			<2.0		ug/L		2	14-DEC-18
o-Xylene			<0.30		ug/L		0.3	14-DEC-18
Styrene			<0.50		ug/L		0.5	14-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	14-DEC-18
Toluene			<0.50		ug/L		0.5	14-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-2 MB								
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	14-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	14-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	14-DEC-18
Surrogate: 1,4-Difluorobenzene			98.4		%		70-130	14-DEC-18
Surrogate: 4-Bromofluorobenzene			98.2		%		70-130	14-DEC-18
WG2951925-5 MS		**WG2951925-3**						
1,1,1,2-Tetrachloroethane			109.3		%		50-140	14-DEC-18
1,1,2,2-Tetrachloroethane			111.7		%		50-140	14-DEC-18
1,1,1-Trichloroethane			108.8		%		50-140	14-DEC-18
1,1,2-Trichloroethane			109.6		%		50-140	14-DEC-18
1,1-Dichloroethane			113.0		%		50-140	14-DEC-18
1,1-Dichloroethylene			107.5		%		50-140	14-DEC-18
1,2-Dibromoethane			105.6		%		50-140	14-DEC-18
1,2-Dichlorobenzene			110.4		%		50-140	14-DEC-18
1,2-Dichloroethane			109.7		%		50-140	14-DEC-18
1,2-Dichloropropane			110.4		%		50-140	14-DEC-18
1,3-Dichlorobenzene			109.1		%		50-140	14-DEC-18
1,4-Dichlorobenzene			109.4		%		50-140	14-DEC-18
Acetone			119.1		%		50-140	14-DEC-18
Benzene			113.5		%		50-140	14-DEC-18
Bromodichloromethane			110.2		%		50-140	14-DEC-18
Bromoform			106.9		%		50-140	14-DEC-18
Bromomethane			91.2		%		50-140	14-DEC-18
Carbon tetrachloride			106.9		%		50-140	14-DEC-18
Chlorobenzene			108.3		%		50-140	14-DEC-18
Chloroform			110.5		%		50-140	14-DEC-18
cis-1,2-Dichloroethylene			103.7		%		50-140	14-DEC-18
cis-1,3-Dichloropropene			105.3		%		50-140	14-DEC-18
Dibromochloromethane			104.4		%		50-140	14-DEC-18
Dichlorodifluoromethane			119.8		%		50-140	14-DEC-18
Ethylbenzene			100.6		%		50-140	14-DEC-18
n-Hexane			99.7		%		50-140	14-DEC-18
m+p-Xylenes			98.5		%		50-140	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-5 MS		**WG2951925-3**						
Methyl Ethyl Ketone			106.8		%		50-140	14-DEC-18
Methyl Isobutyl Ketone			108.3		%		50-140	14-DEC-18
Methylene Chloride			113.5		%		50-140	14-DEC-18
MTBE			110.4		%		50-140	14-DEC-18
o-Xylene			99.1		%		50-140	14-DEC-18
Styrene			105.1		%		50-140	14-DEC-18
Tetrachloroethylene			107.0		%		50-140	14-DEC-18
Toluene			103.0		%		50-140	14-DEC-18
trans-1,2-Dichloroethylene			107.8		%		50-140	14-DEC-18
trans-1,3-Dichloropropene			99.4		%		50-140	14-DEC-18
Trichloroethylene			110.4		%		50-140	14-DEC-18
Trichlorofluoromethane			107.3		%		50-140	14-DEC-18
Vinyl chloride			83.1		%		50-140	14-DEC-18

Quality Control Report

Workorder: L2209635 Report Date: 14-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2209635-COFC

COC Number: 17 - 20181212

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / D	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M HILL	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — Emergency: 1 Business day [E1 - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)) ☐
Phone:		☑ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	
Street:	72 Victoria Street S, Suite 300	Email 1 or Fax michael.shiry@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Kitchener, Ontario	Email 2 ed.taves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3	

Invoice To	Same as Report To ☐ YES ☑ NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M HILL	Email 1 or Fax	
Contact:	Account Payables	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2209635	ALS Contact:	Sampler: V. Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O. Reg 153/04 Hydride Forming Metals	O. Reg 153/04 Metals Only	PAHs	PHCs	VOCs	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW18-115D	12-12-208	12:00	water	X				X			3

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6.9°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 12/12/2018	Time: 4:50 pm	Received by:	Date:	Time:	Received by:	Date: 12/Dec/2018	Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC Form

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 12-DEC-18
Report Date: 20-DEC-18 14:01 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2209758

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-12122018
Legal Site Desc:

Mathy Mahadeva
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2209758-1	MW18-112D									
Sampled By:	V. PETERS on 10-DEC-18 @ 09:4									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Acetone	<30		30	ug/L	14-DEC-18	2700			
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16			
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5			
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30			
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25			
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26			
	1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4			
	n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5			
	Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800			
	Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640			
	MTBE	<2.0		2.0	ug/L	14-DEC-18	15			
	Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Toluene	<0.50		0.50	ug/L	14-DEC-18	24			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150			
	Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5			
	o-Xylene	<0.30		0.30	ug/L	14-DEC-18				
	m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18				
	Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72			
	Surrogate: 4-Bromofluorobenzene	98.1		70-130	%	14-DEC-18				
	Surrogate: 1,4-Difluorobenzene	98.6		70-130	%	14-DEC-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-2 MW18-114D						
Sampled By: V. PETERS on 10-DEC-18 @ 12:3						
Matrix: WATER						#1
Dissolved Metals						
Dissolved Metals Filtration Location	FIELD			No Unit	13-DEC-18	
Antimony (Sb)-Dissolved	6.2	DLHC	1.0	ug/L	13-DEC-18	*6
Arsenic (As)-Dissolved	23.0	DLHC	1.0	ug/L	13-DEC-18	25
Barium (Ba)-Dissolved	60.5	DLHC	1.0	ug/L	13-DEC-18	1000
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	4
Boron (B)-Dissolved	110	DLHC	100	ug/L	13-DEC-18	5000
Cadmium (Cd)-Dissolved	<0.050	DLHC	0.050	ug/L	13-DEC-18	2.1
Chromium (Cr)-Dissolved	13.3	DLHC	5.0	ug/L	13-DEC-18	50
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	3.8
Copper (Cu)-Dissolved	4.3	DLHC	2.0	ug/L	13-DEC-18	69
Lead (Pb)-Dissolved	9.88	DLHC	0.50	ug/L	13-DEC-18	10
Molybdenum (Mo)-Dissolved	52.4	DLHC	0.50	ug/L	13-DEC-18	70
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	100
Selenium (Se)-Dissolved	0.64	DLHC	0.50	ug/L	13-DEC-18	10
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	13-DEC-18	1.2
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	13-DEC-18	2
Uranium (U)-Dissolved	4.85	DLHC	0.10	ug/L	13-DEC-18	20
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	6.2
Zinc (Zn)-Dissolved	62	DLHC	10	ug/L	13-DEC-18	890
L2209758-4 MW18-122G						
Sampled By: V. PETERS on 10-DEC-18 @ 16:1						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	14-DEC-18	2700
Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-4 MW18-122G						
Sampled By: V. PETERS on 10-DEC-18 @ 16:1						
Matrix: WATER						#1
Volatile Organic Compounds						
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
n-Hexane	0.72		0.50	ug/L	14-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
MTBE	<2.0		2.0	ug/L	14-DEC-18	15
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Toluene	0.51		0.50	ug/L	14-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
m+p-Xylenes	0.43		0.40	ug/L	14-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
Surrogate: 4-Bromofluorobenzene	98.1		70-130	%	14-DEC-18	
Surrogate: 1,4-Difluorobenzene	98.9		70-130	%	14-DEC-18	
L2209758-5 MW18-119D						
Sampled By: V. PETERS on 10-DEC-18 @ 17:2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	14-DEC-18	2700
Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	1.67		0.50	ug/L	14-DEC-18	*1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-5	MW18-119D						
Sampled By:	V. PETERS on 10-DEC-18 @ 17:2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
	n-Hexane	1.62		0.50	ug/L	14-DEC-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
	MTBE	<2.0		2.0	ug/L	14-DEC-18	15
	Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Toluene	0.72		0.50	ug/L	14-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
	o-Xylene	0.59		0.30	ug/L	14-DEC-18	
	m+p-Xylenes	0.90		0.40	ug/L	14-DEC-18	
	Xylenes (Total)	1.49		0.50	ug/L	14-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	96.9		70-130	%	14-DEC-18	
	Surrogate: 1,4-Difluorobenzene	99.6		70-130	%	14-DEC-18	
L2209758-6	MW18-113D						
Sampled By:	V. PETERS on 11-DEC-18 @ 08:4						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-6	MW18-113D						
Sampled By:	V. PETERS on 11-DEC-18 @ 08:4						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	cis-1,2-Dichloroethylene	1.33		0.50	ug/L	14-DEC-18	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
	n-Hexane	0.72		0.50	ug/L	14-DEC-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
	MTBE	<2.0		2.0	ug/L	14-DEC-18	15
	Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Toluene	0.52		0.50	ug/L	14-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichloroethylene	0.58		0.50	ug/L	14-DEC-18	*0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
	o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
	m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
	Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	97.7		70-130	%	14-DEC-18	
	Surrogate: 1,4-Difluorobenzene	98.7		70-130	%	14-DEC-18	
L2209758-7	MW18-135D						
Sampled By:	V. PETERS on 11-DEC-18 @ 10:3						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2209758-7 MW18-135D						
Sampled By: V. PETERS on 11-DEC-18 @ 10:3						
Matrix: WATER						
Volatile Organic Compounds						
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	0.89		0.50	ug/L	14-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
MTBE	<2.0		2.0	ug/L	14-DEC-18	15
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	14-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	14-DEC-18	
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	14-DEC-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	14-DEC-18	420
F1-BTEX	<25		25	ug/L	18-DEC-18	420
F2 (C10-C16)	<100		100	ug/L	13-DEC-18	150
F2-Naphth	<100		100	ug/L	18-DEC-18	
F3 (C16-C34)	<250		250	ug/L	13-DEC-18	500
F3-PAH	<250		250	ug/L	18-DEC-18	
F4 (C34-C50)	<250		250	ug/L	13-DEC-18	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	18-DEC-18	
Chrom. to baseline at nC50	YES			No Unit	13-DEC-18	
Surrogate: 2-Bromobenzotrifluoride	84.6		60-140	%	13-DEC-18	
Surrogate: 3,4-Dichlorotoluene	77.1		60-140	%	14-DEC-18	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	18-DEC-18	4.1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-7	MW18-135D						
Sampled By:	V. PETERS on 11-DEC-18 @ 10:3						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
	Acenaphthylene	<0.020		0.020	ug/L	18-DEC-18	1
	Anthracene	<0.020		0.020	ug/L	18-DEC-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	18-DEC-18	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	18-DEC-18	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	18-DEC-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Chrysene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	18-DEC-18	0.2
	Fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.41
	Fluorene	<0.020		0.020	ug/L	18-DEC-18	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	18-DEC-18	0.2
	1+2-Methylnaphthalenes	<0.028		0.028	ug/L	18-DEC-18	3.2
	1-Methylnaphthalene	<0.020		0.020	ug/L	18-DEC-18	3.2
	2-Methylnaphthalene	<0.020		0.020	ug/L	18-DEC-18	3.2
	Naphthalene	<0.050		0.050	ug/L	18-DEC-18	7
	Phenanthrene	<0.020		0.020	ug/L	18-DEC-18	1
	Pyrene	<0.020		0.020	ug/L	18-DEC-18	4.1
	Surrogate: d10-Acenaphthene	96.3		60-140	%	18-DEC-18	
	Surrogate: d12-Chrysene	99.6		60-140	%	18-DEC-18	
	Surrogate: d8-Naphthalene	91.0		60-140	%	18-DEC-18	
	Surrogate: d10-Phenanthrene	98.0		60-140	%	18-DEC-18	
L2209758-8	MW18-114D						
Sampled By:	V. PETERS on 11-DEC-18 @ 13:1						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	1.1		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	cis-1,2-Dichloroethylene	1.87		0.50	ug/L	14-DEC-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-8	MW18-114D						
Sampled By:	V. PETERS on 11-DEC-18 @ 13:1						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
	n-Hexane	0.77		0.50	ug/L	14-DEC-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
	MTBE	<2.0		2.0	ug/L	14-DEC-18	15
	Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Toluene	0.93		0.50	ug/L	14-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
	o-Xylene	0.32		0.30	ug/L	14-DEC-18	
	m+p-Xylenes	0.64		0.40	ug/L	14-DEC-18	
	Xylenes (Total)	0.96		0.50	ug/L	14-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	97.0		70-130	%	14-DEC-18	
	Surrogate: 1,4-Difluorobenzene	100.0		70-130	%	14-DEC-18	
L2209758-9	MW18-136D						
Sampled By:	V. PETERS on 11-DEC-18 @ 15:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-9 MW18-136D						
Sampled By: V. PETERS on 11-DEC-18 @ 15:0						
Matrix: WATER						#1
Volatile Organic Compounds						
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	1.65		0.50	ug/L	14-DEC-18	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
MTBE	<2.0		2.0	ug/L	14-DEC-18	15
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	14-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
Vinyl chloride	0.84		0.50	ug/L	14-DEC-18	*0.5
o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
Surrogate: 4-Bromofluorobenzene	98.3		70-130	%	14-DEC-18	
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	14-DEC-18	
L2209758-10 MW18-136G						
Sampled By: V. PETERS on 11-DEC-18 @ 14:3						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	14-DEC-18	2700
Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-10	MW18-136G						
Sampled By:	V. PETERS on 11-DEC-18 @ 14:3						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
	1,1-Dichloroethane	0.94		0.50	ug/L	14-DEC-18	5
	1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	cis-1,2-Dichloroethylene	3.14		0.50	ug/L	14-DEC-18	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
	Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
	n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
	MTBE	<2.0		2.0	ug/L	14-DEC-18	15
	Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Toluene	<0.50		0.50	ug/L	14-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
	o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
	m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
	Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	98.0		70-130	%	14-DEC-18	
	Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	14-DEC-18	
L2209758-11	MW18-105G						
Sampled By:	V. PETERS on 11-DEC-18 @ 16:0						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-11 MW18-105G						
Sampled By: V. PETERS on 11-DEC-18 @ 16:0						
Matrix: WATER						#1
Volatile Organic Compounds						
1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590
1,1-Dichloroethane	1.04		0.50	ug/L	14-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
cis-1,2-Dichloroethylene	2.04		0.50	ug/L	14-DEC-18	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640
MTBE	<2.0		2.0	ug/L	14-DEC-18	15
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	14-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5
Trichloroethylene	0.50		0.50	ug/L	14-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150
Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5
o-Xylene	<0.30		0.30	ug/L	14-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72
Surrogate: 4-Bromofluorobenzene	96.7		70-130	%	14-DEC-18	
Surrogate: 1,4-Difluorobenzene	98.0		70-130	%	14-DEC-18	
L2209758-12 MW18-135S						
Sampled By: V. PETERS on 11-DEC-18 @ 17:1						
Matrix: WATER						#1
Dissolved Metals						
Dissolved Metals Filtration Location	FIELD			No Unit	13-DEC-18	
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	6
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	25
Barium (Ba)-Dissolved	80.1	DLHC	1.0	ug/L	13-DEC-18	1000
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	4
Boron (B)-Dissolved	<100	DLHC	100	ug/L	13-DEC-18	5000
Cadmium (Cd)-Dissolved	<0.050	DLHC	0.050	ug/L	13-DEC-18	2.1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2209758-12 MW18-135S						
Sampled By: V. PETERS on 11-DEC-18 @ 17:1						
Matrix: WATER						
Dissolved Metals						
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	50
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	3.8
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	13-DEC-18	69
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	13-DEC-18	10
Molybdenum (Mo)-Dissolved	0.94	DLHC	0.50	ug/L	13-DEC-18	70
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	100
Selenium (Se)-Dissolved	2.31	DLHC	0.50	ug/L	13-DEC-18	10
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	13-DEC-18	1.2
Sodium (Na)-Dissolved	4030	DLHC	500	ug/L	13-DEC-18	490000
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	13-DEC-18	2
Uranium (U)-Dissolved	1.63	DLHC	0.10	ug/L	13-DEC-18	20
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	6.2
Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	13-DEC-18	890
Volatile Organic Compounds						
Acetone	<30		30	ug/L	17-DEC-18	2700
Benzene	0.80		0.50	ug/L	17-DEC-18	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	17-DEC-18	16
Bromoform	<5.0		5.0	ug/L	17-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	17-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	17-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	17-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	17-DEC-18	25
Chloroform	<1.0		1.0	ug/L	17-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	17-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	17-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	17-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	17-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	17-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	17-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	17-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	17-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	17-DEC-18	640
MTBE	<2.0		2.0	ug/L	17-DEC-18	15
Styrene	<0.50		0.50	ug/L	17-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2209758-12	MW18-135S						
Sampled By:	V. PETERS on 11-DEC-18 @ 17:1						
Matrix:	WATER						
Volatile Organic Compounds							
	Tetrachloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
	Toluene	<0.50		0.50	ug/L	17-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	17-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	17-DEC-18	0.5
	o-Xylene	<0.30		0.30	ug/L	17-DEC-18	
	m+p-Xylenes	<0.40		0.40	ug/L	17-DEC-18	
	Xylenes (Total)	<0.50		0.50	ug/L	17-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	98.8		70-130	%	17-DEC-18	
	Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	17-DEC-18	
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	17-DEC-18	420
	F1-BTEX	<25		25	ug/L	18-DEC-18	420
	F2 (C10-C16)	190		100	ug/L	13-DEC-18	*150
	F2-Naphth	190		100	ug/L	18-DEC-18	
	F3 (C16-C34)	<250		250	ug/L	13-DEC-18	500
	F3-PAH	<250		250	ug/L	18-DEC-18	
	F4 (C34-C50)	<250		250	ug/L	13-DEC-18	500
	Total Hydrocarbons (C6-C50)	<370		370	ug/L	18-DEC-18	
	Chrom. to baseline at nC50	YES			No Unit	13-DEC-18	
	Surrogate: 2-Bromobenzotrifluoride	91.9		60-140	%	13-DEC-18	
	Surrogate: 3,4-Dichlorotoluene	86.2		60-140	%	17-DEC-18	
Polycyclic Aromatic Hydrocarbons							
	Acenaphthene	1.04		0.020	ug/L	18-DEC-18	4.1
	Acenaphthylene	0.130		0.020	ug/L	18-DEC-18	1
	Anthracene	0.073		0.020	ug/L	18-DEC-18	1
	Benzo(a)anthracene	<0.020		0.020	ug/L	18-DEC-18	1
	Benzo(a)pyrene	<0.010		0.010	ug/L	18-DEC-18	0.01
	Benzo(b)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Benzo(g,h,i)perylene	<0.020		0.020	ug/L	18-DEC-18	0.2
	Benzo(k)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Chrysene	<0.020		0.020	ug/L	18-DEC-18	0.1
	Dibenzo(ah)anthracene	<0.020		0.020	ug/L	18-DEC-18	0.2
	Fluoranthene	0.026		0.020	ug/L	18-DEC-18	0.41
	Fluorene	1.40		0.020	ug/L	18-DEC-18	120
	Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	18-DEC-18	0.2
	1+2-Methylnaphthalenes	0.371		0.028	ug/L	18-DEC-18	3.2
	1-Methylnaphthalene	0.348		0.020	ug/L	18-DEC-18	3.2
	2-Methylnaphthalene	0.023		0.020	ug/L	18-DEC-18	3.2
	Naphthalene	<0.465	DLQ	0.47	ug/L	18-DEC-18	7
	Phenanthrene	0.119		0.020	ug/L	18-DEC-18	1
	Pyrene	0.069		0.020	ug/L	18-DEC-18	4.1
	Surrogate: d10-Acenaphthene	98.0		60-140	%	18-DEC-18	
	Surrogate: d12-Chrysene	93.2		60-140	%	18-DEC-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-12	MW18-135S						
Sampled By:	V. PETERS on 11-DEC-18 @ 17:1						
Matrix:	WATER						#1
Polycyclic Aromatic Hydrocarbons							
Surrogate: d8-Naphthalene		93.3		60-140	%	18-DEC-18	
Surrogate: d10-Phenanthrene		101.9		60-140	%	18-DEC-18	
L2209758-13	MW18-134D						
Sampled By:	V. PETERS on 12-DEC-18 @ 10:4						
Matrix:	WATER						#1
Volatile Organic Compounds							
Acetone		<30		30	ug/L	17-DEC-18	2700
Benzene		3.19		0.50	ug/L	17-DEC-18	*0.5
Bromodichloromethane		<2.0		2.0	ug/L	17-DEC-18	16
Bromoform		<5.0		5.0	ug/L	17-DEC-18	5
Bromomethane		<0.50		0.50	ug/L	17-DEC-18	0.89
Carbon tetrachloride		<0.20		0.20	ug/L	17-DEC-18	0.2
Chlorobenzene		<0.50		0.50	ug/L	17-DEC-18	30
Dibromochloromethane		<2.0		2.0	ug/L	17-DEC-18	25
Chloroform		<1.0		1.0	ug/L	17-DEC-18	2
1,2-Dibromoethane		<0.20		0.20	ug/L	17-DEC-18	0.2
1,2-Dichlorobenzene		<0.50		0.50	ug/L	17-DEC-18	3
1,3-Dichlorobenzene		<0.50		0.50	ug/L	17-DEC-18	59
1,4-Dichlorobenzene		<0.50		0.50	ug/L	17-DEC-18	0.5
Dichlorodifluoromethane		<2.0		2.0	ug/L	17-DEC-18	590
1,1-Dichloroethane		<0.50		0.50	ug/L	17-DEC-18	5
1,2-Dichloroethane		<0.50		0.50	ug/L	17-DEC-18	0.5
1,1-Dichloroethylene		<0.50		0.50	ug/L	17-DEC-18	0.5
cis-1,2-Dichloroethylene		1.59		0.50	ug/L	17-DEC-18	1.6
trans-1,2-Dichloroethylene		<0.50		0.50	ug/L	17-DEC-18	1.6
Methylene Chloride		<5.0		5.0	ug/L	17-DEC-18	26
1,2-Dichloropropane		<0.50		0.50	ug/L	17-DEC-18	0.58
cis-1,3-Dichloropropene		<0.30		0.30	ug/L	17-DEC-18	
trans-1,3-Dichloropropene		<0.30		0.30	ug/L	17-DEC-18	
1,3-Dichloropropene (cis & trans)		<0.50		0.50	ug/L	17-DEC-18	0.5
Ethylbenzene		<0.50		0.50	ug/L	17-DEC-18	2.4
n-Hexane		<0.50		0.50	ug/L	17-DEC-18	5
Methyl Ethyl Ketone		<20		20	ug/L	17-DEC-18	1800
Methyl Isobutyl Ketone		<20		20	ug/L	17-DEC-18	640
MTBE		<2.0		2.0	ug/L	17-DEC-18	15
Styrene		<0.50		0.50	ug/L	17-DEC-18	5.4
1,1,1,2-Tetrachloroethane		<0.50		0.50	ug/L	17-DEC-18	1.1
1,1,2,2-Tetrachloroethane		<0.50		0.50	ug/L	17-DEC-18	0.5
Tetrachloroethylene		<0.50		0.50	ug/L	17-DEC-18	0.5
Toluene		<0.50		0.50	ug/L	17-DEC-18	24
1,1,1-Trichloroethane		<0.50		0.50	ug/L	17-DEC-18	23
1,1,2-Trichloroethane		<0.50		0.50	ug/L	17-DEC-18	0.5
Trichloroethylene		<0.50		0.50	ug/L	17-DEC-18	0.5
Trichlorofluoromethane		<5.0		5.0	ug/L	17-DEC-18	150
Vinyl chloride		0.54		0.50	ug/L	17-DEC-18	*0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-13 MW18-134D						
Sampled By: V. PETERS on 12-DEC-18 @ 10:4						
Matrix: WATER						#1
Volatile Organic Compounds						
o-Xylene	<0.30		0.30	ug/L	17-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	17-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	17-DEC-18	72
Surrogate: 4-Bromofluorobenzene	99.8		70-130	%	17-DEC-18	
Surrogate: 1,4-Difluorobenzene	98.0		70-130	%	17-DEC-18	
L2209758-14 DUP1						
Sampled By: V. PETERS on 11-DEC-18						
Matrix: WATER						#1
Dissolved Metals						
Dissolved Metals Filtration Location	FIELD			No Unit	13-DEC-18	
Antimony (Sb)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	6
Arsenic (As)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	25
Barium (Ba)-Dissolved	81.9	DLHC	1.0	ug/L	13-DEC-18	1000
Beryllium (Be)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	4
Boron (B)-Dissolved	<100	DLHC	100	ug/L	13-DEC-18	5000
Cadmium (Cd)-Dissolved	<0.050	DLHC	0.050	ug/L	13-DEC-18	2.1
Chromium (Cr)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	50
Cobalt (Co)-Dissolved	<1.0	DLHC	1.0	ug/L	13-DEC-18	3.8
Copper (Cu)-Dissolved	<2.0	DLHC	2.0	ug/L	13-DEC-18	69
Lead (Pb)-Dissolved	<0.50	DLHC	0.50	ug/L	13-DEC-18	10
Molybdenum (Mo)-Dissolved	0.71	DLHC	0.50	ug/L	13-DEC-18	70
Nickel (Ni)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	100
Selenium (Se)-Dissolved	2.28	DLHC	0.50	ug/L	13-DEC-18	10
Silver (Ag)-Dissolved	<0.50	DLHC	0.50	ug/L	13-DEC-18	1.2
Sodium (Na)-Dissolved	3990	DLHC	500	ug/L	13-DEC-18	490000
Thallium (Tl)-Dissolved	<0.10	DLHC	0.10	ug/L	13-DEC-18	2
Uranium (U)-Dissolved	1.61	DLHC	0.10	ug/L	13-DEC-18	20
Vanadium (V)-Dissolved	<5.0	DLHC	5.0	ug/L	13-DEC-18	6.2
Zinc (Zn)-Dissolved	<10	DLHC	10	ug/L	13-DEC-18	890
Volatile Organic Compounds						
Acetone	<30		30	ug/L	17-DEC-18	2700
Benzene	0.78		0.50	ug/L	17-DEC-18	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	17-DEC-18	16
Bromoform	<5.0		5.0	ug/L	17-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	17-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	17-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	17-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	17-DEC-18	25
Chloroform	<1.0		1.0	ug/L	17-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	17-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	17-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	5

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-14 DUP1						
Sampled By: V. PETERS on 11-DEC-18						
Matrix: WATER						#1
Volatile Organic Compounds						
1,2-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	17-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	17-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	17-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	17-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	17-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	17-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	17-DEC-18	640
MTBE	<2.0		2.0	ug/L	17-DEC-18	15
Styrene	<0.50		0.50	ug/L	17-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	17-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	17-DEC-18	150
Vinyl chloride	<0.50		0.50	ug/L	17-DEC-18	0.5
o-Xylene	<0.30		0.30	ug/L	17-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	17-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	17-DEC-18	72
Surrogate: 4-Bromofluorobenzene	100.1		70-130	%	17-DEC-18	
Surrogate: 1,4-Difluorobenzene	98.8		70-130	%	17-DEC-18	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	17-DEC-18	420
F1-BTEX	<25		25	ug/L	18-DEC-18	420
F2 (C10-C16)	180		100	ug/L	13-DEC-18	*150
F2-Naphth	180		100	ug/L	18-DEC-18	
F3 (C16-C34)	<250		250	ug/L	13-DEC-18	500
F3-PAH	<250		250	ug/L	18-DEC-18	
F4 (C34-C50)	<250		250	ug/L	13-DEC-18	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	18-DEC-18	
Chrom. to baseline at nC50	YES			No Unit	13-DEC-18	
Surrogate: 2-Bromobenzotrifluoride	93.5		60-140	%	13-DEC-18	
Surrogate: 3,4-Dichlorotoluene	94.7		60-140	%	17-DEC-18	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	1.03		0.020	ug/L	18-DEC-18	4.1
Acenaphthylene	0.128		0.020	ug/L	18-DEC-18	1
Anthracene	0.072		0.020	ug/L	18-DEC-18	1
Benzo(a)anthracene	<0.020		0.020	ug/L	18-DEC-18	1

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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-14 DUP1						
Sampled By: V. PETERS on 11-DEC-18						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Benzo(a)pyrene	<0.010		0.010	ug/L	18-DEC-18	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	18-DEC-18	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	18-DEC-18	0.1
Chrysene	<0.020		0.020	ug/L	18-DEC-18	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	18-DEC-18	0.2
Fluoranthene	0.025		0.020	ug/L	18-DEC-18	0.41
Fluorene	1.39		0.020	ug/L	18-DEC-18	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	18-DEC-18	0.2
1+2-Methylnaphthalenes	0.374		0.028	ug/L	18-DEC-18	3.2
1-Methylnaphthalene	0.352		0.020	ug/L	18-DEC-18	3.2
2-Methylnaphthalene	0.022		0.020	ug/L	18-DEC-18	3.2
Naphthalene	<0.465	DLQ	0.47	ug/L	18-DEC-18	7
Phenanthrene	0.127		0.020	ug/L	18-DEC-18	1
Pyrene	0.068		0.020	ug/L	18-DEC-18	4.1
Surrogate: d10-Acenaphthene	98.6		60-140	%	18-DEC-18	
Surrogate: d12-Chrysene	95.5		60-140	%	18-DEC-18	
Surrogate: d8-Naphthalene	94.9		60-140	%	18-DEC-18	
Surrogate: d10-Phenanthrene	102.7		60-140	%	18-DEC-18	
L2209758-15 DUP2						
Sampled By: V. PETERS on 12-DEC-18						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	18-DEC-18	2700
Benzene	2.95		0.50	ug/L	18-DEC-18	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	18-DEC-18	16
Bromoform	<5.0		5.0	ug/L	18-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	18-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	18-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	18-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	18-DEC-18	25
Chloroform	<1.0		1.0	ug/L	18-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	18-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	18-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	18-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	18-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	18-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	18-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	18-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	18-DEC-18	0.5
cis-1,2-Dichloroethylene	1.55		0.50	ug/L	18-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	18-DEC-18	1.6
Methylene Chloride	<5.0		5.0	ug/L	18-DEC-18	26
1,2-Dichloropropane	<0.50		0.50	ug/L	18-DEC-18	0.58
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	18-DEC-18	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-15 DUP2						
Sampled By: V. PETERS on 12-DEC-18						
Matrix: WATER						#1
Volatile Organic Compounds						
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	18-DEC-18	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	18-DEC-18	0.5
Ethylbenzene	<0.50		0.50	ug/L	18-DEC-18	2.4
n-Hexane	<0.50		0.50	ug/L	18-DEC-18	5
Methyl Ethyl Ketone	<20		20	ug/L	18-DEC-18	1800
Methyl Isobutyl Ketone	<20		20	ug/L	18-DEC-18	640
MTBE	<2.0		2.0	ug/L	18-DEC-18	15
Styrene	<0.50		0.50	ug/L	18-DEC-18	5.4
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	18-DEC-18	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	18-DEC-18	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	18-DEC-18	0.5
Toluene	<0.50		0.50	ug/L	18-DEC-18	24
1,1,1-Trichloroethane	<0.50		0.50	ug/L	18-DEC-18	23
1,1,2-Trichloroethane	<0.50		0.50	ug/L	18-DEC-18	0.5
Trichloroethylene	<0.50		0.50	ug/L	18-DEC-18	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	18-DEC-18	150
Vinyl chloride	0.51		0.50	ug/L	18-DEC-18	*0.5
o-Xylene	<0.30		0.30	ug/L	18-DEC-18	
m+p-Xylenes	<0.40		0.40	ug/L	18-DEC-18	
Xylenes (Total)	<0.50		0.50	ug/L	18-DEC-18	72
Surrogate: 4-Bromofluorobenzene	94.8		70-130	%	18-DEC-18	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	18-DEC-18	
L2209758-16 TRIP BLANK						
Sampled By: V. PETERS on 12-DEC-18						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	17-DEC-18	2700
Benzene	<0.50		0.50	ug/L	17-DEC-18	0.5
Bromodichloromethane	<2.0		2.0	ug/L	17-DEC-18	16
Bromoform	<5.0		5.0	ug/L	17-DEC-18	5
Bromomethane	<0.50		0.50	ug/L	17-DEC-18	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	17-DEC-18	0.2
Chlorobenzene	<0.50		0.50	ug/L	17-DEC-18	30
Dibromochloromethane	<2.0		2.0	ug/L	17-DEC-18	25
Chloroform	<1.0		1.0	ug/L	17-DEC-18	2
1,2-Dibromoethane	<0.20		0.20	ug/L	17-DEC-18	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	3
1,3-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	59
1,4-Dichlorobenzene	<0.50		0.50	ug/L	17-DEC-18	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	17-DEC-18	590
1,1-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	5
1,2-Dichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	17-DEC-18	1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2209758-16	TRIP BLANK						
Sampled By:	V. PETERS on 12-DEC-18						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Methylene Chloride	<5.0		5.0	ug/L	17-DEC-18	26
	1,2-Dichloropropane	<0.50		0.50	ug/L	17-DEC-18	0.58
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	17-DEC-18	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	17-DEC-18	0.5
	Ethylbenzene	<0.50		0.50	ug/L	17-DEC-18	2.4
	n-Hexane	<0.50		0.50	ug/L	17-DEC-18	5
	Methyl Ethyl Ketone	<20		20	ug/L	17-DEC-18	1800
	Methyl Isobutyl Ketone	<20		20	ug/L	17-DEC-18	640
	MTBE	<2.0		2.0	ug/L	17-DEC-18	15
	Styrene	<0.50		0.50	ug/L	17-DEC-18	5.4
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
	Toluene	<0.50		0.50	ug/L	17-DEC-18	24
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	23
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	17-DEC-18	0.5
	Trichloroethylene	<0.50		0.50	ug/L	17-DEC-18	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	17-DEC-18	150
	Vinyl chloride	<0.50		0.50	ug/L	17-DEC-18	0.5
	o-Xylene	<0.30		0.30	ug/L	17-DEC-18	
	m+p-Xylenes	<0.40		0.40	ug/L	17-DEC-18	
	Xylenes (Total)	<0.50		0.50	ug/L	17-DEC-18	72
	Surrogate: 4-Bromofluorobenzene	99.5		70-130	%	17-DEC-18	
	Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	17-DEC-18	
Hydrocarbons							
	F1 (C6-C10)	<25		25	ug/L	17-DEC-18	420
	F1-BTEX	<25		25	ug/L	17-DEC-18	420
	Surrogate: 3,4-Dichlorotoluene	120.8		60-140	%	17-DEC-18	
L2209758-17	MW18-134S						
Sampled By:	V. PETERS on 12-DEC-18						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	14-DEC-18	2700
	Benzene	<0.50		0.50	ug/L	14-DEC-18	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	14-DEC-18	16
	Bromoform	<5.0		5.0	ug/L	14-DEC-18	5
	Bromomethane	<0.50		0.50	ug/L	14-DEC-18	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	14-DEC-18	0.2
	Chlorobenzene	<0.50		0.50	ug/L	14-DEC-18	30
	Dibromochloromethane	<2.0		2.0	ug/L	14-DEC-18	25
	Chloroform	<1.0		1.0	ug/L	14-DEC-18	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	14-DEC-18	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	3
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	59

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2209758-17 MW18-134S Sampled By: V. PETERS on 12-DEC-18 Matrix: WATER									
Volatile Organic Compounds									
1,4-Dichlorobenzene	<0.50		0.50	ug/L	14-DEC-18	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	14-DEC-18	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	5			
1,2-Dichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	14-DEC-18	1.6			
Methylene Chloride	<5.0		5.0	ug/L	14-DEC-18	26			
1,2-Dichloropropane	<0.50		0.50	ug/L	14-DEC-18	0.58			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	14-DEC-18				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	14-DEC-18	0.5			
Ethylbenzene	<0.50		0.50	ug/L	14-DEC-18	2.4			
n-Hexane	<0.50		0.50	ug/L	14-DEC-18	5			
Methyl Ethyl Ketone	<20		20	ug/L	14-DEC-18	1800			
Methyl Isobutyl Ketone	<20		20	ug/L	14-DEC-18	640			
MTBE	<2.0		2.0	ug/L	14-DEC-18	15			
Styrene	<0.50		0.50	ug/L	14-DEC-18	5.4			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
Toluene	<0.50		0.50	ug/L	14-DEC-18	24			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	23			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	14-DEC-18	0.5			
Trichloroethylene	<0.50		0.50	ug/L	14-DEC-18	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	14-DEC-18	150			
Vinyl chloride	<0.50		0.50	ug/L	14-DEC-18	0.5			
o-Xylene	<0.30		0.30	ug/L	14-DEC-18				
m+p-Xylenes	<0.40		0.40	ug/L	14-DEC-18				
Xylenes (Total)	<0.50		0.50	ug/L	14-DEC-18	72			
Surrogate: 4-Bromofluorobenzene	96.0		70-130	%	14-DEC-18				
Surrogate: 1,4-Difluorobenzene	98.4		70-130	%	14-DEC-18				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T6-Ground Water-All Types of Property Uses

#1: T6-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-12122018

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2209758 Report Date: 20-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R4395489								
WG2949710-4 DUP		**WG2949710-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	14-DEC-18
WG2949710-1 LCS								
F1 (C6-C10)			101.7		%		80-120	14-DEC-18
WG2949710-2 MB								
F1 (C6-C10)			<25		ug/L		25	14-DEC-18
Surrogate: 3,4-Dichlorotoluene			87.8		%		60-140	14-DEC-18
WG2949710-5 MS		**WG2949710-3**						
F1 (C6-C10)			87.9		%		60-140	14-DEC-18
Batch R4396802								
WG2951927-4 DUP		**WG2951927-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	17-DEC-18
WG2951927-1 LCS								
F1 (C6-C10)			112.9		%		80-120	14-DEC-18
WG2951927-2 MB								
F1 (C6-C10)			<25		ug/L		25	17-DEC-18
Surrogate: 3,4-Dichlorotoluene			106.9		%		60-140	17-DEC-18
WG2951927-5 MS		**WG2951927-3**						
F1 (C6-C10)			96.8		%		60-140	17-DEC-18
F2-F4-511-WT	**Water**							
Batch R4394673								
WG2952851-2 LCS								
F2 (C10-C16)			106.6		%		70-130	13-DEC-18
F3 (C16-C34)			109.1		%		70-130	13-DEC-18
F4 (C34-C50)			113.3		%		70-130	13-DEC-18
WG2952851-3 LCSD		**WG2952851-2**						
F2 (C10-C16)		106.6	107.8		%	1.0	50	13-DEC-18
F3 (C16-C34)		109.1	107.6		%	1.4	50	13-DEC-18
F4 (C34-C50)		113.3	110.1		%	2.9	50	13-DEC-18
WG2952851-1 MB								
F2 (C10-C16)			<100		ug/L		100	13-DEC-18
F3 (C16-C34)			<250		ug/L		250	13-DEC-18
F4 (C34-C50)			<250		ug/L		250	13-DEC-18
Surrogate: 2-Bromobenzotrifluoride			75.0		%		60-140	13-DEC-18
MET-D-UG/L-MS-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-4 DUP		**WG2952810-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Arsenic (As)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Barium (Ba)-Dissolved		56.8	57.9		ug/L	1.9	20	13-DEC-18
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Boron (B)-Dissolved		<10	<10	RPD-NA	ug/L	N/A	20	13-DEC-18
Cadmium (Cd)-Dissolved		<0.0050	<0.0050	RPD-NA	ug/L	N/A	20	13-DEC-18
Chromium (Cr)-Dissolved		0.81	0.83		ug/L	3.1	20	13-DEC-18
Cobalt (Co)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	13-DEC-18
Copper (Cu)-Dissolved		0.66	0.68		ug/L	2.6	20	13-DEC-18
Lead (Pb)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	13-DEC-18
Molybdenum (Mo)-Dissolved		0.076	0.073		ug/L	2.8	20	13-DEC-18
Nickel (Ni)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	13-DEC-18
Selenium (Se)-Dissolved		0.164	0.139		ug/L	16	20	13-DEC-18
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	13-DEC-18
Sodium (Na)-Dissolved		2020	2010		ug/L	0.2	20	13-DEC-18
Thallium (Tl)-Dissolved		<0.010	<0.010	RPD-NA	ug/L	N/A	20	13-DEC-18
Uranium (U)-Dissolved		0.193	0.186		ug/L	3.7	20	13-DEC-18
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	13-DEC-18
Zinc (Zn)-Dissolved		<1.0	<1.0	RPD-NA	ug/L	N/A	20	13-DEC-18
WG2952810-2 LCS								
Antimony (Sb)-Dissolved			101.2		%		80-120	13-DEC-18
Arsenic (As)-Dissolved			103.4		%		80-120	13-DEC-18
Barium (Ba)-Dissolved			102.2		%		80-120	13-DEC-18
Beryllium (Be)-Dissolved			98.3		%		80-120	13-DEC-18
Boron (B)-Dissolved			99.8		%		80-120	13-DEC-18
Cadmium (Cd)-Dissolved			100.0		%		80-120	13-DEC-18
Chromium (Cr)-Dissolved			100.9		%		80-120	13-DEC-18
Cobalt (Co)-Dissolved			99.9		%		80-120	13-DEC-18
Copper (Cu)-Dissolved			111.3		%		80-120	13-DEC-18
Lead (Pb)-Dissolved			101.1		%		80-120	13-DEC-18
Molybdenum (Mo)-Dissolved			100.6		%		80-120	13-DEC-18
Nickel (Ni)-Dissolved			101.2		%		80-120	13-DEC-18
Selenium (Se)-Dissolved			102.2		%		80-120	13-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-2 LCS								
Silver (Ag)-Dissolved			103.7		%		80-120	13-DEC-18
Sodium (Na)-Dissolved			100.7		%		80-120	13-DEC-18
Thallium (Tl)-Dissolved			100.3		%		80-120	13-DEC-18
Uranium (U)-Dissolved			100.7		%		80-120	13-DEC-18
Vanadium (V)-Dissolved			102.9		%		80-120	13-DEC-18
Zinc (Zn)-Dissolved			100.4		%		80-120	13-DEC-18
WG2952810-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Boron (B)-Dissolved			<10		ug/L		10	13-DEC-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	13-DEC-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	13-DEC-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	13-DEC-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	13-DEC-18
Sodium (Na)-Dissolved			<50		ug/L		50	13-DEC-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	13-DEC-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	13-DEC-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	13-DEC-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	13-DEC-18
WG2952810-5 MS		**WG2952810-6**						
Antimony (Sb)-Dissolved			98.9		%		70-130	13-DEC-18
Arsenic (As)-Dissolved			105.4		%		70-130	13-DEC-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Beryllium (Be)-Dissolved			99.7		%		70-130	13-DEC-18
Boron (B)-Dissolved			99.2		%		70-130	13-DEC-18
Cadmium (Cd)-Dissolved			101.4		%		70-130	13-DEC-18
Chromium (Cr)-Dissolved			100.5		%		70-130	13-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4393615								
WG2952810-5 MS		**WG2952810-6**						
Cobalt (Co)-Dissolved			96.8		%		70-130	13-DEC-18
Copper (Cu)-Dissolved			96.7		%		70-130	13-DEC-18
Lead (Pb)-Dissolved			99.0		%		70-130	13-DEC-18
Molybdenum (Mo)-Dissolved			99.1		%		70-130	13-DEC-18
Nickel (Ni)-Dissolved			97.7		%		70-130	13-DEC-18
Selenium (Se)-Dissolved			105.6		%		70-130	13-DEC-18
Silver (Ag)-Dissolved			102.5		%		70-130	13-DEC-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Thallium (Tl)-Dissolved			97.9		%		70-130	13-DEC-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	13-DEC-18
Vanadium (V)-Dissolved			103.0		%		70-130	13-DEC-18
Zinc (Zn)-Dissolved			102.7		%		70-130	13-DEC-18
PAH-511-WT	**Water**							
Batch R4399476								
WG2952851-2 LCS								
1-Methylnaphthalene			105.0		%		50-140	18-DEC-18
2-Methylnaphthalene			103.8		%		50-140	18-DEC-18
Acenaphthene			107.3		%		50-140	18-DEC-18
Acenaphthylene			109.0		%		50-140	18-DEC-18
Anthracene			115.2		%		50-140	18-DEC-18
Benzo(a)anthracene			130.9		%		50-140	18-DEC-18
Benzo(a)pyrene			103.8		%		50-140	18-DEC-18
Benzo(b)fluoranthene			100.2		%		50-140	18-DEC-18
Benzo(g,h,i)perylene			116.7		%		50-140	18-DEC-18
Benzo(k)fluoranthene			107.4		%		50-140	18-DEC-18
Chrysene			124.2		%		50-140	18-DEC-18
Dibenzo(ah)anthracene			116.2		%		50-140	18-DEC-18
Fluoranthene			120.3		%		50-140	18-DEC-18
Fluorene			113.1		%		50-140	18-DEC-18
Indeno(1,2,3-cd)pyrene			129.3		%		50-140	18-DEC-18
Naphthalene			108.1		%		50-140	18-DEC-18
Phenanthrene			116.2		%		50-140	18-DEC-18
Pyrene			122.3		%		50-140	18-DEC-18
WG2952851-3 LCSD		**WG2952851-2**						

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4399476								
WG2952851-3 LCSD		**WG2952851-2**						
1-Methylnaphthalene		105.0	106.0		%	1.0	50	18-DEC-18
2-Methylnaphthalene		103.8	105.2		%	1.3	50	18-DEC-18
Acenaphthene		107.3	108.7		%	1.3	50	18-DEC-18
Acenaphthylene		109.0	109.8		%	0.7	50	18-DEC-18
Anthracene		115.2	115.4		%	0.2	50	18-DEC-18
Benzo(a)anthracene		130.9	130.4		%	0.4	50	18-DEC-18
Benzo(a)pyrene		103.8	111.7		%	7.4	50	18-DEC-18
Benzo(b)fluoranthene		100.2	103.9		%	3.7	50	18-DEC-18
Benzo(g,h,i)perylene		116.7	117.8		%	1.0	50	18-DEC-18
Benzo(k)fluoranthene		107.4	111.4		%	3.6	50	18-DEC-18
Chrysene		124.2	123.8		%	0.3	50	18-DEC-18
Dibenzo(ah)anthracene		116.2	116.9		%	0.6	50	18-DEC-18
Fluoranthene		120.3	121.6		%	1.1	50	18-DEC-18
Fluorene		113.1	114.7		%	1.4	50	18-DEC-18
Indeno(1,2,3-cd)pyrene		129.3	129.0		%	0.2	50	18-DEC-18
Naphthalene		108.1	111.5		%	3.1	50	18-DEC-18
Phenanthrene		116.2	117.3		%	1.0	50	18-DEC-18
Pyrene		122.3	122.9		%	0.5	50	18-DEC-18
WG2952851-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	18-DEC-18
2-Methylnaphthalene			<0.020		ug/L		0.02	18-DEC-18
Acenaphthene			<0.020		ug/L		0.02	18-DEC-18
Acenaphthylene			<0.020		ug/L		0.02	18-DEC-18
Anthracene			<0.020		ug/L		0.02	18-DEC-18
Benzo(a)anthracene			<0.020		ug/L		0.02	18-DEC-18
Benzo(a)pyrene			<0.010		ug/L		0.01	18-DEC-18
Benzo(b)fluoranthene			<0.020		ug/L		0.02	18-DEC-18
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	18-DEC-18
Benzo(k)fluoranthene			<0.020		ug/L		0.02	18-DEC-18
Chrysene			<0.020		ug/L		0.02	18-DEC-18
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	18-DEC-18
Fluoranthene			<0.020		ug/L		0.02	18-DEC-18
Fluorene			<0.020		ug/L		0.02	18-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4399476								
WG2952851-1 MB								
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	18-DEC-18
Naphthalene			<0.050		ug/L		0.05	18-DEC-18
Phenanthrene			<0.020		ug/L		0.02	18-DEC-18
Pyrene			<0.020		ug/L		0.02	18-DEC-18
Surrogate: d8-Naphthalene			89.6		%		60-140	18-DEC-18
Surrogate: d10-Phenanthrene			102.5		%		60-140	18-DEC-18
Surrogate: d12-Chrysene			106.3		%		60-140	18-DEC-18
Surrogate: d10-Acenaphthene			97.5		%		60-140	18-DEC-18
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-4 DUP		**WG2951925-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	14-DEC-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-DEC-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-4 DUP		**WG2951925-3**						
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
WG2951925-1 LCS								
1,1,1,2-Tetrachloroethane			109.2		%		70-130	14-DEC-18
1,1,2,2-Tetrachloroethane			126.0		%		70-130	14-DEC-18
1,1,1-Trichloroethane			104.8		%		70-130	14-DEC-18
1,1,2-Trichloroethane			118.2		%		70-130	14-DEC-18
1,1-Dichloroethane			112.5		%		70-130	14-DEC-18
1,1-Dichloroethylene			105.9		%		70-130	14-DEC-18
1,2-Dibromoethane			117.8		%		70-130	14-DEC-18
1,2-Dichlorobenzene			109.9		%		70-130	14-DEC-18
1,2-Dichloroethane			120.4		%		70-130	14-DEC-18
1,2-Dichloropropane			114.4		%		70-130	14-DEC-18
1,3-Dichlorobenzene			106.2		%		70-130	14-DEC-18
1,4-Dichlorobenzene			107.3		%		70-130	14-DEC-18
Acetone			138.4		%		60-140	14-DEC-18
Benzene			114.0		%		70-130	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-1 LCS								
Bromodichloromethane			114.0		%		70-130	14-DEC-18
Bromoform			118.1		%		70-130	14-DEC-18
Bromomethane			97.8		%		60-140	14-DEC-18
Carbon tetrachloride			102.2		%		70-130	14-DEC-18
Chlorobenzene			108.1		%		70-130	14-DEC-18
Chloroform			111.0		%		70-130	14-DEC-18
cis-1,2-Dichloroethylene			105.9		%		70-130	14-DEC-18
cis-1,3-Dichloropropene			117.2		%		70-130	14-DEC-18
Dibromochloromethane			111.1		%		70-130	14-DEC-18
Dichlorodifluoromethane			131.3		%		50-140	14-DEC-18
Ethylbenzene			97.2		%		70-130	14-DEC-18
n-Hexane			99.0		%		70-130	14-DEC-18
m+p-Xylenes			95.2		%		70-130	14-DEC-18
Methyl Ethyl Ketone			147.1	MES	%		60-140	14-DEC-18
Methyl Isobutyl Ketone			137.1		%		60-140	14-DEC-18
Methylene Chloride			122.4		%		70-130	14-DEC-18
MTBE			110.7		%		70-130	14-DEC-18
o-Xylene			97.2		%		70-130	14-DEC-18
Styrene			107.8		%		70-130	14-DEC-18
Tetrachloroethylene			101.5		%		70-130	14-DEC-18
Toluene			101.4		%		70-130	14-DEC-18
trans-1,2-Dichloroethylene			108.7		%		70-130	14-DEC-18
trans-1,3-Dichloropropene			113.8		%		70-130	14-DEC-18
Trichloroethylene			108.3		%		70-130	14-DEC-18
Trichlorofluoromethane			105.5		%		60-140	14-DEC-18
Vinyl chloride			86.4		%		60-140	14-DEC-18
WG2951925-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	14-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Acetone			<30		ug/L		30	14-DEC-18
Benzene			<0.50		ug/L		0.5	14-DEC-18
Bromodichloromethane			<2.0		ug/L		2	14-DEC-18
Bromoform			<5.0		ug/L		5	14-DEC-18
Bromomethane			<0.50		ug/L		0.5	14-DEC-18
Carbon tetrachloride			<0.20		ug/L		0.2	14-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Chloroform			<1.0		ug/L		1	14-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Dibromochloromethane			<2.0		ug/L		2	14-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	14-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	14-DEC-18
n-Hexane			<0.50		ug/L		0.5	14-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	14-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	14-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	14-DEC-18
Methylene Chloride			<5.0		ug/L		5	14-DEC-18
MTBE			<2.0		ug/L		2	14-DEC-18
o-Xylene			<0.30		ug/L		0.3	14-DEC-18
Styrene			<0.50		ug/L		0.5	14-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	14-DEC-18
Toluene			<0.50		ug/L		0.5	14-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	14-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	14-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-2 MB								
Surrogate: 1,4-Difluorobenzene			98.4		%		70-130	14-DEC-18
Surrogate: 4-Bromofluorobenzene			98.2		%		70-130	14-DEC-18
WG2951925-5 MS		**WG2951925-3**						
1,1,1,2-Tetrachloroethane			109.3		%		50-140	14-DEC-18
1,1,2,2-Tetrachloroethane			111.7		%		50-140	14-DEC-18
1,1,1-Trichloroethane			108.8		%		50-140	14-DEC-18
1,1,2-Trichloroethane			109.6		%		50-140	14-DEC-18
1,1-Dichloroethane			113.0		%		50-140	14-DEC-18
1,1-Dichloroethylene			107.5		%		50-140	14-DEC-18
1,2-Dibromoethane			105.6		%		50-140	14-DEC-18
1,2-Dichlorobenzene			110.4		%		50-140	14-DEC-18
1,2-Dichloroethane			109.7		%		50-140	14-DEC-18
1,2-Dichloropropane			110.4		%		50-140	14-DEC-18
1,3-Dichlorobenzene			109.1		%		50-140	14-DEC-18
1,4-Dichlorobenzene			109.4		%		50-140	14-DEC-18
Acetone			119.1		%		50-140	14-DEC-18
Benzene			113.5		%		50-140	14-DEC-18
Bromodichloromethane			110.2		%		50-140	14-DEC-18
Bromoform			106.9		%		50-140	14-DEC-18
Bromomethane			91.2		%		50-140	14-DEC-18
Carbon tetrachloride			106.9		%		50-140	14-DEC-18
Chlorobenzene			108.3		%		50-140	14-DEC-18
Chloroform			110.5		%		50-140	14-DEC-18
cis-1,2-Dichloroethylene			103.7		%		50-140	14-DEC-18
cis-1,3-Dichloropropene			105.3		%		50-140	14-DEC-18
Dibromochloromethane			104.4		%		50-140	14-DEC-18
Dichlorodifluoromethane			119.8		%		50-140	14-DEC-18
Ethylbenzene			100.6		%		50-140	14-DEC-18
n-Hexane			99.7		%		50-140	14-DEC-18
m+p-Xylenes			98.5		%		50-140	14-DEC-18
Methyl Ethyl Ketone			106.8		%		50-140	14-DEC-18
Methyl Isobutyl Ketone			108.3		%		50-140	14-DEC-18
Methylene Chloride			113.5		%		50-140	14-DEC-18
MTBE			110.4		%		50-140	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395167								
WG2951925-5 MS		**WG2951925-3**						
o-Xylene			99.1		%		50-140	14-DEC-18
Styrene			105.1		%		50-140	14-DEC-18
Tetrachloroethylene			107.0		%		50-140	14-DEC-18
Toluene			103.0		%		50-140	14-DEC-18
trans-1,2-Dichloroethylene			107.8		%		50-140	14-DEC-18
trans-1,3-Dichloropropene			99.4		%		50-140	14-DEC-18
Trichloroethylene			110.4		%		50-140	14-DEC-18
Trichlorofluoromethane			107.3		%		50-140	14-DEC-18
Vinyl chloride			83.1		%		50-140	14-DEC-18
Batch R4395489								
WG2949710-4 DUP		**WG2949710-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	14-DEC-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	14-DEC-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	14-DEC-18
cis-1,2-Dichloroethylene		0.89	0.90		ug/L	1.1	30	14-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395489								
WG2949710-4 DUP		**WG2949710-3**						
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	14-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	14-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	14-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	14-DEC-18
WG2949710-1 LCS								
1,1,1,2-Tetrachloroethane			106.2		%		70-130	14-DEC-18
1,1,2,2-Tetrachloroethane			113.1		%		70-130	14-DEC-18
1,1,1-Trichloroethane			110.5		%		70-130	14-DEC-18
1,1,2-Trichloroethane			110.9		%		70-130	14-DEC-18
1,1-Dichloroethane			116.1		%		70-130	14-DEC-18
1,1-Dichloroethylene			110.3		%		70-130	14-DEC-18
1,2-Dibromoethane			111.4		%		70-130	14-DEC-18
1,2-Dichlorobenzene			108.4		%		70-130	14-DEC-18
1,2-Dichloroethane			114.9		%		70-130	14-DEC-18
1,2-Dichloropropane			111.0		%		70-130	14-DEC-18
1,3-Dichlorobenzene			108.9		%		70-130	14-DEC-18
1,4-Dichlorobenzene			110.3		%		70-130	14-DEC-18
Acetone			108.2		%		60-140	14-DEC-18
Benzene			114.1		%		70-130	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395489								
WG2949710-1 LCS								
Bromodichloromethane			114.2		%		70-130	14-DEC-18
Bromoform			107.4		%		70-130	14-DEC-18
Bromomethane			105.0		%		60-140	14-DEC-18
Carbon tetrachloride			109.2		%		70-130	14-DEC-18
Chlorobenzene			108.3		%		70-130	14-DEC-18
Chloroform			112.4		%		70-130	14-DEC-18
cis-1,2-Dichloroethylene			110.9		%		70-130	14-DEC-18
cis-1,3-Dichloropropene			113.6		%		70-130	14-DEC-18
Dibromochloromethane			109.6		%		70-130	14-DEC-18
Dichlorodifluoromethane			139.4		%		50-140	14-DEC-18
Ethylbenzene			97.8		%		70-130	14-DEC-18
n-Hexane			101.0		%		70-130	14-DEC-18
m+p-Xylenes			101.9		%		70-130	14-DEC-18
Methyl Ethyl Ketone			104.5		%		60-140	14-DEC-18
Methyl Isobutyl Ketone			91.9		%		60-140	14-DEC-18
Methylene Chloride			118.5		%		70-130	14-DEC-18
MTBE			111.1		%		70-130	14-DEC-18
o-Xylene			96.7		%		70-130	14-DEC-18
Styrene			100.7		%		70-130	14-DEC-18
Tetrachloroethylene			107.2		%		70-130	14-DEC-18
Toluene			100.7		%		70-130	14-DEC-18
trans-1,2-Dichloroethylene			113.1		%		70-130	14-DEC-18
trans-1,3-Dichloropropene			109.8		%		70-130	14-DEC-18
Trichloroethylene			111.2		%		70-130	14-DEC-18
Trichlorofluoromethane			118.7		%		60-140	14-DEC-18
Vinyl chloride			94.3		%		60-140	14-DEC-18
WG2949710-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395489								
WG2949710-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	14-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	14-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Acetone			<30		ug/L		30	14-DEC-18
Benzene			<0.50		ug/L		0.5	14-DEC-18
Bromodichloromethane			<2.0		ug/L		2	14-DEC-18
Bromoform			<5.0		ug/L		5	14-DEC-18
Bromomethane			<0.50		ug/L		0.5	14-DEC-18
Carbon tetrachloride			<0.20		ug/L		0.2	14-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	14-DEC-18
Chloroform			<1.0		ug/L		1	14-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Dibromochloromethane			<2.0		ug/L		2	14-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	14-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	14-DEC-18
n-Hexane			<0.50		ug/L		0.5	14-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	14-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	14-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	14-DEC-18
Methylene Chloride			<5.0		ug/L		5	14-DEC-18
MTBE			<2.0		ug/L		2	14-DEC-18
o-Xylene			<0.30		ug/L		0.3	14-DEC-18
Styrene			<0.50		ug/L		0.5	14-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	14-DEC-18
Toluene			<0.50		ug/L		0.5	14-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	14-DEC-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	14-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	14-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	14-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395489								
WG2949710-2 MB								
Surrogate: 1,4-Difluorobenzene			98.9		%		70-130	14-DEC-18
Surrogate: 4-Bromofluorobenzene			97.6		%		70-130	14-DEC-18
WG2949710-5 MS		**WG2949710-3**						
1,1,1,2-Tetrachloroethane			108.1		%		50-140	14-DEC-18
1,1,2,2-Tetrachloroethane			130.8		%		50-140	14-DEC-18
1,1,1-Trichloroethane			109.3		%		50-140	14-DEC-18
1,1,2-Trichloroethane			119.2		%		50-140	14-DEC-18
1,1-Dichloroethane			119.3		%		50-140	14-DEC-18
1,1-Dichloroethylene			106.4		%		50-140	14-DEC-18
1,2-Dibromoethane			121.5		%		50-140	14-DEC-18
1,2-Dichlorobenzene			108.7		%		50-140	14-DEC-18
1,2-Dichloroethane			126.7		%		50-140	14-DEC-18
1,2-Dichloropropane			117.5		%		50-140	14-DEC-18
1,3-Dichlorobenzene			105.0		%		50-140	14-DEC-18
1,4-Dichlorobenzene			106.3		%		50-140	14-DEC-18
Acetone			126.6		%		50-140	14-DEC-18
Benzene			116.0		%		50-140	14-DEC-18
Bromodichloromethane			121.7		%		50-140	14-DEC-18
Bromoform			116.1		%		50-140	14-DEC-18
Bromomethane			104.1		%		50-140	14-DEC-18
Carbon tetrachloride			106.5		%		50-140	14-DEC-18
Chlorobenzene			106.9		%		50-140	14-DEC-18
Chloroform			116.3		%		50-140	14-DEC-18
cis-1,2-Dichloroethylene			113.9		%		50-140	14-DEC-18
cis-1,3-Dichloropropene			115.9		%		50-140	14-DEC-18
Dibromochloromethane			116.2		%		50-140	14-DEC-18
Dichlorodifluoromethane			125.6		%		50-140	14-DEC-18
Ethylbenzene			91.9		%		50-140	14-DEC-18
n-Hexane			93.5		%		50-140	14-DEC-18
m+p-Xylenes			95.7		%		50-140	14-DEC-18
Methyl Ethyl Ketone			115.1		%		50-140	14-DEC-18
Methyl Isobutyl Ketone			106.6		%		50-140	14-DEC-18
Methylene Chloride			124.7		%		50-140	14-DEC-18
MTBE			110.8		%		50-140	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4395489								
WG2949710-5 MS		**WG2949710-3**						
o-Xylene			92.6		%		50-140	14-DEC-18
Styrene			97.6		%		50-140	14-DEC-18
Tetrachloroethylene			97.4		%		50-140	14-DEC-18
Toluene			97.1		%		50-140	14-DEC-18
trans-1,2-Dichloroethylene			107.8		%		50-140	14-DEC-18
trans-1,3-Dichloropropene			108.9		%		50-140	14-DEC-18
Trichloroethylene			107.8		%		50-140	14-DEC-18
Trichlorofluoromethane			113.0		%		50-140	14-DEC-18
Vinyl chloride			88.7		%		50-140	14-DEC-18
Batch R4396802								
WG2951927-4 DUP		**WG2951927-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	17-DEC-18
Benzene		0.78	0.72		ug/L	8.0	30	17-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4396802								
WG2951927-4 DUP		**WG2951927-3**						
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	17-DEC-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
WG2951927-1 LCS								
1,1,1,2-Tetrachloroethane			107.3		%		70-130	14-DEC-18
1,1,2,2-Tetrachloroethane			105.1		%		70-130	14-DEC-18
1,1,1-Trichloroethane			109.7		%		70-130	14-DEC-18
1,1,2-Trichloroethane			104.5		%		70-130	14-DEC-18
1,1-Dichloroethane			111.3		%		70-130	14-DEC-18
1,1-Dichloroethylene			111.7		%		70-130	14-DEC-18
1,2-Dibromoethane			100.6		%		70-130	14-DEC-18
1,2-Dichlorobenzene			110.3		%		70-130	14-DEC-18
1,2-Dichloroethane			104.0		%		70-130	14-DEC-18
1,2-Dichloropropane			106.3		%		70-130	14-DEC-18
1,3-Dichlorobenzene			112.9		%		70-130	14-DEC-18
1,4-Dichlorobenzene			113.2		%		70-130	14-DEC-18
Acetone			111.5		%		60-140	14-DEC-18
Benzene			112.3		%		70-130	14-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4396802								
WG2951927-1 LCS								
Bromodichloromethane			105.6		%		70-130	14-DEC-18
Bromoform			102.0		%		70-130	14-DEC-18
Bromomethane			95.9		%		60-140	14-DEC-18
Carbon tetrachloride			109.1		%		70-130	14-DEC-18
Chlorobenzene			108.1		%		70-130	14-DEC-18
Chloroform			108.1		%		70-130	14-DEC-18
cis-1,2-Dichloroethylene			102.6		%		70-130	14-DEC-18
cis-1,3-Dichloropropene			105.0		%		70-130	14-DEC-18
Dibromochloromethane			101.0		%		70-130	14-DEC-18
Dichlorodifluoromethane			138.8		%		50-140	14-DEC-18
Ethylbenzene			103.4		%		70-130	14-DEC-18
n-Hexane			108.3		%		70-130	14-DEC-18
m+p-Xylenes			101.8		%		70-130	14-DEC-18
Methyl Ethyl Ketone			109.9		%		60-140	14-DEC-18
Methyl Isobutyl Ketone			100.4		%		60-140	14-DEC-18
Methylene Chloride			112.7		%		70-130	14-DEC-18
MTBE			111.3		%		70-130	14-DEC-18
o-Xylene			100.3		%		70-130	14-DEC-18
Styrene			106.4		%		70-130	14-DEC-18
Tetrachloroethylene			112.8		%		70-130	14-DEC-18
Toluene			104.8		%		70-130	14-DEC-18
trans-1,2-Dichloroethylene			112.1		%		70-130	14-DEC-18
trans-1,3-Dichloropropene			100.0		%		70-130	14-DEC-18
Trichloroethylene			112.6		%		70-130	14-DEC-18
Trichlorofluoromethane			114.5		%		60-140	14-DEC-18
Vinyl chloride			90.2		%		60-140	14-DEC-18
WG2951927-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4396802								
WG2951927-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	17-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
Acetone			<30		ug/L		30	17-DEC-18
Benzene			<0.50		ug/L		0.5	17-DEC-18
Bromodichloromethane			<2.0		ug/L		2	17-DEC-18
Bromoform			<5.0		ug/L		5	17-DEC-18
Bromomethane			<0.50		ug/L		0.5	17-DEC-18
Carbon tetrachloride			<0.20		ug/L		0.2	17-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	17-DEC-18
Chloroform			<1.0		ug/L		1	17-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	17-DEC-18
Dibromochloromethane			<2.0		ug/L		2	17-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	17-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	17-DEC-18
n-Hexane			<0.50		ug/L		0.5	17-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	17-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	17-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	17-DEC-18
Methylene Chloride			<5.0		ug/L		5	17-DEC-18
MTBE			<2.0		ug/L		2	17-DEC-18
o-Xylene			<0.30		ug/L		0.3	17-DEC-18
Styrene			<0.50		ug/L		0.5	17-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	17-DEC-18
Toluene			<0.50		ug/L		0.5	17-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	17-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	17-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	17-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4396802								
WG2951927-2 MB								
Surrogate: 1,4-Difluorobenzene			99.0		%		70-130	17-DEC-18
Surrogate: 4-Bromofluorobenzene			97.2		%		70-130	17-DEC-18
WG2951927-5 MS		**WG2951927-3**						
1,1,1,2-Tetrachloroethane			109.0		%		50-140	18-DEC-18
1,1,2,2-Tetrachloroethane			125.3		%		50-140	18-DEC-18
1,1,1-Trichloroethane			102.8		%		50-140	18-DEC-18
1,1,2-Trichloroethane			117.5		%		50-140	18-DEC-18
1,1-Dichloroethane			110.1		%		50-140	18-DEC-18
1,1-Dichloroethylene			99.6		%		50-140	18-DEC-18
1,2-Dibromoethane			116.9		%		50-140	18-DEC-18
1,2-Dichlorobenzene			109.2		%		50-140	18-DEC-18
1,2-Dichloroethane			118.5		%		50-140	18-DEC-18
1,2-Dichloropropane			113.1		%		50-140	18-DEC-18
1,3-Dichlorobenzene			105.7		%		50-140	18-DEC-18
1,4-Dichlorobenzene			106.1		%		50-140	18-DEC-18
Acetone			140.4	MES	%		50-140	18-DEC-18
Benzene			113.0		%		50-140	18-DEC-18
Bromodichloromethane			113.6		%		50-140	18-DEC-18
Bromoform			119.8		%		50-140	18-DEC-18
Bromomethane			89.6		%		50-140	18-DEC-18
Carbon tetrachloride			100.6		%		50-140	18-DEC-18
Chlorobenzene			107.7		%		50-140	18-DEC-18
Chloroform			109.9		%		50-140	18-DEC-18
cis-1,2-Dichloroethylene			105.6		%		50-140	18-DEC-18
cis-1,3-Dichloropropene			111.2		%		50-140	18-DEC-18
Dibromochloromethane			110.4		%		50-140	18-DEC-18
Dichlorodifluoromethane			100.1		%		50-140	18-DEC-18
Ethylbenzene			95.3		%		50-140	18-DEC-18
n-Hexane			92.6		%		50-140	18-DEC-18
m+p-Xylenes			93.8		%		50-140	18-DEC-18
Methyl Ethyl Ketone			136.4		%		50-140	18-DEC-18
Methyl Isobutyl Ketone			132.0		%		50-140	18-DEC-18
Methylene Chloride			119.3		%		50-140	18-DEC-18
MTBE			109.5		%		50-140	18-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4396802								
WG2951927-5 MS		**WG2951927-3**						
o-Xylene			95.6		%		50-140	18-DEC-18
Styrene			105.3		%		50-140	18-DEC-18
Tetrachloroethylene			101.8		%		50-140	18-DEC-18
Toluene			99.4		%		50-140	18-DEC-18
trans-1,2-Dichloroethylene			105.5		%		50-140	18-DEC-18
trans-1,3-Dichloropropene			105.4		%		50-140	18-DEC-18
Trichloroethylene			108.8		%		50-140	18-DEC-18
Trichlorofluoromethane			98.0		%		50-140	18-DEC-18
Vinyl chloride			76.9		%		50-140	18-DEC-18
Batch R4397168								
WG2951880-4 DUP		**WG2951880-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	17-DEC-18
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	17-DEC-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	17-DEC-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4397168								
WG2951880-4 DUP		**WG2951880-3**						
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	17-DEC-18
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	17-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	17-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	17-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	17-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	17-DEC-18
WG2951880-1 LCS								
1,1,1,2-Tetrachloroethane			107.2		%		70-130	17-DEC-18
1,1,2,2-Tetrachloroethane			102.1		%		70-130	17-DEC-18
1,1,1-Trichloroethane			115.5		%		70-130	17-DEC-18
1,1,2-Trichloroethane			105.3		%		70-130	17-DEC-18
1,1-Dichloroethane			113.4		%		70-130	17-DEC-18
1,1-Dichloroethylene			111.3		%		70-130	17-DEC-18
1,2-Dibromoethane			107.1		%		70-130	17-DEC-18
1,2-Dichlorobenzene			109.5		%		70-130	17-DEC-18
1,2-Dichloroethane			115.1		%		70-130	17-DEC-18
1,2-Dichloropropane			104.4		%		70-130	17-DEC-18
1,3-Dichlorobenzene			110.7		%		70-130	17-DEC-18
1,4-Dichlorobenzene			111.8		%		70-130	17-DEC-18
Acetone			107.6		%		60-140	17-DEC-18
Benzene			111.8		%		70-130	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4397168								
WG2951880-1 LCS								
Bromodichloromethane			112.2		%		70-130	17-DEC-18
Bromoform			99.8		%		70-130	17-DEC-18
Bromomethane			99.6		%		60-140	17-DEC-18
Carbon tetrachloride			116.8		%		70-130	17-DEC-18
Chlorobenzene			109.3		%		70-130	17-DEC-18
Chloroform			111.8		%		70-130	17-DEC-18
cis-1,2-Dichloroethylene			109.3		%		70-130	17-DEC-18
cis-1,3-Dichloropropene			112.7		%		70-130	17-DEC-18
Dibromochloromethane			107.9		%		70-130	17-DEC-18
Dichlorodifluoromethane			126.9		%		50-140	17-DEC-18
Ethylbenzene			103.8		%		70-130	17-DEC-18
n-Hexane			99.4		%		70-130	17-DEC-18
m+p-Xylenes			107.7		%		70-130	17-DEC-18
Methyl Ethyl Ketone			111.0		%		60-140	17-DEC-18
Methyl Isobutyl Ketone			97.9		%		60-140	17-DEC-18
Methylene Chloride			110.8		%		70-130	17-DEC-18
MTBE			111.5		%		70-130	17-DEC-18
o-Xylene			101.7		%		70-130	17-DEC-18
Styrene			105.7		%		70-130	17-DEC-18
Tetrachloroethylene			113.0		%		70-130	17-DEC-18
Toluene			105.7		%		70-130	17-DEC-18
trans-1,2-Dichloroethylene			112.7		%		70-130	17-DEC-18
trans-1,3-Dichloropropene			110.4		%		70-130	17-DEC-18
Trichloroethylene			113.5		%		70-130	17-DEC-18
Trichlorofluoromethane			129.6		%		60-140	17-DEC-18
Vinyl chloride			88.6		%		60-140	17-DEC-18
WG2951880-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4397168								
WG2951880-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	17-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	17-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	17-DEC-18
Acetone			<30		ug/L		30	17-DEC-18
Benzene			<0.50		ug/L		0.5	17-DEC-18
Bromodichloromethane			<2.0		ug/L		2	17-DEC-18
Bromoform			<5.0		ug/L		5	17-DEC-18
Bromomethane			<0.50		ug/L		0.5	17-DEC-18
Carbon tetrachloride			<0.20		ug/L		0.2	17-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	17-DEC-18
Chloroform			<1.0		ug/L		1	17-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	17-DEC-18
Dibromochloromethane			<2.0		ug/L		2	17-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	17-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	17-DEC-18
n-Hexane			<0.50		ug/L		0.5	17-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	17-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	17-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	17-DEC-18
Methylene Chloride			<5.0		ug/L		5	17-DEC-18
MTBE			<2.0		ug/L		2	17-DEC-18
o-Xylene			<0.30		ug/L		0.3	17-DEC-18
Styrene			<0.50		ug/L		0.5	17-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	17-DEC-18
Toluene			<0.50		ug/L		0.5	17-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	17-DEC-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	17-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	17-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	17-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4397168								
WG2951880-2 MB								
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	17-DEC-18
Surrogate: 4-Bromofluorobenzene			93.2		%		70-130	17-DEC-18
WG2951880-5 MS		**WG2951880-3**						
1,1,1,2-Tetrachloroethane			106.0		%		50-140	17-DEC-18
1,1,2,2-Tetrachloroethane			94.5		%		50-140	17-DEC-18
1,1,1-Trichloroethane			115.9		%		50-140	17-DEC-18
1,1,2-Trichloroethane			102.6		%		50-140	17-DEC-18
1,1-Dichloroethane			113.6		%		50-140	17-DEC-18
1,1-Dichloroethylene			110.8		%		50-140	17-DEC-18
1,2-Dibromoethane			103.0		%		50-140	17-DEC-18
1,2-Dichlorobenzene			109.7		%		50-140	17-DEC-18
1,2-Dichloroethane			112.9		%		50-140	17-DEC-18
1,2-Dichloropropane			103.4		%		50-140	17-DEC-18
1,3-Dichlorobenzene			114.5		%		50-140	17-DEC-18
1,4-Dichlorobenzene			115.7		%		50-140	17-DEC-18
Acetone			113.0		%		50-140	17-DEC-18
Benzene			111.5		%		50-140	17-DEC-18
Bromodichloromethane			110.6		%		50-140	17-DEC-18
Bromoform			94.5		%		50-140	17-DEC-18
Bromomethane			97.4		%		50-140	17-DEC-18
Carbon tetrachloride			116.2		%		50-140	17-DEC-18
Chlorobenzene			109.0		%		50-140	17-DEC-18
Chloroform			111.5		%		50-140	17-DEC-18
cis-1,2-Dichloroethylene			109.0		%		50-140	17-DEC-18
cis-1,3-Dichloropropene			114.4		%		50-140	17-DEC-18
Dibromochloromethane			104.5		%		50-140	17-DEC-18
Dichlorodifluoromethane			118.6		%		50-140	17-DEC-18
Ethylbenzene			103.6		%		50-140	17-DEC-18
n-Hexane			97.4		%		50-140	17-DEC-18
m+p-Xylenes			109.1		%		50-140	17-DEC-18
Methyl Ethyl Ketone			102.2		%		50-140	17-DEC-18
Methyl Isobutyl Ketone			91.4		%		50-140	17-DEC-18
Methylene Chloride			110.8		%		50-140	17-DEC-18
MTBE			109.7		%		50-140	17-DEC-18

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4397168								
WG2951880-5 MS		**WG2951880-3**						
o-Xylene			101.4		%		50-140	17-DEC-18
Styrene			104.0		%		50-140	17-DEC-18
Tetrachloroethylene			115.1		%		50-140	17-DEC-18
Toluene			105.1		%		50-140	17-DEC-18
trans-1,2-Dichloroethylene			114.0		%		50-140	17-DEC-18
trans-1,3-Dichloropropene			107.2		%		50-140	17-DEC-18
Trichloroethylene			114.4		%		50-140	17-DEC-18
Trichlorofluoromethane			128.1		%		50-140	17-DEC-18
Vinyl chloride			87.3		%		50-140	17-DEC-18

Quality Control Report

Workorder: L2209758 Report Date: 20-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

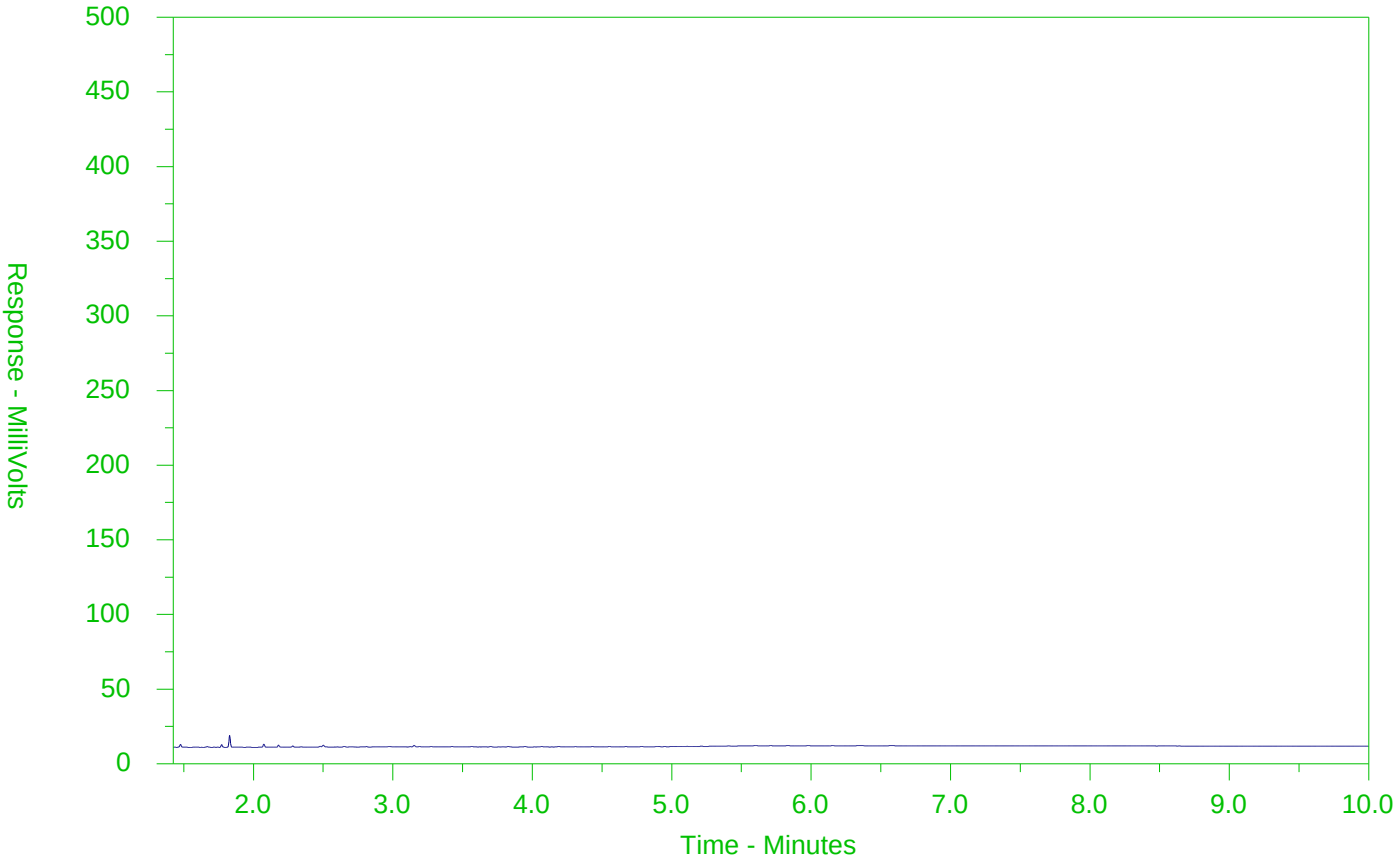
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2209758-7
Client Sample ID: MW18-135D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

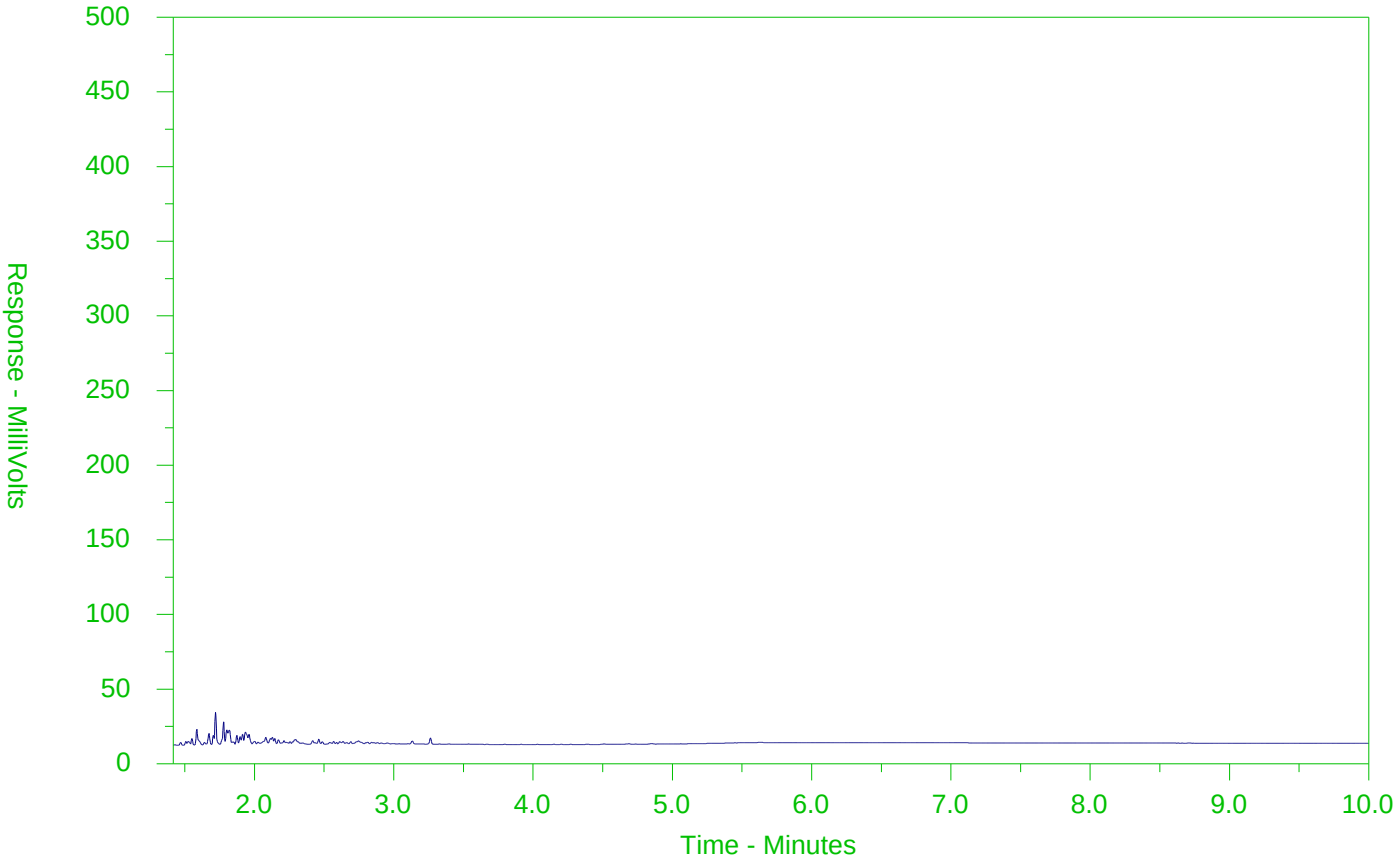
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2209758-12
Client Sample ID: MW18-135S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

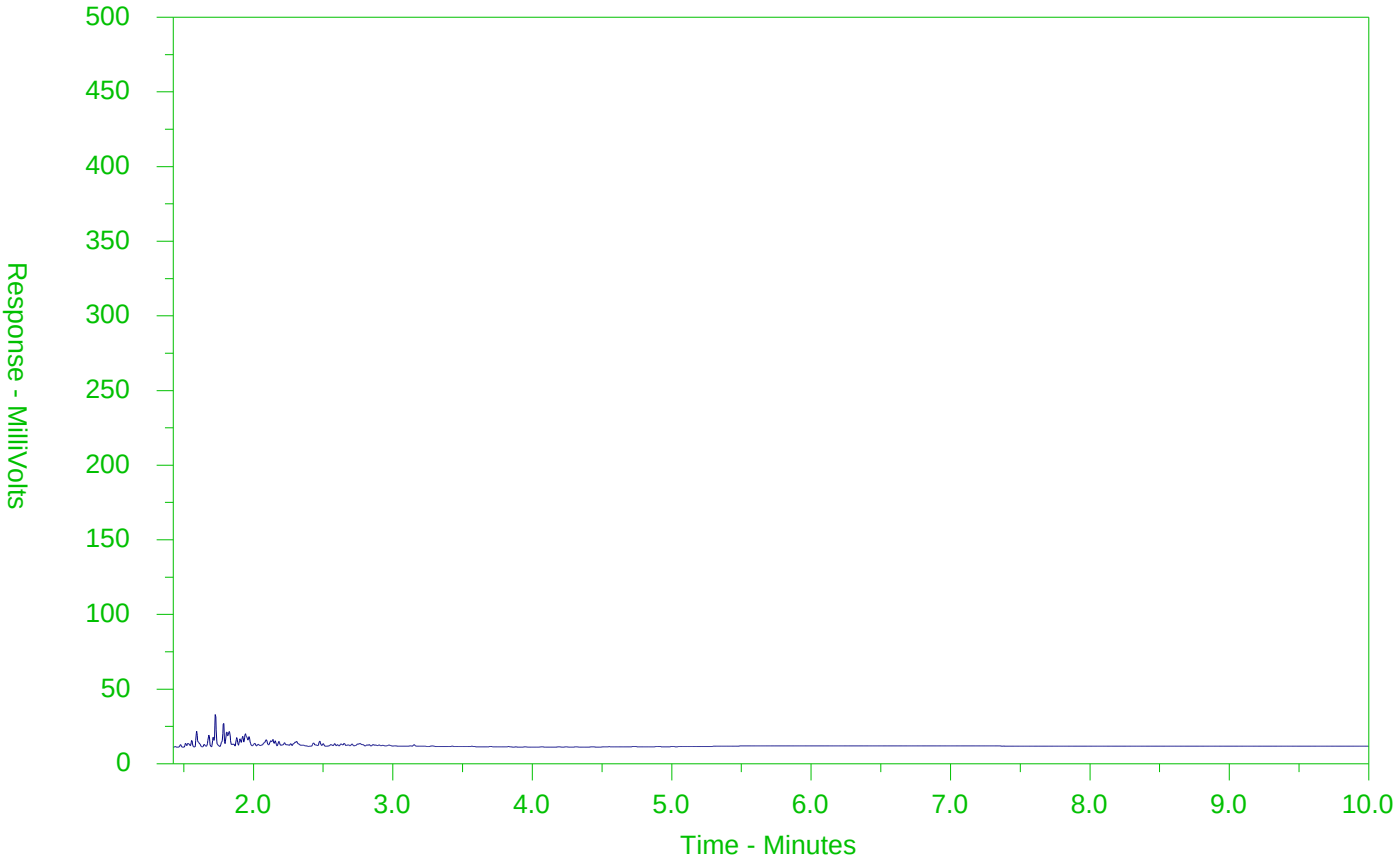
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2209758-14
Client Sample ID: DUP1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2209758-COFC

COC Number: 17 - 12122018

Page 2 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M HILL	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report ☑ YES ☐ NO	PRIORITY (Business days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:		☑ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E1 - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)) ☐
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria Street S. Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, Ontario	Email 2: ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3	Analysis Request
Invoice To	Same as Report To ☐ YES ☑ NO	**Invoice Distribution**	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	CH2M HILL	Email 1 or Fax	
Contact:	Account Payables	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#
Job #:	694757	Major/Minor Code	Routing Code
PO / AFE:		Requisitioner	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2209758-COFC	ALS Contact:	Sampler: V Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O. Reg 153/04 Hydride Forming Metals	O. Reg 153/04 Metals Only	PAHs	PHCs	VOCs	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
12	MW18-134S	12-12-18	11:15	water					X			2
13	MW18-134D	12-12-18	10:45	water					X			2
14	DUP1	12-11-18	—	water		X	X	X	X			13
15	DUP2	12-12-18	—	water								2
16	TRIP BLANK	—	—	water								

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
		4.1°C	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 12/12/2018	Time: 4:30 pm	Received by:	Date:	Time:	Received by:	Date: 12/Dec/2018	Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIF.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2209758-COFC

COC Number 17 - 12122018

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M HILL	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report ☑ YES ☐ NO	Priority (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — Emergency: 1 Business day [E1 - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) ☐
Phone		☑ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs:
Street:	72 Victoria Street S, Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, Ontario	Email 2: ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To ☐ YES ☑ NO	Invoice Distribution	
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	
Company:	CH2M HILL	Email 1 or Fax:	
Contact:	Account Payables	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q82156	AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2209758	ALS Contact:	Sampler: V Peters

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	O. Reg. 153/04 Hydride Forming Metals	O. Reg. 153/04 Metals Only	PAHs	PHCs	VOCs	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
					F		P	P	P			
1	MW18-112D	12-10-18	9:40	water					X			2
2	MW18-114D	12-10-18	12:35	water	X							1
3	MW18-113D	12-10-18	13:54	water	X							1
4	MW18-122G	12-10-18	16:10	water					X			2
5	MW18-119D	12-10-18	17:25	water					X			2
6	MW18-113D	12-11-18	8:40	water					X			2
7	MW18-135D	12-11-18	10:30	water			X	X	X			8
8	MW18-114D	12-11-18	13:10	water					X			2
9	MW18-136D	12-11-18	15:00	water					X			2
10	MW18-136G	12-11-18	14:35	water					X			2
11	MW18-105G	12-11-18	16:05	water					X			2
12	MW18-135S	12-11-18	17:15	water		X	X	X	X			13

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations: Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact: Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				4.1°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 12/12/2018	Time: 4:50 pm	Received by:	Date:	Time:	Received by:	Date: 12/Dec/2018	Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIF

CH2M HILL CANADA LIMITED
ATTN: AMY CASEY
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 17-DEC-18
Report Date: 20-DEC-18 13:53 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2211509

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-625974
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2211509-1 MW18-113D Sampled By: CLIENT on 17-DEC-18 @ 15:00 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					18-DEC-18	R4398911
Antimony (Sb)-Dissolved	0.00042		0.00010	mg/L	18-DEC-18	18-DEC-18	R4399948
Arsenic (As)-Dissolved	0.0171		0.00010	mg/L	18-DEC-18	18-DEC-18	R4399948
Selenium (Se)-Dissolved	0.000115		0.000050	mg/L	18-DEC-18	18-DEC-18	R4399948

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-625974

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2211509 Report Date: 20-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4399948								
WG2955942-4 DUP		**WG2955942-3**						
Antimony (Sb)-Dissolved		0.00022	0.00021		mg/L	1.1	20	18-DEC-18
Arsenic (As)-Dissolved		0.00025	0.00026		mg/L	2.3	20	18-DEC-18
Selenium (Se)-Dissolved		<0.000050	0.000065	RPD-NA	mg/L	N/A	20	18-DEC-18
WG2955942-2 LCS								
Antimony (Sb)-Dissolved			100.9		%		80-120	18-DEC-18
Arsenic (As)-Dissolved			100.9		%		80-120	18-DEC-18
Selenium (Se)-Dissolved			97.8		%		80-120	18-DEC-18
WG2955942-1 MB								
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-DEC-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-DEC-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-DEC-18
WG2955942-5 MS		**WG2955942-6**						
Antimony (Sb)-Dissolved			103.0		%		70-130	18-DEC-18
Arsenic (As)-Dissolved			104.5		%		70-130	18-DEC-18
Selenium (Se)-Dissolved			108.6		%		70-130	18-DEC-18

Quality Control Report

Workorder: L2211509 Report Date: 20-DEC-18

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: AMY CASEY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2211509-COFC

COC Number: 17 - 625974

Page of

Report To — Contact and company name below will appear on the final report

Company: Jacobs
Contact: Amy Casey
Phone: 519 803 2283
Company address below will appear on the final report
Street: 72 Victoria St
City/Province: Kitchener, ON
Postal Code:
Invoice To: Same as Report To [X] YES [ ] NO
Copy of Invoice with Report [ ] YES [ ] NO
Company:
Contact:

Report Format

Select Report Format: [ ] PDF [X] EXCEL [ ] EDD (DIGITAL)
Quality Control (QC) Report with Report [ ] YES [ ] NO
[ ] Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: [ ] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax: amy.casey@jacobs.com
Email 2: Jennifer
Email 3: Katherine.Appleby@jacobs.com

Invoice Distribution

Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX
Email 1 or Fax:
Email 2:

Project Information

ALS Account # / Quote #:
Job #: 694757
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2211509
ALS Contact: Sampler:

Turnaround Time (TAT) Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] [ ] Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days): [ ] 4 day [P4-20%] [ ] 3 day [P3-25%] [ ] 2 day [P2-50%]

Emergency: [ ] 1 Business day [E-100%] [ ] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)

Date and Time Required for all E&P TATs: EDD Dec 21, 2018

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

0.8cg 153 Hydride (Dissolved As, Se) (Field Filtered)

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW113D	17-12-18	15:00	W	X		1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? [ ] YES [X] NO
Are samples for human consumption/use? [ ] YES [ ] NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]
Ice Packs [ ] Ice Cubes [X] Custody seal intact Yes [ ] No [ ]
Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			6.8		

SHIPMENT RELEASE (client use)

Released by: A. Casey Date: 12/17/18 Time:

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Dec 17/2018 Time: 5:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit results on an Authorized DW COC form.

CH2M HILL Canada Ltd.
ATTN: MICHAEL SHIRY
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3

Date Received: 21-DEC-18
Report Date: 28-DEC-18 11:47 (MT)
Version: FINAL

Client Phone: 416-499-0090

Certificate of Analysis

Lab Work Order #: L2213740

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-641726
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2213740-1 TRIP BLANK Sampled By: AC on 21-DEC-18 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		24-DEC-18	R4413254
Benzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Bromodichloromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
Bromoform	<5.0		5.0	ug/L		24-DEC-18	R4413254
Bromomethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Carbon tetrachloride	<0.20		0.20	ug/L		24-DEC-18	R4413254
Chlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Dibromochloromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
Chloroform	<1.0		1.0	ug/L		24-DEC-18	R4413254
1,2-Dibromoethane	<0.20		0.20	ug/L		24-DEC-18	R4413254
1,2-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,3-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,4-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Dichlorodifluoromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
1,1-Dichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,2-Dichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1-Dichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Methylene Chloride	<5.0		5.0	ug/L		24-DEC-18	R4413254
1,2-Dichloropropane	<0.50		0.50	ug/L		24-DEC-18	R4413254
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		24-DEC-18	R4413254
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		24-DEC-18	R4413254
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		24-DEC-18	
Ethylbenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
n-Hexane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Methyl Ethyl Ketone	<20		20	ug/L		24-DEC-18	R4413254
Methyl Isobutyl Ketone	<20		20	ug/L		24-DEC-18	R4413254
MTBE	<2.0		2.0	ug/L		24-DEC-18	R4413254
Styrene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Tetrachloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Toluene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,1-Trichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,2-Trichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Trichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Trichlorofluoromethane	<5.0		5.0	ug/L		24-DEC-18	R4413254
Vinyl chloride	<0.50		0.50	ug/L		24-DEC-18	R4413254
o-Xylene	<0.30		0.30	ug/L		24-DEC-18	R4413254
m+p-Xylenes	<0.40		0.40	ug/L		24-DEC-18	R4413254

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2213740-1 TRIP BLANK Sampled By: AC on 21-DEC-18 Matrix: WATER							
Volatile Organic Compounds							
Xylenes (Total)	<0.50		0.50	ug/L		24-DEC-18	
Surrogate: 4-Bromofluorobenzene	104.2		70-130	%		24-DEC-18	R4413254
Surrogate: 1,4-Difluorobenzene	95.3		70-130	%		24-DEC-18	R4413254
L2213740-2 MW17-102D Sampled By: AC on 21-DEC-18 @ 09:05 Matrix: WATER							
Volatile Organic Compounds							
Benzene	1.44		0.50	ug/L		24-DEC-18	R4413187
Ethylbenzene	<0.50		0.50	ug/L		24-DEC-18	R4413187
Toluene	<0.50		0.50	ug/L		24-DEC-18	R4413187
o-Xylene	<0.30		0.30	ug/L		24-DEC-18	R4413187
m+p-Xylenes	<0.40		0.40	ug/L		24-DEC-18	R4413187
Xylenes (Total)	<0.50		0.50	ug/L		24-DEC-18	
Surrogate: 4-Bromofluorobenzene	103.8		70-130	%		24-DEC-18	R4413187
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%		24-DEC-18	R4413187
L2213740-3 MW18-113D Sampled By: AC on 21-DEC-18 @ 11:00 Matrix: WATER							
Volatile Organic Compounds							
Acetone	<30		30	ug/L		24-DEC-18	R4413254
Benzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Bromodichloromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
Bromoform	<5.0		5.0	ug/L		24-DEC-18	R4413254
Bromomethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Carbon tetrachloride	<0.20		0.20	ug/L		24-DEC-18	R4413254
Chlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Dibromochloromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
Chloroform	<1.0		1.0	ug/L		24-DEC-18	R4413254
1,2-Dibromoethane	<0.20		0.20	ug/L		24-DEC-18	R4413254
1,2-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,3-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,4-Dichlorobenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Dichlorodifluoromethane	<2.0		2.0	ug/L		24-DEC-18	R4413254
1,1-Dichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,2-Dichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1-Dichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
cis-1,2-Dichloroethylene	1.75		0.50	ug/L		24-DEC-18	R4413254
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Methylene Chloride	<5.0		5.0	ug/L		24-DEC-18	R4413254
1,2-Dichloropropane	<0.50		0.50	ug/L		24-DEC-18	R4413254
cis-1,3-Dichloropropene	<0.30		0.30	ug/L		24-DEC-18	R4413254
trans-1,3-Dichloropropene	<0.30		0.30	ug/L		24-DEC-18	R4413254

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2213740-3 MW18-113D Sampled By: AC on 21-DEC-18 @ 11:00 Matrix: WATER							
Volatile Organic Compounds							
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L		24-DEC-18	
Ethylbenzene	<0.50		0.50	ug/L		24-DEC-18	R4413254
n-Hexane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Methyl Ethyl Ketone	<20		20	ug/L		24-DEC-18	R4413254
Methyl Isobutyl Ketone	<20		20	ug/L		24-DEC-18	R4413254
MTBE	<2.0		2.0	ug/L		24-DEC-18	R4413254
Styrene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Tetrachloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Toluene	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,1-Trichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
1,1,2-Trichloroethane	<0.50		0.50	ug/L		24-DEC-18	R4413254
Trichloroethylene	<0.50		0.50	ug/L		24-DEC-18	R4413254
Trichlorofluoromethane	<5.0		5.0	ug/L		24-DEC-18	R4413254
Vinyl chloride	<0.50		0.50	ug/L		24-DEC-18	R4413254
o-Xylene	<0.30		0.30	ug/L		24-DEC-18	R4413254
m+p-Xylenes	<0.40		0.40	ug/L		24-DEC-18	R4413254
Xylenes (Total)	<0.50		0.50	ug/L		24-DEC-18	
Surrogate: 4-Bromofluorobenzene	102.9		70-130	%		24-DEC-18	R4413254
Surrogate: 1,4-Difluorobenzene	95.6		70-130	%		24-DEC-18	R4413254
L2213740-4 MW18-114D Sampled By: AC on 21-DEC-18 @ 10:20 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					24-DEC-18	R4412393
Antimony (Sb)-Dissolved	1.54		0.10	ug/L	24-DEC-18	24-DEC-18	R4414508
Arsenic (As)-Dissolved	24.8		0.10	ug/L	24-DEC-18	24-DEC-18	R4414508
Barium (Ba)-Dissolved	48.0		0.10	ug/L	24-DEC-18	24-DEC-18	R4414508
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	24-DEC-18	24-DEC-18	R4414508
Boron (B)-Dissolved	89		10	ug/L	24-DEC-18	24-DEC-18	R4414508
Cadmium (Cd)-Dissolved	<0.010		0.010	ug/L	24-DEC-18	24-DEC-18	R4414508
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	24-DEC-18	24-DEC-18	R4414508
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	24-DEC-18	24-DEC-18	R4414508
Copper (Cu)-Dissolved	<0.20		0.20	ug/L	24-DEC-18	24-DEC-18	R4414508
Lead (Pb)-Dissolved	0.343		0.050	ug/L	24-DEC-18	24-DEC-18	R4414508
Molybdenum (Mo)-Dissolved	43.1		0.050	ug/L	24-DEC-18	24-DEC-18	R4414508
Nickel (Ni)-Dissolved	2.70		0.50	ug/L	24-DEC-18	24-DEC-18	R4414508
Selenium (Se)-Dissolved	0.177		0.050	ug/L	24-DEC-18	24-DEC-18	R4414508
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	24-DEC-18	24-DEC-18	R4414508
Thallium (Tl)-Dissolved	<0.010		0.010	ug/L	24-DEC-18	24-DEC-18	R4414508
Uranium (U)-Dissolved	5.35		0.010	ug/L	24-DEC-18	24-DEC-18	R4414508

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2213740-4 MW18-114D Sampled By: AC on 21-DEC-18 @ 10:20 Matrix: WATER							
Dissolved Metals							
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	24-DEC-18	24-DEC-18	R4414508
Zinc (Zn)-Dissolved	13.6		1.0	ug/L	24-DEC-18	24-DEC-18	R4414508

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2213740-4
Matrix Spike	Boron (B)-Dissolved	MS-B	L2213740-4
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2213740-4

Sample Parameter Qualifier key listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)
BTX is determined by analyzing by headspace-GC/MS.			
MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8
The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260
Liquid samples are analyzed by headspace GC/MSD.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).			
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
Total xylenes represents the sum of o-xylene and m&p-xylene.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-641726

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX-511-HS-WT	**Water**							
Batch R4413187								
WG2959685-4 DUP		**WG2959685-3**						
Benzene		1.44	1.42		ug/L	1.4	30	24-DEC-18
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	24-DEC-18
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-DEC-18
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
WG2959685-1 LCS								
Benzene			103.0		%		70-130	24-DEC-18
Ethylbenzene			101.8		%		70-130	24-DEC-18
m+p-Xylenes			101.1		%		70-130	24-DEC-18
o-Xylene			100.3		%		70-130	24-DEC-18
Toluene			102.8		%		70-130	24-DEC-18
WG2959685-2 MB								
Benzene			<0.50		ug/L		0.5	24-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	24-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	24-DEC-18
o-Xylene			<0.30		ug/L		0.3	24-DEC-18
Toluene			<0.50		ug/L		0.5	24-DEC-18
Surrogate: 1,4-Difluorobenzene			101.3		%		70-130	24-DEC-18
Surrogate: 4-Bromofluorobenzene			101.7		%		70-130	24-DEC-18
WG2959685-5 MS		**WG2959685-3**						
Benzene			102.6		%		50-140	24-DEC-18
Ethylbenzene			101.1		%		50-140	24-DEC-18
m+p-Xylenes			100.5		%		50-140	24-DEC-18
o-Xylene			99.8		%		50-140	24-DEC-18
Toluene			102.7		%		50-140	24-DEC-18
MET-D-UG/L-MS-WT	**Water**							
Batch R4414508								
WG2960087-4 DUP		**WG2960087-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	24-DEC-18
Arsenic (As)-Dissolved		0.61	0.61		ug/L	0.7	20	24-DEC-18
Barium (Ba)-Dissolved		61.4	60.6		ug/L	1.3	20	24-DEC-18
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	24-DEC-18
Boron (B)-Dissolved		68	68		ug/L	1.2	20	24-DEC-18
Cadmium (Cd)-Dissolved		0.126	0.130		ug/L	3.2	20	24-DEC-18

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4414508								
WG2960087-4 DUP		**WG2960087-3**						
Chromium (Cr)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	24-DEC-18
Cobalt (Co)-Dissolved		2.41	2.40		ug/L	0.7	20	24-DEC-18
Copper (Cu)-Dissolved		1.33	1.38		ug/L	4.2	20	24-DEC-18
Lead (Pb)-Dissolved		0.053	0.051		ug/L	3.1	20	24-DEC-18
Molybdenum (Mo)-Dissolved		3.42	3.35		ug/L	2.1	20	24-DEC-18
Nickel (Ni)-Dissolved		11.1	11.0		ug/L	1.3	20	24-DEC-18
Selenium (Se)-Dissolved		0.075	0.092	J	ug/L	0.017	0.1	24-DEC-18
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	24-DEC-18
Thallium (Tl)-Dissolved		0.039	0.036		ug/L	8.2	20	24-DEC-18
Uranium (U)-Dissolved		1.31	1.25		ug/L	4.8	20	24-DEC-18
Vanadium (V)-Dissolved		0.72	0.73		ug/L	1.4	20	24-DEC-18
Zinc (Zn)-Dissolved		4.8	5.1		ug/L	5.3	20	24-DEC-18
WG2960087-2 LCS								
Antimony (Sb)-Dissolved			96.8		%		80-120	24-DEC-18
Arsenic (As)-Dissolved			98.7		%		80-120	24-DEC-18
Barium (Ba)-Dissolved			97.7		%		80-120	24-DEC-18
Beryllium (Be)-Dissolved			99.6		%		80-120	24-DEC-18
Boron (B)-Dissolved			103.6		%		80-120	24-DEC-18
Cadmium (Cd)-Dissolved			100.2		%		80-120	24-DEC-18
Chromium (Cr)-Dissolved			98.9		%		80-120	24-DEC-18
Cobalt (Co)-Dissolved			96.3		%		80-120	24-DEC-18
Copper (Cu)-Dissolved			98.1		%		80-120	24-DEC-18
Lead (Pb)-Dissolved			101.7		%		80-120	24-DEC-18
Molybdenum (Mo)-Dissolved			105.5		%		80-120	24-DEC-18
Nickel (Ni)-Dissolved			97.3		%		80-120	24-DEC-18
Selenium (Se)-Dissolved			103.3		%		80-120	24-DEC-18
Silver (Ag)-Dissolved			103.3		%		80-120	24-DEC-18
Thallium (Tl)-Dissolved			97.9		%		80-120	24-DEC-18
Uranium (U)-Dissolved			101.5		%		80-120	24-DEC-18
Vanadium (V)-Dissolved			99.1		%		80-120	24-DEC-18
Zinc (Zn)-Dissolved			98.9		%		80-120	24-DEC-18
WG2960087-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	24-DEC-18
Arsenic (As)-Dissolved			<0.10				0.1	

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4414508								
WG2960087-1 MB								
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	24-DEC-18
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	24-DEC-18
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	24-DEC-18
Boron (B)-Dissolved			<10		ug/L		10	24-DEC-18
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	24-DEC-18
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	24-DEC-18
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	24-DEC-18
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	24-DEC-18
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	24-DEC-18
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	24-DEC-18
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	24-DEC-18
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	24-DEC-18
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	24-DEC-18
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	24-DEC-18
Uranium (U)-Dissolved			<0.010		ug/L		0.01	24-DEC-18
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	24-DEC-18
Zinc (Zn)-Dissolved			<1.0		ug/L		1	24-DEC-18
WG2960087-5 MS		**WG2960087-6**						
Antimony (Sb)-Dissolved			88.2		%		70-130	24-DEC-18
Arsenic (As)-Dissolved			92.2		%		70-130	24-DEC-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	24-DEC-18
Beryllium (Be)-Dissolved			93.9		%		70-130	24-DEC-18
Boron (B)-Dissolved			N/A	MS-B	%		-	24-DEC-18
Cadmium (Cd)-Dissolved			86.9		%		70-130	24-DEC-18
Chromium (Cr)-Dissolved			80.2		%		70-130	24-DEC-18
Lead (Pb)-Dissolved			90.8		%		70-130	24-DEC-18
Molybdenum (Mo)-Dissolved			81.2		%		70-130	24-DEC-18
Selenium (Se)-Dissolved			95.4		%		70-130	24-DEC-18
Silver (Ag)-Dissolved			88.1		%		70-130	24-DEC-18
Thallium (Tl)-Dissolved			93.6		%		70-130	24-DEC-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	24-DEC-18
Vanadium (V)-Dissolved			84.8		%		70-130	24-DEC-18
VOC-511-HS-WT	**Water**							

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4413254								
WG2955028-34 DUP		**WG2955028-33**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	24-DEC-18
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Acetone		41	38		ug/L	6.9	30	24-DEC-18
Benzene		1.71	1.57		ug/L	8.5	30	24-DEC-18
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-DEC-18
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-DEC-18
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	24-DEC-18
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	24-DEC-18
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-DEC-18
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-DEC-18
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-DEC-18
Ethylbenzene		2.53	2.30		ug/L	9.5	30	24-DEC-18
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
m+p-Xylenes		23.2	21.3		ug/L	8.6	30	24-DEC-18
Methyl Ethyl Ketone		78	68		ug/L	13	30	24-DEC-18
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	24-DEC-18
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-DEC-18
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	24-DEC-18
o-Xylene		44.4	40.8		ug/L	8.5	30	24-DEC-18
Styrene		<0.50	<0.50		ug/L			24-DEC-18

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4413254								
WG2955028-34 DUP		**WG2955028-33**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Toluene		1.14	1.01		ug/L	12	30	24-DEC-18
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	24-DEC-18
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	24-DEC-18
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	24-DEC-18
WG2955028-31 LCS								
1,1,1,2-Tetrachloroethane			105.8		%		70-130	24-DEC-18
1,1,2,2-Tetrachloroethane			104.4		%		70-130	24-DEC-18
1,1,1-Trichloroethane			107.4		%		70-130	24-DEC-18
1,1,2-Trichloroethane			98.0		%		70-130	24-DEC-18
1,1-Dichloroethane			106.6		%		70-130	24-DEC-18
1,1-Dichloroethylene			108.2		%		70-130	24-DEC-18
1,2-Dibromoethane			95.3		%		70-130	24-DEC-18
1,2-Dichlorobenzene			107.4		%		70-130	24-DEC-18
1,2-Dichloroethane			98.2		%		70-130	24-DEC-18
1,2-Dichloropropane			99.5		%		70-130	24-DEC-18
1,3-Dichlorobenzene			113.3		%		70-130	24-DEC-18
1,4-Dichlorobenzene			112.6		%		70-130	24-DEC-18
Acetone			88.8		%		60-140	24-DEC-18
Benzene			107.2		%		70-130	24-DEC-18
Bromodichloromethane			100.6		%		70-130	24-DEC-18
Bromoform			97.7		%		70-130	24-DEC-18
Bromomethane			132.6		%		60-140	24-DEC-18
Carbon tetrachloride			107.3		%		70-130	24-DEC-18
Chlorobenzene			106.2		%		70-130	24-DEC-18
Chloroform			102.9		%		70-130	24-DEC-18
cis-1,2-Dichloroethylene			103.7		%		70-130	24-DEC-18
cis-1,3-Dichloropropene			100.9		%		70-130	24-DEC-18
Dibromochloromethane			94.8		%		70-130	24-DEC-18
Dichlorodifluoromethane			96.8		%		50-140	24-DEC-18

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4413254								
WG2955028-31 LCS								
Ethylbenzene			109.6		%		70-130	24-DEC-18
n-Hexane			109.7		%		70-130	24-DEC-18
m+p-Xylenes			108.8		%		70-130	24-DEC-18
Methyl Ethyl Ketone			85.8		%		60-140	24-DEC-18
Methyl Isobutyl Ketone			79.1		%		60-140	24-DEC-18
Methylene Chloride			101.4		%		70-130	24-DEC-18
MTBE			108.8		%		70-130	24-DEC-18
o-Xylene			104.8		%		70-130	24-DEC-18
Styrene			106.4		%		70-130	24-DEC-18
Tetrachloroethylene			117.8		%		70-130	24-DEC-18
Toluene			109.1		%		70-130	24-DEC-18
trans-1,2-Dichloroethylene			110.1		%		70-130	24-DEC-18
trans-1,3-Dichloropropene			98.0		%		70-130	24-DEC-18
Trichloroethylene			112.7		%		70-130	24-DEC-18
Trichlorofluoromethane			118.6		%		60-140	24-DEC-18
Vinyl chloride			90.2		%		60-140	24-DEC-18
WG2955028-32 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	24-DEC-18
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	24-DEC-18
1,1,1-Trichloroethane			<0.50		ug/L		0.5	24-DEC-18
1,1,2-Trichloroethane			<0.50		ug/L		0.5	24-DEC-18
1,1-Dichloroethane			<0.50		ug/L		0.5	24-DEC-18
1,1-Dichloroethylene			<0.50		ug/L		0.5	24-DEC-18
1,2-Dibromoethane			<0.20		ug/L		0.2	24-DEC-18
1,2-Dichlorobenzene			<0.50		ug/L		0.5	24-DEC-18
1,2-Dichloroethane			<0.50		ug/L		0.5	24-DEC-18
1,2-Dichloropropane			<0.50		ug/L		0.5	24-DEC-18
1,3-Dichlorobenzene			<0.50		ug/L		0.5	24-DEC-18
1,4-Dichlorobenzene			<0.50		ug/L		0.5	24-DEC-18
Acetone			<30		ug/L		30	24-DEC-18
Benzene			<0.50		ug/L		0.5	24-DEC-18
Bromodichloromethane			<2.0		ug/L		2	24-DEC-18
Bromoform			<5.0		ug/L		5	24-DEC-18
Bromomethane			<0.50		ug/L		0.5	24-DEC-18

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4413254								
WG2955028-32 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	24-DEC-18
Chlorobenzene			<0.50		ug/L		0.5	24-DEC-18
Chloroform			<1.0		ug/L		1	24-DEC-18
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	24-DEC-18
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	24-DEC-18
Dibromochloromethane			<2.0		ug/L		2	24-DEC-18
Dichlorodifluoromethane			<2.0		ug/L		2	24-DEC-18
Ethylbenzene			<0.50		ug/L		0.5	24-DEC-18
n-Hexane			<0.50		ug/L		0.5	24-DEC-18
m+p-Xylenes			<0.40		ug/L		0.4	24-DEC-18
Methyl Ethyl Ketone			<20		ug/L		20	24-DEC-18
Methyl Isobutyl Ketone			<20		ug/L		20	24-DEC-18
Methylene Chloride			<5.0		ug/L		5	24-DEC-18
MTBE			<2.0		ug/L		2	24-DEC-18
o-Xylene			<0.30		ug/L		0.3	24-DEC-18
Styrene			<0.50		ug/L		0.5	24-DEC-18
Tetrachloroethylene			<0.50		ug/L		0.5	24-DEC-18
Toluene			<0.50		ug/L		0.5	24-DEC-18
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	24-DEC-18
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	24-DEC-18
Trichloroethylene			<0.50		ug/L		0.5	24-DEC-18
Trichlorofluoromethane			<5.0		ug/L		5	24-DEC-18
Vinyl chloride			<0.50		ug/L		0.5	24-DEC-18
Surrogate: 1,4-Difluorobenzene			96.2		%		70-130	24-DEC-18
Surrogate: 4-Bromofluorobenzene			104.5		%		70-130	24-DEC-18
WG2955028-35 MS		**WG2955028-33**						
1,1,1,2-Tetrachloroethane			106.0		%		50-140	24-DEC-18
1,1,2,2-Tetrachloroethane			106.9		%		50-140	24-DEC-18
1,1,1-Trichloroethane			106.7		%		50-140	24-DEC-18
1,1,2-Trichloroethane			98.3		%		50-140	24-DEC-18
1,1-Dichloroethane			106.3		%		50-140	24-DEC-18
1,1-Dichloroethylene			104.4		%		50-140	24-DEC-18
1,2-Dibromoethane			94.0		%		50-140	24-DEC-18
1,2-Dichlorobenzene			107.6		%		50-140	24-DEC-18

Quality Control Report

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R4413254								
WG2955028-35 MS		**WG2955028-33**						
1,2-Dichloroethane			99.3		%		50-140	24-DEC-18
1,2-Dichloropropane			100.8		%		50-140	24-DEC-18
1,3-Dichlorobenzene			112.8		%		50-140	24-DEC-18
1,4-Dichlorobenzene			111.3		%		50-140	24-DEC-18
Acetone			82.7		%		50-140	24-DEC-18
Benzene			107.1		%		50-140	24-DEC-18
Bromodichloromethane			100.3		%		50-140	24-DEC-18
Bromoform			97.0		%		50-140	24-DEC-18
Bromomethane			128.3		%		50-140	24-DEC-18
Carbon tetrachloride			106.2		%		50-140	24-DEC-18
Chlorobenzene			105.8		%		50-140	24-DEC-18
Chloroform			103.4		%		50-140	24-DEC-18
cis-1,2-Dichloroethylene			103.9		%		50-140	24-DEC-18
cis-1,3-Dichloropropene			98.2		%		50-140	24-DEC-18
Dibromochloromethane			93.6		%		50-140	24-DEC-18
Dichlorodifluoromethane			88.2		%		50-140	24-DEC-18
Ethylbenzene			108.7		%		50-140	24-DEC-18
n-Hexane			103.3		%		50-140	24-DEC-18
m+p-Xylenes			107.6		%		50-140	24-DEC-18
Methyl Ethyl Ketone			62.1		%		50-140	24-DEC-18
Methyl Isobutyl Ketone			77.3		%		50-140	24-DEC-18
Methylene Chloride			100.6		%		50-140	24-DEC-18
MTBE			108.6		%		50-140	24-DEC-18
o-Xylene			104.3		%		50-140	24-DEC-18
Styrene			105.4		%		50-140	24-DEC-18
Tetrachloroethylene			115.0		%		50-140	24-DEC-18
Toluene			108.4		%		50-140	24-DEC-18
trans-1,2-Dichloroethylene			107.4		%		50-140	24-DEC-18
trans-1,3-Dichloropropene			98.0		%		50-140	24-DEC-18
Trichloroethylene			111.3		%		50-140	24-DEC-18
Trichlorofluoromethane			113.9		%		50-140	24-DEC-18
Vinyl chloride			85.7		%		50-140	24-DEC-18

Quality Control Report

Workorder: L2213740 Report Date: 28-DEC-18

Client: CH2M HILL Canada Ltd.
245 CONSUMERS ROAD, SUITE 400
TORONTO ON M2J 1R3
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

• Canada Toll Free: 1 800 668 9878

L2213740-COFC

COC Number: 17 - 641726

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	CH2M HILL	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular (R) Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	~~Accounts Payable~~ Michael Shiry	Quality Control (QC) Report with Report YES NO	Priority (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:	416-449-0090	Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	
Street:	245 Consumers Rd.	Email 1 or Fax: Michael.Shiry@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Toronto / ON	Email 2: Ed.Tuves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	M2J 1R3	Email 3:	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	CH2M HILL	Email 1 or Fax: Accounts Payable	
Contact:	Account Payable	Email 2:	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #		AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2213740 | ALS Contact: Kathy | Sampler: A. Canali

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Metal hydrides only	VOC	BTEX	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	Trip Blank	—	—	Water		X				2
	MW17-1020	21-12-18	09:05			X	X			2
	MW18-1130	21-12-18	11:48			X				2
	MW18-1140	21-12-18	10:20	↓	X					1

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? NO	
Are samples for human consumption/ use? NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☒ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.3				7.3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Andrew Canali	Date: 2018-12-21	Time:	Received by:	Date: Dec 21/18	Time: 1119	Received by: SB	Date: 12/21/18	Time: 17:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: ED TAVES
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 27-MAR-19
Report Date: 01-APR-19 14:38 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2250326

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH.01.04.02.05
C of C Numbers: 17-623248, 17-728869
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-1 OW25 Sampled By: J. GOWING on 27-MAR-19 @ 09:45 Matrix: WATER							
Hydrocarbons							
F2 (C10-C16)	<100		100	ug/L	29-MAR-19	29-MAR-19	R4588031
F2-Naphth	<100		100	ug/L		01-APR-19	
F3 (C16-C34)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
F3-PAH	<250		250	ug/L		01-APR-19	
F4 (C34-C50)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
Chrom. to baseline at nC50	YES				29-MAR-19	29-MAR-19	R4588031
Surrogate: 2-Bromobenzotrifluoride	92.1		60-140	%	29-MAR-19	29-MAR-19	R4588031
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Acenaphthylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(a)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(a)pyrene	<0.010		0.010	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(b)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(k)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Chrysene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluorene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		01-APR-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
2-Methylnaphthalene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Naphthalene	<0.050		0.050	ug/L	29-MAR-19	01-APR-19	R4587095
Phenanthrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Acenaphthene	113.7		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d12-Chrysene	114.7		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d8-Naphthalene	116.0		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Phenanthrene	114.4		60-140	%	29-MAR-19	01-APR-19	R4587095
Semi-Volatile Organics							
Benzo(a)pyrene-lab filtered	<0.010		0.010	ug/L	28-MAR-19	01-APR-19	R4586913
Surrogate: d12-Chrysene	108.2		60-140	%	28-MAR-19	01-APR-19	R4586913
L2250326-2 OW07-32 Sampled By: J. GOWING on 27-MAR-19 @ 10:55 Matrix: WATER							
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1248	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1254	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1260	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-2 OW07-32 Sampled By: J. GOWING on 27-MAR-19 @ 10:55 Matrix: WATER							
Polychlorinated Biphenyls							
Total PCBs	<0.040		0.040	ug/L	29-MAR-19	29-MAR-19	R4588077
Surrogate: 2-fluorobiphenyl	78.5		50-150	%	29-MAR-19	29-MAR-19	R4588077
L2250326-3 OW07-37 Sampled By: J. GOWING on 27-MAR-19 @ 11:55 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					29-MAR-19	R4586725
Antimony (Sb)-Dissolved	0.42		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Arsenic (As)-Dissolved	0.24		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Barium (Ba)-Dissolved	27.4		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Boron (B)-Dissolved	46		10	ug/L	29-MAR-19	01-APR-19	R4587922
Cadmium (Cd)-Dissolved	0.842		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Copper (Cu)-Dissolved	9.99		0.20	ug/L	29-MAR-19	01-APR-19	R4587922
Lead (Pb)-Dissolved	0.899		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Molybdenum (Mo)-Dissolved	2.85		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Nickel (Ni)-Dissolved	4.86		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Selenium (Se)-Dissolved	3.73		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Sodium (Na)-Dissolved	104000	DLHC	500	ug/L	29-MAR-19	29-MAR-19	R4587922
Thallium (Tl)-Dissolved	0.083		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Uranium (U)-Dissolved	5.35		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Zinc (Zn)-Dissolved	744		1.0	ug/L	29-MAR-19	01-APR-19	R4587922
L2250326-4 MW18-114D Sampled By: J. GOWING on 27-MAR-19 @ 13:40 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					29-MAR-19	R4586725
Antimony (Sb)-Dissolved	0.12		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Arsenic (As)-Dissolved	9.11		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Selenium (Se)-Dissolved	0.254		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
L2250326-5 OW03-1 Sampled By: J. GOWING on 27-MAR-19 @ 14:55 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Acenaphthylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(a)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-5 OW03-1 Sampled By: J. GOWING on 27-MAR-19 @ 14:55 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	<0.010		0.010	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(b)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(k)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Chrysene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluorene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
1+2-Methylnaphthalenes	0.032		0.028	ug/L		01-APR-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
2-Methylnaphthalene	0.032		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Naphthalene	0.066		0.050	ug/L	29-MAR-19	01-APR-19	R4587095
Phenanthrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Acenaphthene	90.3		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d12-Chrysene	95.1		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d8-Naphthalene	92.1		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Phenanthrene	91.9		60-140	%	29-MAR-19	01-APR-19	R4587095
Semi-Volatile Organics							
Benzo(a)pyrene-lab filtered	<0.010		0.010	ug/L	28-MAR-19	01-APR-19	R4586913
Surrogate: d12-Chrysene	100.0		60-140	%	28-MAR-19	01-APR-19	R4586913
L2250326-6 OW23D Sampled By: J. GOWING on 27-MAR-19 @ 15:55 Matrix: WATER							
Hydrocarbons							
F2 (C10-C16)	<100		100	ug/L	29-MAR-19	29-MAR-19	R4588031
F3 (C16-C34)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
F4 (C34-C50)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
Chrom. to baseline at nC50	YES				29-MAR-19	29-MAR-19	R4588031
Surrogate: 2-Bromobenzotrifluoride	98.9		60-140	%	29-MAR-19	29-MAR-19	R4588031
L2250326-7 OW24D Sampled By: J. GOWING on 27-MAR-19 @ 17:05 Matrix: WATER							
Hydrocarbons							
F1 (C6-C10)	258		25	ug/L		29-MAR-19	R4586976
Surrogate: 3,4-Dichlorotoluene	101.3		60-140	%		29-MAR-19	R4586976
L2250326-8 GW-DUP1 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Hydrocarbons							
F2 (C10-C16)	<100		100	ug/L	29-MAR-19	29-MAR-19	R4588031
F2-Naphth	<100		100	ug/L		01-APR-19	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-8 GW-DUP1 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Hydrocarbons							
F3 (C16-C34)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
F3-PAH	<250		250	ug/L		01-APR-19	
F4 (C34-C50)	<250		250	ug/L	29-MAR-19	29-MAR-19	R4588031
Chrom. to baseline at nC50	YES				29-MAR-19	29-MAR-19	R4588031
Surrogate: 2-Bromobenzotrifluoride	88.3		60-140	%	29-MAR-19	29-MAR-19	R4588031
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Acenaphthylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(a)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(a)pyrene	<0.010		0.010	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(b)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Benzo(k)fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Chrysene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluoranthene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Fluorene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		01-APR-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
2-Methylnaphthalene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Naphthalene	<0.050		0.050	ug/L	29-MAR-19	01-APR-19	R4587095
Phenanthrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Pyrene	<0.020		0.020	ug/L	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Acenaphthene	107.0		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d12-Chrysene	107.7		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d8-Naphthalene	108.4		60-140	%	29-MAR-19	01-APR-19	R4587095
Surrogate: d10-Phenanthrene	105.6		60-140	%	29-MAR-19	01-APR-19	R4587095
Semi-Volatile Organics							
Benzo(a)pyrene-lab filtered	<0.010		0.010	ug/L	28-MAR-19	01-APR-19	R4586913
Surrogate: d12-Chrysene	106.9		60-140	%	28-MAR-19	01-APR-19	R4586913
L2250326-9 GW-DUP2 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1248	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1254	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Aroclor 1260	<0.020		0.020	ug/L	29-MAR-19	29-MAR-19	R4588077
Total PCBs	<0.040		0.040	ug/L	29-MAR-19	29-MAR-19	R4588077
Surrogate: 2-fluorobiphenyl	75.7		50-150	%	29-MAR-19	29-MAR-19	R4588077

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-9 GW-DUP2 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Polychlorinated Biphenyls							
L2250326-10 GW-DUP3 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					29-MAR-19	R4586725
Antimony (Sb)-Dissolved	0.42		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Arsenic (As)-Dissolved	0.21		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Barium (Ba)-Dissolved	27.1		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Beryllium (Be)-Dissolved	<0.10		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Boron (B)-Dissolved	46		10	ug/L	29-MAR-19	01-APR-19	R4587922
Cadmium (Cd)-Dissolved	0.849		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Chromium (Cr)-Dissolved	<0.50		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Cobalt (Co)-Dissolved	<0.10		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Copper (Cu)-Dissolved	9.96		0.20	ug/L	29-MAR-19	01-APR-19	R4587922
Lead (Pb)-Dissolved	0.890		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Molybdenum (Mo)-Dissolved	2.84		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Nickel (Ni)-Dissolved	4.78		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Selenium (Se)-Dissolved	3.87		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Silver (Ag)-Dissolved	<0.050		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
Sodium (Na)-Dissolved	106000	DLHC	500	ug/L	29-MAR-19	29-MAR-19	R4587922
Thallium (Tl)-Dissolved	0.086		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Uranium (U)-Dissolved	5.34		0.010	ug/L	29-MAR-19	01-APR-19	R4587922
Vanadium (V)-Dissolved	<0.50		0.50	ug/L	29-MAR-19	01-APR-19	R4587922
Zinc (Zn)-Dissolved	747		1.0	ug/L	29-MAR-19	01-APR-19	R4587922
L2250326-11 GW-DUP4 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					29-MAR-19	R4586725
Antimony (Sb)-Dissolved	0.10		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Arsenic (As)-Dissolved	8.96		0.10	ug/L	29-MAR-19	01-APR-19	R4587922
Selenium (Se)-Dissolved	0.264		0.050	ug/L	29-MAR-19	01-APR-19	R4587922
L2250326-12 GW-DUP5 Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Hydrocarbons							
F1 (C6-C10)	254		25	ug/L		29-MAR-19	R4586976
Surrogate: 3,4-Dichlorotoluene	103.3		60-140	%		29-MAR-19	R4586976
L2250326-13 TRIP BLANK Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Hydrocarbons							
F1 (C6-C10)	<25		25	ug/L		29-MAR-19	R4586976

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2250326-13 TRIP BLANK Sampled By: J. GOWING on 27-MAR-19 Matrix: WATER							
Hydrocarbons							
Surrogate: 3,4-Dichlorotoluene	106.6		60-140	%		29-MAR-19	R4586976

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2250326-10, -3
Matrix Spike	Boron (B)-Dissolved	MS-B	L2250326-10, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2250326-10, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2250326-10, -3

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
BAP-LABFILTER-511-WT	Water	B(a)P-lab filtered-153/04 (July 2011)	SW846 8270 (511)

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-UG/L-MS-WT	Water	Diss. Metals in Water by ICPMS (ug/L)	EPA 200.8

The metal constituents of a non-acidified sample that pass through a membrane filter prior to ICP/MS analysis.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270

PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG

Reference Information

must be reported).

PCB-511-WT Water PCB-O. Reg 153/04 (July 2011) SW846 3510/8082
Aqueous samples are extracted, then concentrated, reconstituted, and analyzed by GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-623248 17-728869

GLOSSARY OF REPORT TERMS
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2250326 Report Date: 01-APR-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BAP-LABFILTER-511-WT	**Water**							
Batch R4586913								
WG3016407-2 LCS								
Benzo(a)pyrene-lab filtered			98.6		%		50-140	29-MAR-19
WG3016407-1 MB								
Benzo(a)pyrene-lab filtered			<0.010		ug/L		0.01	29-MAR-19
Surrogate: d12-Chrysene			104.8		%		60-140	29-MAR-19
F1-HS-511-WT	**Water**							
Batch R4586976								
WG3011921-1 LCS								
F1 (C6-C10)			97.3		%		80-120	29-MAR-19
WG3011921-2 MB								
F1 (C6-C10)			<25		ug/L		25	29-MAR-19
Surrogate: 3,4-Dichlorotoluene			102.1		%		60-140	29-MAR-19
WG3011921-5 MS		**WG3011921-3**						
F1 (C6-C10)			80.9		%		60-140	01-APR-19
F2-F4-511-WT	**Water**							
Batch R4588031								
WG3016865-2 LCS								
F2 (C10-C16)			93.6		%		70-130	29-MAR-19
F3 (C16-C34)			93.9		%		70-130	29-MAR-19
F4 (C34-C50)			99.2		%		70-130	29-MAR-19
WG3016865-1 MB								
F2 (C10-C16)			<100		ug/L		100	29-MAR-19
F3 (C16-C34)			<250		ug/L		250	29-MAR-19
F4 (C34-C50)			<250		ug/L		250	29-MAR-19
Surrogate: 2-Bromobenzotrifluoride			81.8		%		60-140	29-MAR-19
MET-D-UG/L-MS-WT	**Water**							
Batch R4587922								
WG3016815-4 DUP		**WG3016815-3**						
Antimony (Sb)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	01-APR-19
Arsenic (As)-Dissolved		0.42	0.41		ug/L	2.0	20	01-APR-19
Barium (Ba)-Dissolved		49.5	46.8		ug/L	5.6	20	01-APR-19
Beryllium (Be)-Dissolved		<0.10	<0.10	RPD-NA	ug/L	N/A	20	01-APR-19
Boron (B)-Dissolved		132	137		ug/L	3.8	20	01-APR-19
Cadmium (Cd)-Dissolved		0.205	0.201		ug/L	2.0	20	01-APR-19
Chromium (Cr)-Dissolved		1.17	1.13		ug/L	3.3	20	01-APR-19
Cobalt (Co)-Dissolved		1.08	1.07		ug/L			01-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4587922								
WG3016815-4 DUP		**WG3016815-3**						
Cobalt (Co)-Dissolved		1.08	1.07		ug/L	0.2	20	01-APR-19
Copper (Cu)-Dissolved		0.55	0.57		ug/L	2.7	20	01-APR-19
Lead (Pb)-Dissolved		0.057	0.056		ug/L	2.1	20	01-APR-19
Molybdenum (Mo)-Dissolved		0.424	0.445		ug/L	4.9	20	01-APR-19
Nickel (Ni)-Dissolved		2.28	2.22		ug/L	2.5	20	01-APR-19
Selenium (Se)-Dissolved		0.095	0.081		ug/L	16	20	01-APR-19
Silver (Ag)-Dissolved		<0.050	<0.050	RPD-NA	ug/L	N/A	20	01-APR-19
Sodium (Na)-Dissolved		38000	37400		ug/L	1.6	20	01-APR-19
Thallium (Tl)-Dissolved		0.021	0.019		ug/L	7.5	20	01-APR-19
Uranium (U)-Dissolved		0.529	0.531		ug/L	0.4	20	01-APR-19
Vanadium (V)-Dissolved		<0.50	<0.50	RPD-NA	ug/L	N/A	20	01-APR-19
Zinc (Zn)-Dissolved		1.8	1.9		ug/L	4.3	20	01-APR-19
WG3016815-2 LCS								
Antimony (Sb)-Dissolved			100.7		%		80-120	29-MAR-19
Arsenic (As)-Dissolved			99.2		%		80-120	29-MAR-19
Barium (Ba)-Dissolved			101.3		%		80-120	29-MAR-19
Beryllium (Be)-Dissolved			96.9		%		80-120	29-MAR-19
Boron (B)-Dissolved			95.5		%		80-120	29-MAR-19
Cadmium (Cd)-Dissolved			99.5		%		80-120	29-MAR-19
Chromium (Cr)-Dissolved			99.9		%		80-120	29-MAR-19
Cobalt (Co)-Dissolved			98.6		%		80-120	29-MAR-19
Copper (Cu)-Dissolved			98.4		%		80-120	29-MAR-19
Lead (Pb)-Dissolved			99.7		%		80-120	29-MAR-19
Molybdenum (Mo)-Dissolved			103.3		%		80-120	29-MAR-19
Nickel (Ni)-Dissolved			99.99		%		80-120	29-MAR-19
Selenium (Se)-Dissolved			99.6		%		80-120	29-MAR-19
Silver (Ag)-Dissolved			96.3		%		80-120	29-MAR-19
Sodium (Na)-Dissolved			104.9		%		80-120	29-MAR-19
Thallium (Tl)-Dissolved			102.5		%		80-120	29-MAR-19
Uranium (U)-Dissolved			98.2		%		80-120	29-MAR-19
Vanadium (V)-Dissolved			102.0		%		80-120	29-MAR-19
Zinc (Zn)-Dissolved			98.9		%		80-120	29-MAR-19
WG3016815-1 MB								
Antimony (Sb)-Dissolved			<0.10				0.1	

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4587922								
WG3016815-1 MB								
Antimony (Sb)-Dissolved			<0.10		ug/L		0.1	29-MAR-19
Arsenic (As)-Dissolved			<0.10		ug/L		0.1	29-MAR-19
Barium (Ba)-Dissolved			<0.10		ug/L		0.1	29-MAR-19
Beryllium (Be)-Dissolved			<0.10		ug/L		0.1	29-MAR-19
Boron (B)-Dissolved			<10		ug/L		10	29-MAR-19
Cadmium (Cd)-Dissolved			<0.0050		ug/L		0.005	29-MAR-19
Chromium (Cr)-Dissolved			<0.50		ug/L		0.5	29-MAR-19
Cobalt (Co)-Dissolved			<0.10		ug/L		0.1	29-MAR-19
Copper (Cu)-Dissolved			<0.20		ug/L		0.2	29-MAR-19
Lead (Pb)-Dissolved			<0.050		ug/L		0.05	29-MAR-19
Molybdenum (Mo)-Dissolved			<0.050		ug/L		0.05	29-MAR-19
Nickel (Ni)-Dissolved			<0.50		ug/L		0.5	29-MAR-19
Selenium (Se)-Dissolved			<0.050		ug/L		0.05	29-MAR-19
Silver (Ag)-Dissolved			<0.050		ug/L		0.05	29-MAR-19
Sodium (Na)-Dissolved			<50		ug/L		50	29-MAR-19
Thallium (Tl)-Dissolved			<0.010		ug/L		0.01	29-MAR-19
Uranium (U)-Dissolved			<0.010		ug/L		0.01	29-MAR-19
Vanadium (V)-Dissolved			<0.50		ug/L		0.5	29-MAR-19
Zinc (Zn)-Dissolved			<1.0		ug/L		1	29-MAR-19
WG3016815-5 MS		**WG3016815-6**						
Antimony (Sb)-Dissolved			95.2		%		70-130	01-APR-19
Arsenic (As)-Dissolved			106.9		%		70-130	01-APR-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	01-APR-19
Beryllium (Be)-Dissolved			97.5		%		70-130	01-APR-19
Boron (B)-Dissolved			N/A	MS-B	%		-	01-APR-19
Cadmium (Cd)-Dissolved			98.9		%		70-130	01-APR-19
Chromium (Cr)-Dissolved			97.0		%		70-130	01-APR-19
Cobalt (Co)-Dissolved			96.2		%		70-130	01-APR-19
Copper (Cu)-Dissolved			96.3		%		70-130	01-APR-19
Lead (Pb)-Dissolved			96.3		%		70-130	01-APR-19
Molybdenum (Mo)-Dissolved			103.7		%		70-130	01-APR-19
Nickel (Ni)-Dissolved			94.8		%		70-130	01-APR-19
Selenium (Se)-Dissolved			120.1		%		70-130	01-APR-19
Silver (Ag)-Dissolved			94.3		%		70-130	01-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-UG/L-MS-WT	**Water**							
Batch R4587922								
WG3016815-5 MS		**WG3016815-6**						
Sodium (Na)-Dissolved			N/A	MS-B	%		-	01-APR-19
Thallium (Tl)-Dissolved			97.8		%		70-130	01-APR-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	01-APR-19
Vanadium (V)-Dissolved			101.7		%		70-130	01-APR-19
Zinc (Zn)-Dissolved			98.0		%		70-130	01-APR-19
PAH-511-WT	**Water**							
Batch R4587095								
WG3016865-2 LCS								
1-Methylnaphthalene			92.6		%		50-140	29-MAR-19
2-Methylnaphthalene			90.9		%		50-140	29-MAR-19
Acenaphthene			106.1		%		50-140	29-MAR-19
Acenaphthylene			100.2		%		50-140	29-MAR-19
Anthracene			88.1		%		50-140	29-MAR-19
Benzo(a)anthracene			114.0		%		50-140	29-MAR-19
Benzo(a)pyrene			100.2		%		50-140	29-MAR-19
Benzo(b)fluoranthene			101.8		%		50-140	29-MAR-19
Benzo(g,h,i)perylene			111.5		%		50-140	29-MAR-19
Benzo(k)fluoranthene			115.8		%		50-140	29-MAR-19
Chrysene			120.3		%		50-140	29-MAR-19
Dibenzo(ah)anthracene			108.8		%		50-140	29-MAR-19
Fluoranthene			106.6		%		50-140	29-MAR-19
Fluorene			99.7		%		50-140	29-MAR-19
Indeno(1,2,3-cd)pyrene			103.8		%		50-140	29-MAR-19
Naphthalene			97.8		%		50-140	29-MAR-19
Phenanthrene			106.2		%		50-140	29-MAR-19
Pyrene			107.8		%		50-140	29-MAR-19
WG3016865-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	29-MAR-19
2-Methylnaphthalene			<0.020		ug/L		0.02	29-MAR-19
Acenaphthene			<0.020		ug/L		0.02	29-MAR-19
Acenaphthylene			<0.020		ug/L		0.02	29-MAR-19
Anthracene			<0.020		ug/L		0.02	29-MAR-19
Benzo(a)anthracene			<0.020		ug/L		0.02	29-MAR-19
Benzo(a)pyrene			<0.010		ug/L		0.01	29-MAR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4587095								
WG3016865-1 MB								
Benzo(b)fluoranthene			<0.020		ug/L		0.02	29-MAR-19
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	29-MAR-19
Benzo(k)fluoranthene			<0.020		ug/L		0.02	29-MAR-19
Chrysene			<0.020		ug/L		0.02	29-MAR-19
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	29-MAR-19
Fluoranthene			<0.020		ug/L		0.02	29-MAR-19
Fluorene			<0.020		ug/L		0.02	29-MAR-19
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	29-MAR-19
Naphthalene			<0.050		ug/L		0.05	29-MAR-19
Phenanthrene			<0.020		ug/L		0.02	29-MAR-19
Pyrene			<0.020		ug/L		0.02	29-MAR-19
Surrogate: d8-Naphthalene			119.6		%		60-140	29-MAR-19
Surrogate: d10-Phenanthrene			110.0		%		60-140	29-MAR-19
Surrogate: d12-Chrysene			112.7		%		60-140	29-MAR-19
Surrogate: d10-Acenaphthene			115.8		%		60-140	29-MAR-19
PCB-511-WT	**Water**							
Batch R4588077								
WG3015907-2 LCS								
Aroclor 1242			77.3		%		60-140	29-MAR-19
Aroclor 1248			92.5		%		60-140	29-MAR-19
Aroclor 1254			76.8		%		60-140	29-MAR-19
Aroclor 1260			90.8		%		60-140	29-MAR-19
WG3015907-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	29-MAR-19
Aroclor 1248			<0.020		ug/L		0.02	29-MAR-19
Aroclor 1254			<0.020		ug/L		0.02	29-MAR-19
Aroclor 1260			<0.020		ug/L		0.02	29-MAR-19
Surrogate: 2-fluorobiphenyl			63.2		%		50-150	29-MAR-19

Quality Control Report

Workorder: L2250326 Report Date: 01-APR-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: ED TAVES

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

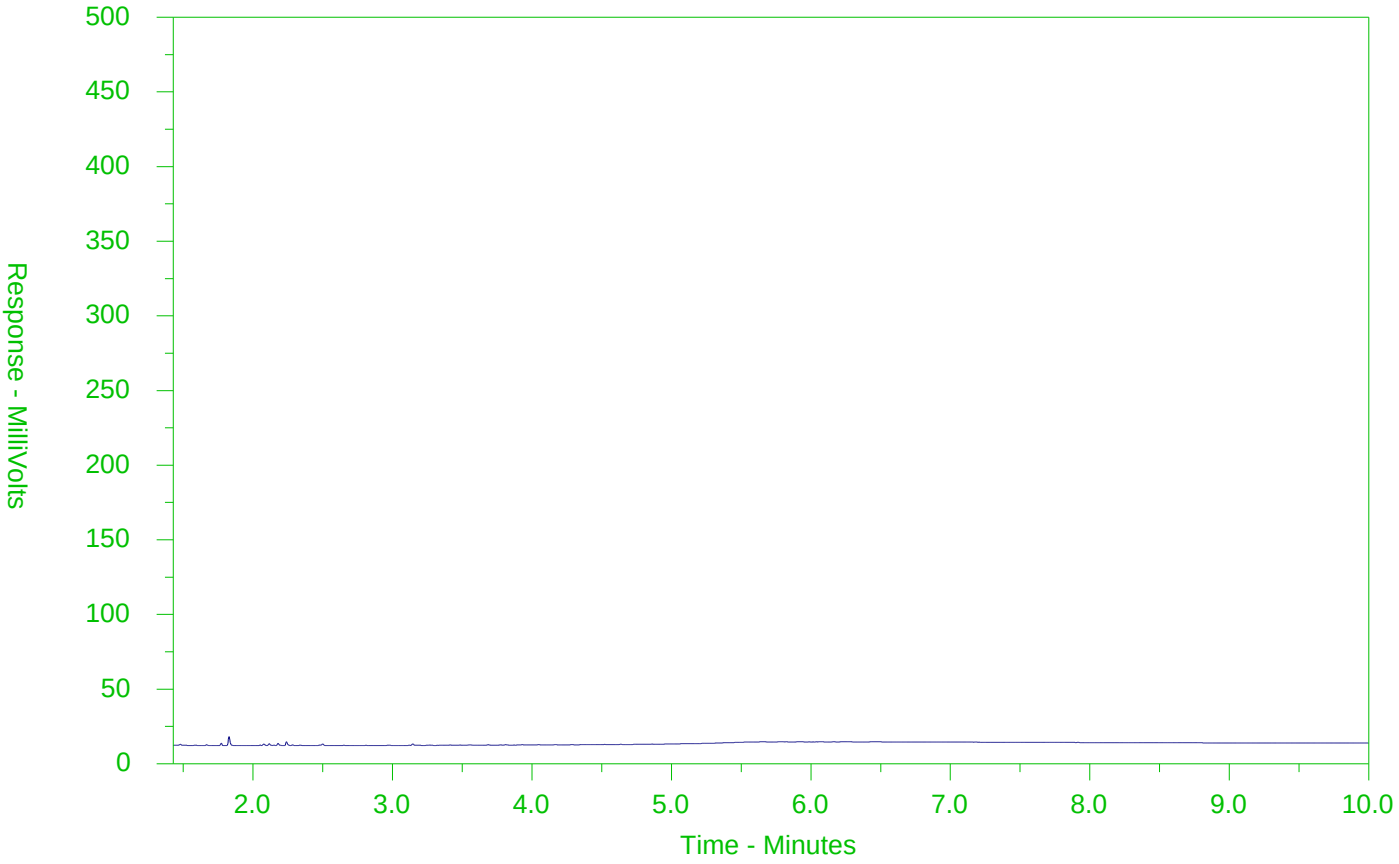
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2250326-1
Client Sample ID: OW25



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

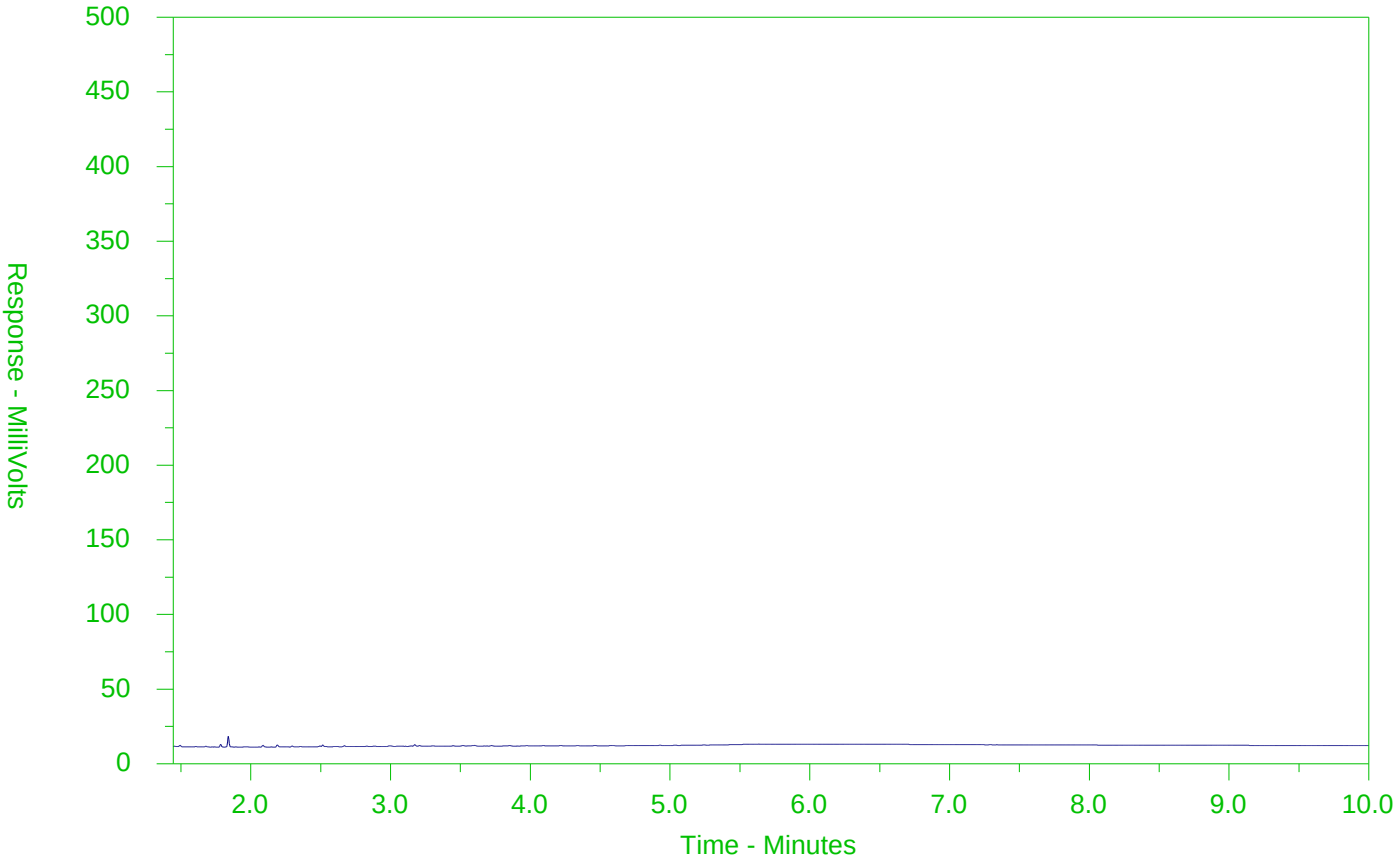
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2250326-6
Client Sample ID: OW23D



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

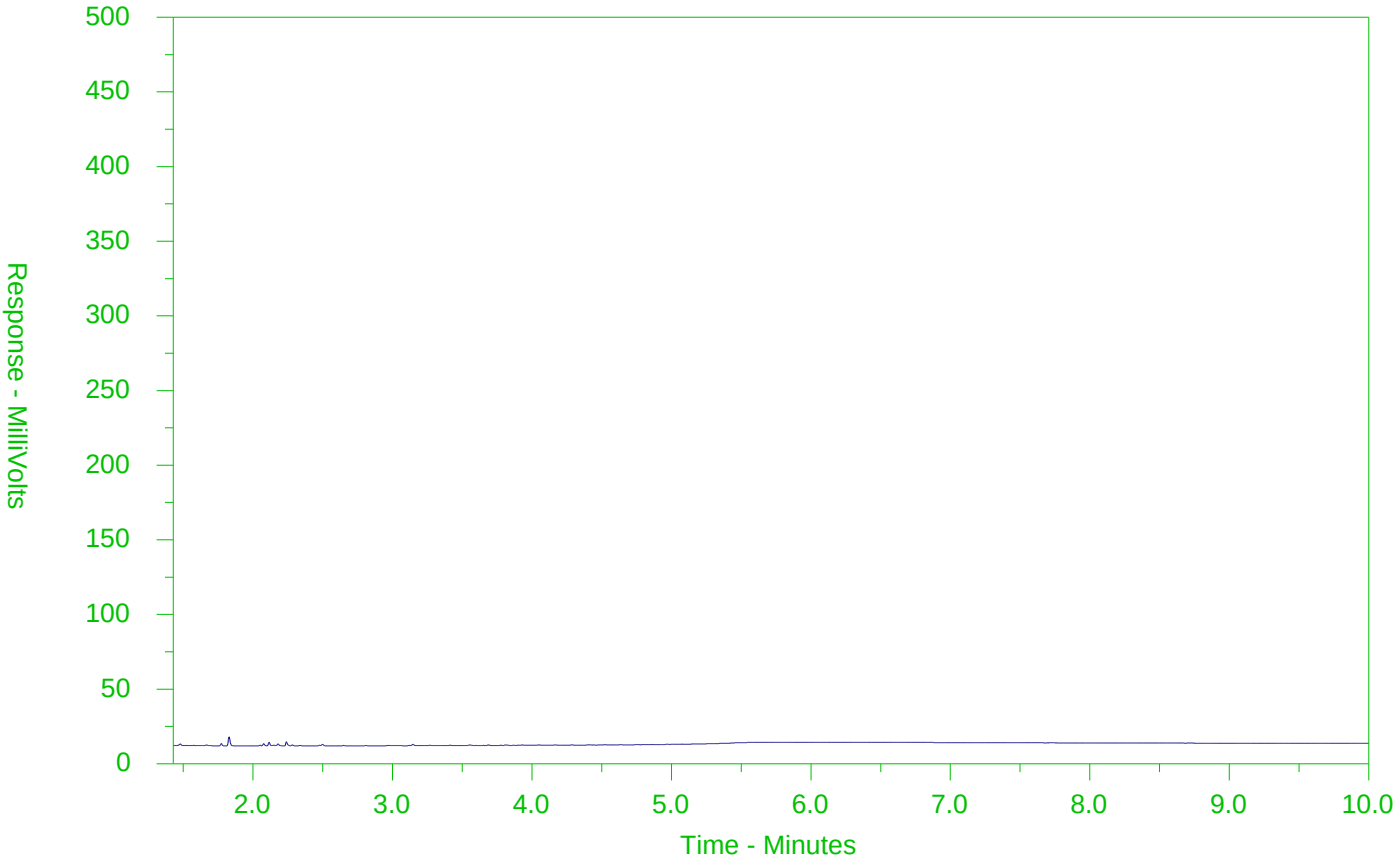
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2250326-8
Client Sample ID: GW-DUP1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2250326-COFC

COC Number: 17 - 623248

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs (CH2M HILL)	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Jon Gowing	Quality Control (QC) Report with Report: YES NO	Priority (Business Days): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
Phone:	519-497-2011	Compare Results to Criteria on Report - provide details below if box checked	Emergency: 1 Business day [E-100%]; Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St S	Email 1 or Fax: ED.TAVES@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener ON	Email 2: Catherine.Appleby@jacobs.com	
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	694757CH.01.04.02.05	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2250326	ALS Contact: MATHY	Sampler: J. Gowing

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F2-F4 (PHC)	PAH (SIM FILTER & GRAB)	PCB 14 congeners	Metals Reg (53) (dw)	Metals Reg (53) (dw) Filtered & Preserved	PHC (F1)	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	OW25	27-03-19	09:45	GW	X	X							4
	OW07-32		10:55				X						2
	OW07-37		11:55					X					1
	MW18-114D		13:40						X				1
	OW03-1		14:55			X							2
	OW23D		15:55		X	X							2
	OW24D		17:05							X			2
	GW-DUP1		—		X	X							4
	GW-DUP2		—				X						2
	GW-DUP3		—					X					1
	GW-DUP4		—						X				1
	GW-DUP5		—							X			2

Drinking Water (DW) Samples' (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Contact Catherine Appleby or ED TAVES for specific sample instructions. Quadruple.
Are samples for human consumption/use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			7.7°C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 3/27/2019	Time: 1320	Received by:	Date	Time	Received by:	Date: 27/Mar/2019	Time: 18:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of this white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2250326-COFC

COC Number: 17 - 728869
Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Requested - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	SEE PG 1	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:		Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	JACOBS	Email 1 or Fax	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2	
Postal Code:		Email 3	

Invoice To		Invoice Distribution
	Same as Report To YES NO	
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX
Company:		Email 1 or Fax
Contact:		Email 2

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q62156	AFE/Cost Center:	PO#:
Job #:	694757.01.04.02.05	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2250326	ALS Contact:	Sampler:

Analysis Request
Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

PHC F1

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type		SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	TRIP BLANK	—	—	Water	X			2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes X	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				2.7°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 3/27/19	Time: 1020	Received by:	Date:	Time:	Received by:	Date: 27/Mar/2019	Time: 18:80

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: MICHAEL SHIRY/ED TAVES
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 03-APR-19
Report Date: 10-APR-19 12:17 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2252977

Project P.O. #: NOT SUBMITTED
Job Reference: 674757
C of C Numbers: 17-630752
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2252977-1 TRIP BLANK Sampled By: M.SHIRY on 03-APR-19 Matrix: SOIL							
Physical Tests							
% Moisture	<0.10		0.10	%	03-APR-19	04-APR-19	R4590116
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Benzene	<0.0068		0.0068	ug/g	05-APR-19	08-APR-19	R4592043
Bromodichloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromoform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromomethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Carbon tetrachloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dibromochloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chloroform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dibromoethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,4-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dichlorodifluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Methylene Chloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloropropane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		08-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	05-APR-19	08-APR-19	R4592043
n-Hexane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Methyl Ethyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
MTBE	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Styrene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Tetrachloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Toluene	<0.080		0.080	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Trichloroethylene	<0.010		0.010	ug/g	05-APR-19	08-APR-19	R4592043
Trichlorofluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Vinyl chloride	<0.020		0.020	ug/g	05-APR-19	08-APR-19	R4592043

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2252977-1 TRIP BLANK Sampled By: M.SHIRY on 03-APR-19 Matrix: SOIL							
Volatile Organic Compounds							
o-Xylene	<0.020		0.020	ug/g	05-APR-19	08-APR-19	R4592043
m+p-Xylenes	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
Xylenes (Total)	<0.050		0.050	ug/g		08-APR-19	
Surrogate: 4-Bromofluorobenzene	100.9		50-140	%	05-APR-19	08-APR-19	R4592043
Surrogate: 1,4-Difluorobenzene	119.2		50-140	%	05-APR-19	08-APR-19	R4592043
L2252977-2 BH17-100I Sampled By: M.SHIRY on 03-APR-19 @ 13:10 Matrix: SOIL							
Physical Tests							
pH	7.71		0.10	pH units		04-APR-19	R4590210
L2252977-4 BH17-102I Sampled By: M.SHIRY on 03-APR-19 @ 12:20 Matrix: SOIL							
Physical Tests							
% Moisture	8.51		0.10	%	03-APR-19	04-APR-19	R4590116
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Benzene	<0.0068		0.0068	ug/g	05-APR-19	08-APR-19	R4592043
Bromodichloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromoform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromomethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Carbon tetrachloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dibromochloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chloroform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dibromoethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,4-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dichlorodifluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Methylene Chloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloropropane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		08-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	05-APR-19	08-APR-19	R4592043
n-Hexane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2252977-4 BH17-102I Sampled By: M.SHIRY on 03-APR-19 @ 12:20 Matrix: SOIL							
Volatile Organic Compounds							
Methyl Ethyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
MTBE	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Styrene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Tetrachloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Toluene	<0.080		0.080	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Trichloroethylene	0.032		0.010	ug/g	05-APR-19	08-APR-19	R4592043
Trichlorofluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Vinyl chloride	<0.020		0.020	ug/g	05-APR-19	08-APR-19	R4592043
o-Xylene	0.023		0.020	ug/g	05-APR-19	08-APR-19	R4592043
m+p-Xylenes	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
Xylenes (Total)	<0.050		0.050	ug/g		08-APR-19	
Surrogate: 4-Bromofluorobenzene	91.6		50-140	%	05-APR-19	08-APR-19	R4592043
Surrogate: 1,4-Difluorobenzene	109.7		50-140	%	05-APR-19	08-APR-19	R4592043
L2252977-5 BH17-102II Sampled By: M.SHIRY on 03-APR-19 @ 12:25 Matrix: SOIL							
Physical Tests							
% Moisture	5.98		0.10	%	03-APR-19	04-APR-19	R4590116
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Benzene	<0.0068		0.0068	ug/g	05-APR-19	08-APR-19	R4592043
Bromodichloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromoform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Bromomethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Carbon tetrachloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dibromochloromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Chloroform	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dibromoethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,4-Dichlorobenzene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Dichlorodifluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2252977-5 BH17-102II Sampled By: M.SHIRY on 03-APR-19 @ 12:25 Matrix: SOIL							
Volatile Organic Compounds							
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Methylene Chloride	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,2-Dichloropropane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		08-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	05-APR-19	08-APR-19	R4592043
n-Hexane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Methyl Ethyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	05-APR-19	08-APR-19	R4592043
MTBE	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Styrene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Tetrachloroethylene	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Toluene	<0.080		0.080	ug/g	05-APR-19	08-APR-19	R4592043
1,1,1-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
1,1,2-Trichloroethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Trichloroethylene	0.011		0.010	ug/g	05-APR-19	08-APR-19	R4592043
Trichlorofluoromethane	<0.050		0.050	ug/g	05-APR-19	08-APR-19	R4592043
Vinyl chloride	<0.020		0.020	ug/g	05-APR-19	08-APR-19	R4592043
o-Xylene	<0.020		0.020	ug/g	05-APR-19	08-APR-19	R4592043
m+p-Xylenes	<0.030		0.030	ug/g	05-APR-19	08-APR-19	R4592043
Xylenes (Total)	<0.050		0.050	ug/g		08-APR-19	
Surrogate: 4-Bromofluorobenzene	109.9		50-140	%	05-APR-19	08-APR-19	R4592043
Surrogate: 1,4-Difluorobenzene	132.3		50-140	%	05-APR-19	08-APR-19	R4592043

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-630752

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2252977 Report Date: 10-APR-19

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R4590116								
WG3020542-3 DUP		**L2252706-1**						
% Moisture		16.5	15.3		%	7.4	20	04-APR-19
WG3020542-2 LCS								
% Moisture			102.0		%		90-110	04-APR-19
WG3020542-1 MB								
% Moisture			<0.10		%		0.1	04-APR-19
PH-WT	**Soil**							
Batch R4590210								
WG3020524-1 DUP		**L2253180-1**						
pH		7.33	7.34	J	pH units	0.01	0.3	04-APR-19
WG3020766-1 LCS								
pH			7.00		pH units		6.9-7.1	04-APR-19
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-4 DUP		**WG3021651-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-APR-19
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	08-APR-19
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-4 DUP		**WG3021651-3**						
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-APR-19
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	08-APR-19
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-APR-19
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-APR-19
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	08-APR-19
o-Xylene		0.023	0.023		ug/g	1.1	40	08-APR-19
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	08-APR-19
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	08-APR-19
Trichloroethylene		0.032	0.031		ug/g	5.8	40	08-APR-19
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	08-APR-19
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	08-APR-19
WG3021651-2 LCS								
1,1,1,2-Tetrachloroethane			99.2		%		60-130	08-APR-19
1,1,2,2-Tetrachloroethane			89.6		%		60-130	08-APR-19
1,1,1-Trichloroethane			109.6		%		60-130	08-APR-19
1,1,2-Trichloroethane			96.6		%		60-130	08-APR-19
1,1-Dichloroethane			106.7		%		60-130	08-APR-19
1,1-Dichloroethylene			114.0		%		60-130	08-APR-19
1,2-Dibromoethane			90.9		%		70-130	08-APR-19
1,2-Dichlorobenzene			106.4		%		70-130	08-APR-19
1,2-Dichloroethane			99.3		%		60-130	08-APR-19
1,2-Dichloropropane			104.4		%		70-130	08-APR-19
1,3-Dichlorobenzene			113.8		%		70-130	08-APR-19
1,4-Dichlorobenzene			112.7		%		70-130	08-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-2 LCS								
Acetone			86.0		%		60-140	08-APR-19
Benzene			110.6		%		70-130	08-APR-19
Bromodichloromethane			100.9		%		50-140	08-APR-19
Bromoform			81.1		%		70-130	08-APR-19
Bromomethane			106.4		%		50-140	08-APR-19
Carbon tetrachloride			108.4		%		70-130	08-APR-19
Chlorobenzene			105.4		%		70-130	08-APR-19
Chloroform			107.5		%		70-130	08-APR-19
cis-1,2-Dichloroethylene			103.0		%		70-130	08-APR-19
cis-1,3-Dichloropropene			102.4		%		70-130	08-APR-19
Dibromochloromethane			91.6		%		60-130	08-APR-19
Dichlorodifluoromethane			64.6		%		50-140	08-APR-19
Ethylbenzene			110.7		%		70-130	08-APR-19
n-Hexane			111.6		%		70-130	08-APR-19
Methylene Chloride			102.1		%		70-130	08-APR-19
MTBE			108.5		%		70-130	08-APR-19
m+p-Xylenes			113.6		%		70-130	08-APR-19
Methyl Ethyl Ketone			81.4		%		60-140	08-APR-19
Methyl Isobutyl Ketone			73.5		%		60-140	08-APR-19
o-Xylene			105.1		%		70-130	08-APR-19
Styrene			99.95		%		70-130	08-APR-19
Tetrachloroethylene			113.2		%		60-130	08-APR-19
Toluene			110.7		%		70-130	08-APR-19
trans-1,2-Dichloroethylene			116.9		%		60-130	08-APR-19
trans-1,3-Dichloropropene			99.8		%		70-130	08-APR-19
Trichloroethylene			111.3		%		60-130	08-APR-19
Trichlorofluoromethane			107.8		%		50-140	08-APR-19
Vinyl chloride			86.3		%		60-140	08-APR-19
WG3021651-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	08-APR-19
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	08-APR-19
1,1,1-Trichloroethane			<0.050		ug/g		0.05	08-APR-19
1,1,2-Trichloroethane			<0.050		ug/g		0.05	08-APR-19
1,1-Dichloroethane			<0.050		ug/g		0.05	08-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-1 MB								
1,1-Dichloroethylene			<0.050		ug/g		0.05	08-APR-19
1,2-Dibromoethane			<0.050		ug/g		0.05	08-APR-19
1,2-Dichlorobenzene			<0.050		ug/g		0.05	08-APR-19
1,2-Dichloroethane			<0.050		ug/g		0.05	08-APR-19
1,2-Dichloropropane			<0.050		ug/g		0.05	08-APR-19
1,3-Dichlorobenzene			<0.050		ug/g		0.05	08-APR-19
1,4-Dichlorobenzene			<0.050		ug/g		0.05	08-APR-19
Acetone			<0.50		ug/g		0.5	08-APR-19
Benzene			<0.0068		ug/g		0.0068	08-APR-19
Bromodichloromethane			<0.050		ug/g		0.05	08-APR-19
Bromoform			<0.050		ug/g		0.05	08-APR-19
Bromomethane			<0.050		ug/g		0.05	08-APR-19
Carbon tetrachloride			<0.050		ug/g		0.05	08-APR-19
Chlorobenzene			<0.050		ug/g		0.05	08-APR-19
Chloroform			<0.050		ug/g		0.05	08-APR-19
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	08-APR-19
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	08-APR-19
Dibromochloromethane			<0.050		ug/g		0.05	08-APR-19
Dichlorodifluoromethane			<0.050		ug/g		0.05	08-APR-19
Ethylbenzene			<0.018		ug/g		0.018	08-APR-19
n-Hexane			<0.050		ug/g		0.05	08-APR-19
Methylene Chloride			<0.050		ug/g		0.05	08-APR-19
MTBE			<0.050		ug/g		0.05	08-APR-19
m+p-Xylenes			<0.030		ug/g		0.03	08-APR-19
Methyl Ethyl Ketone			<0.50		ug/g		0.5	08-APR-19
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	08-APR-19
o-Xylene			<0.020		ug/g		0.02	08-APR-19
Styrene			<0.050		ug/g		0.05	08-APR-19
Tetrachloroethylene			<0.050		ug/g		0.05	08-APR-19
Toluene			<0.080		ug/g		0.08	08-APR-19
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	08-APR-19
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	08-APR-19
Trichloroethylene			<0.010		ug/g		0.01	08-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-1 MB								
Trichlorofluoromethane			<0.050		ug/g		0.05	08-APR-19
Vinyl chloride			<0.020		ug/g		0.02	08-APR-19
Surrogate: 1,4-Difluorobenzene			111.5		%		50-140	08-APR-19
Surrogate: 4-Bromofluorobenzene			95.3		%		50-140	08-APR-19
WG3021651-5 MS		**L2252977-4**						
1,1,1,2-Tetrachloroethane			100.6		%		50-140	08-APR-19
1,1,2,2-Tetrachloroethane			91.2		%		50-140	08-APR-19
1,1,1-Trichloroethane			111.6		%		50-140	08-APR-19
1,1,2-Trichloroethane			99.1		%		50-140	08-APR-19
1,1-Dichloroethane			108.7		%		50-140	08-APR-19
1,1-Dichloroethylene			116.3		%		50-140	08-APR-19
1,2-Dibromoethane			93.3		%		50-140	08-APR-19
1,2-Dichlorobenzene			106.9		%		50-140	08-APR-19
1,2-Dichloroethane			101.8		%		50-140	08-APR-19
1,2-Dichloropropane			106.9		%		50-140	08-APR-19
1,3-Dichlorobenzene			113.3		%		50-140	08-APR-19
1,4-Dichlorobenzene			112.5		%		50-140	08-APR-19
Acetone			90.4		%		50-140	08-APR-19
Benzene			112.5		%		50-140	08-APR-19
Bromodichloromethane			102.6		%		50-140	08-APR-19
Bromoform			82.5		%		50-140	08-APR-19
Bromomethane			110.4		%		50-140	08-APR-19
Carbon tetrachloride			109.5		%		50-140	08-APR-19
Chlorobenzene			106.6		%		50-140	08-APR-19
Chloroform			109.7		%		50-140	08-APR-19
cis-1,2-Dichloroethylene			105.1		%		50-140	08-APR-19
cis-1,3-Dichloropropene			104.9		%		50-140	08-APR-19
Dibromochloromethane			93.5		%		50-140	08-APR-19
Dichlorodifluoromethane			71.7		%		50-140	08-APR-19
Ethylbenzene			111.1		%		50-140	08-APR-19
n-Hexane			115.0		%		50-140	08-APR-19
Methylene Chloride			104.6		%		50-140	08-APR-19
MTBE			109.0		%		50-140	08-APR-19
m+p-Xylenes			114.1		%		50-140	08-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4592043								
WG3021651-5 MS		**L2252977-4**						
Methyl Ethyl Ketone			81.0		%		50-140	08-APR-19
Methyl Isobutyl Ketone			75.7		%		50-140	08-APR-19
o-Xylene			105.8		%		50-140	08-APR-19
Styrene			100.4		%		50-140	08-APR-19
Tetrachloroethylene			112.4		%		50-140	08-APR-19
Toluene			111.6		%		50-140	08-APR-19
trans-1,2-Dichloroethylene			118.1		%		50-140	08-APR-19
trans-1,3-Dichloropropene			103.1		%		50-140	08-APR-19
Trichloroethylene			111.2		%		50-140	08-APR-19
Trichlorofluoromethane			111.0		%		50-140	08-APR-19
Vinyl chloride			89.1		%		50-140	08-APR-19

Quality Control Report

Workorder: L2252977 Report Date: 10-APR-19

Client: CH2M HILL CANADA LIMITED
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY/ED TAVES

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2252977-COFC

COC Number: 17 - 630752

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Sucobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	M Shay Ed Taves	Quality Control (QC) Report with Report YES NO	4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] (Business days only) — 1 Business day [E-100%] / Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply) (Emergency)
Phone:		Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:		Email 1 or Fax	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:		Email 2	
Postal Code:		Email 3	
Invoice To	Same as Report To YES NO	Invoice Distribution	
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:		Email 1 or Fax	
Contact:	Acct Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q62156	AFE/Cost Center:	PO#
Job #	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2252977	ALS Contact: Mathew	Sampler: M. Shay

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	Trip Blank	03-Apr-19	—	Matrix	X			1
	BH17-100 i		1310	Soil	X			1
	BH17-100 ii		1315		X	X		1
	BH17-102 i		1220		X			3
	BH17-102 ii		1225		X			3

Drinking Water (DW) Samples* (client use)
Are samples taken from a Regulated DW System? YES NO
Are samples for human consumption/use? YES NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)
Frozen / Ice Packs / Ice Cubes / Cooling Initiated
SIF Observations: Yes No
Custody seal intact: Yes No

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				3.5			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time	Received by:	Date:	Time:	Received by	Date	Time:
	2019/4/3	14:40					3-APR-19	1433

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white report copy.

*. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

CH2M HILL CANADA LIMITED
ATTN: JON GOWING
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 17-APR-19
Report Date: 24-APR-19 14:36 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2259873

Project P.O. #: NOT SUBMITTED
Job Reference: 694757
C of C Numbers: 17-622539, 17-623582
Legal Site Desc:

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-1 BH19-209-2.5 Sampled By: J.GOWING on 16-APR-19 @ 11:50 Matrix: SOIL							
Physical Tests							
% Moisture	8.63		0.10	%	22-APR-19	23-APR-19	R4606426
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.037		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-1 BH19-209-2.5 Sampled By: J.GOWING on 16-APR-19 @ 11:50 Matrix: SOIL							
Volatile Organic Compounds							
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	93.7		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	106.1		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-2 BH19-209-7 Sampled By: J.GOWING on 16-APR-19 @ 12:00 Matrix: SOIL							
Physical Tests							
% Moisture	3.67		0.10	%	22-APR-19	23-APR-19	R4606426
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-2 BH19-209-7 Sampled By: J.GOWING on 16-APR-19 @ 12:00 Matrix: SOIL							
Volatile Organic Compounds							
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.013		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	94.8		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	106.8		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-3 BH19-209-9.5 Sampled By: J.GOWING on 16-APR-19 @ 12:10 Matrix: SOIL							
Physical Tests							
% Moisture	6.73		0.10	%	22-APR-19	23-APR-19	R4606426
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-3 BH19-209-9.5 Sampled By: J.GOWING on 16-APR-19 @ 12:10 Matrix: SOIL							
Volatile Organic Compounds							
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.034		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	91.7		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	103.0		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-4 BH19-210-2.5 Sampled By: J.GOWING on 16-APR-19 @ 12:40 Matrix: SOIL							
Physical Tests							
% Moisture	6.34		0.10	%	22-APR-19	23-APR-19	R4606426
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-4 BH19-210-2.5 Sampled By: J.GOWING on 16-APR-19 @ 12:40 Matrix: SOIL							
Volatile Organic Compounds							
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	93.4		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	105.1		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-5 BH19-210-6 Sampled By: J.GOWING on 16-APR-19 @ 12:50 Matrix: SOIL							
Physical Tests							
% Moisture	5.52		0.10	%	22-APR-19	23-APR-19	R4606426
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-5 BH19-210-6 Sampled By: J.GOWING on 16-APR-19 @ 12:50 Matrix: SOIL							
Volatile Organic Compounds							
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	94.2		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	107.1		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-6 BH19-210-7.5 Sampled By: J.GOWING on 16-APR-19 @ 13:00 Matrix: SOIL							
Physical Tests							
% Moisture	4.88		0.10	%	22-APR-19	23-APR-19	R4606426

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-6 BH19-210-7.5 Sampled By: J.GOWING on 16-APR-19 @ 13:00 Matrix: SOIL							
Physical Tests							
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-6 BH19-210-7.5 Sampled By: J.GOWING on 16-APR-19 @ 13:00 Matrix: SOIL							
Volatile Organic Compounds							
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	90.8		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	103.2		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-7 BH19-210-9.5 Sampled By: J.GOWING on 16-APR-19 @ 13:05 Matrix: SOIL							
Physical Tests							
% Moisture	11.1		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-7 BH19-210-9.5 Sampled By: J.GOWING on 16-APR-19 @ 13:05 Matrix: SOIL							
Volatile Organic Compounds							
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	86.7		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	105.2		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-8 BH19-211-2.5 Sampled By: J.GOWING on 16-APR-19 @ 13:30 Matrix: SOIL							
Physical Tests							
% Moisture	4.49		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-8 BH19-211-2.5 Sampled By: J.GOWING on 16-APR-19 @ 13:30 Matrix: SOIL							
Volatile Organic Compounds							
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.120		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	95.6		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	108.5		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-9 BH19-211-4 Sampled By: J.GOWING on 16-APR-19 @ 13:40 Matrix: SOIL							
Physical Tests							
% Moisture	3.45		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-9 BH19-211-4 Sampled By: J.GOWING on 16-APR-19 @ 13:40 Matrix: SOIL							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.209		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	92.2		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	105.0		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-10 BH19-211-10 Sampled By: J.GOWING on 16-APR-19 @ 13:50 Matrix: SOIL							
Physical Tests							
% Moisture	8.21		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-10 BH19-211-10 Sampled By: J.GOWING on 16-APR-19 @ 13:50 Matrix: SOIL							
Volatile Organic Compounds							
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	0.085		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	84.9		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	95.6		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-11 SOIL-DUP1 Sampled By: J.GOWING on 16-APR-19 Matrix: SOIL							
Physical Tests							
% Moisture	3.67		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-11 SOIL-DUP1 Sampled By: J.GOWING on 16-APR-19 Matrix: SOIL							
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-11 SOIL-DUP1 Sampled By: J.GOWING on 16-APR-19 Matrix: SOIL							
Volatile Organic Compounds							
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	89.4		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	102.5		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-12 TRIP BLANK Sampled By: J.GOWING on 16-APR-19 Matrix: SOIL							
Physical Tests							
% Moisture	<0.10		0.10	%	22-APR-19	23-APR-19	R4607767
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Benzene	<0.0068		0.0068	ug/g	23-APR-19	24-APR-19	R4611475
Bromodichloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromoform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Bromomethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Carbon tetrachloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dibromochloromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Chloroform	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dibromoethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,4-Dichlorobenzene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Dichlorodifluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methylene Chloride	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,2-Dichloropropane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-APR-19	
Ethylbenzene	<0.018		0.018	ug/g	23-APR-19	24-APR-19	R4611475
n-Hexane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Ethyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	23-APR-19	24-APR-19	R4611475
MTBE	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Styrene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Tetrachloroethylene	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2259873-12 TRIP BLANK Sampled By: J.GOWING on 16-APR-19 Matrix: SOIL							
Volatile Organic Compounds							
Toluene	<0.080		0.080	ug/g	23-APR-19	24-APR-19	R4611475
1,1,1-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
1,1,2-Trichloroethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Trichloroethylene	<0.010		0.010	ug/g	23-APR-19	24-APR-19	R4611475
Trichlorofluoromethane	<0.050		0.050	ug/g	23-APR-19	24-APR-19	R4611475
Vinyl chloride	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
o-Xylene	<0.020		0.020	ug/g	23-APR-19	24-APR-19	R4611475
m+p-Xylenes	<0.030		0.030	ug/g	23-APR-19	24-APR-19	R4611475
Xylenes (Total)	<0.050		0.050	ug/g		24-APR-19	
Surrogate: 4-Bromofluorobenzene	90.8		50-140	%	23-APR-19	24-APR-19	R4611475
Surrogate: 1,4-Difluorobenzene	104.1		50-140	%	23-APR-19	24-APR-19	R4611475
L2259873-13 OW25 Sampled By: J.GOWING on 17-APR-19 @ 11:45 Matrix: WATER							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Acenaphthylene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Anthracene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Benzo(a)anthracene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Benzo(a)pyrene	<0.010		0.010	ug/L	17-APR-19	22-APR-19	R4605567
Benzo(b)fluoranthene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Benzo(k)fluoranthene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Chrysene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Fluoranthene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Fluorene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
1+2-Methylnaphthalenes	<0.028		0.028	ug/L		22-APR-19	
1-Methylnaphthalene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
2-Methylnaphthalene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Naphthalene	<0.050		0.050	ug/L	17-APR-19	22-APR-19	R4605567
Phenanthrene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Pyrene	<0.020		0.020	ug/L	17-APR-19	22-APR-19	R4605567
Surrogate: d10-Acenaphthene	87.0		60-140	%	17-APR-19	22-APR-19	R4605567
Surrogate: d12-Chrysene	86.0		60-140	%	17-APR-19	22-APR-19	R4605567
Surrogate: d8-Naphthalene	90.1		60-140	%	17-APR-19	22-APR-19	R4605567
Surrogate: d10-Phenanthrene	86.8		60-140	%	17-APR-19	22-APR-19	R4605567

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	Vinyl chloride	MES	L2259873-1, -10, -11, -12, -2, -3, -4, -5, -6, -7, -8, -9

Sample Parameter Qualifier key listed:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-622539 17-623582

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2259873 Report Date: 24-APR-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4605567								
WG3029969-2 LCS								
1-Methylnaphthalene			96.5		%		50-140	18-APR-19
2-Methylnaphthalene			92.2		%		50-140	18-APR-19
Acenaphthene			103.1		%		50-140	18-APR-19
Acenaphthylene			101.0		%		50-140	18-APR-19
Anthracene			107.6		%		50-140	18-APR-19
Benzo(a)anthracene			116.1		%		50-140	18-APR-19
Benzo(a)pyrene			105.0		%		50-140	18-APR-19
Benzo(b)fluoranthene			98.0		%		50-140	18-APR-19
Benzo(g,h,i)perylene			108.2		%		50-140	18-APR-19
Benzo(k)fluoranthene			105.1		%		50-140	18-APR-19
Chrysene			109.4		%		50-140	18-APR-19
Dibenzo(ah)anthracene			105.7		%		50-140	18-APR-19
Fluoranthene			109.0		%		50-140	18-APR-19
Fluorene			105.1		%		50-140	18-APR-19
Indeno(1,2,3-cd)pyrene			113.5		%		50-140	18-APR-19
Naphthalene			99.5		%		50-140	18-APR-19
Phenanthrene			109.1		%		50-140	18-APR-19
Pyrene			111.0		%		50-140	18-APR-19
WG3029969-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	18-APR-19
2-Methylnaphthalene			<0.020		ug/L		0.02	18-APR-19
Acenaphthene			<0.020		ug/L		0.02	18-APR-19
Acenaphthylene			<0.020		ug/L		0.02	18-APR-19
Anthracene			<0.020		ug/L		0.02	18-APR-19
Benzo(a)anthracene			<0.020		ug/L		0.02	18-APR-19
Benzo(a)pyrene			<0.010		ug/L		0.01	18-APR-19
Benzo(b)fluoranthene			<0.020		ug/L		0.02	18-APR-19
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	18-APR-19
Benzo(k)fluoranthene			<0.020		ug/L		0.02	18-APR-19
Chrysene			<0.020		ug/L		0.02	18-APR-19
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	18-APR-19
Fluoranthene			<0.020		ug/L		0.02	18-APR-19
Fluorene			<0.020		ug/L		0.02	18-APR-19
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	18-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R4605567								
WG3029969-1 MB								
Naphthalene			<0.050		ug/L		0.05	18-APR-19
Phenanthrene			<0.020		ug/L		0.02	18-APR-19
Pyrene			<0.020		ug/L		0.02	18-APR-19
Surrogate: d8-Naphthalene			120.0		%		60-140	18-APR-19
Surrogate: d10-Phenanthrene			116.3		%		60-140	18-APR-19
Surrogate: d12-Chrysene			115.0		%		60-140	18-APR-19
Surrogate: d10-Acenaphthene			113.0		%		60-140	18-APR-19
MOISTURE-WT	**Soil**							
Batch R4606426								
WG3031536-3 DUP		**L2260518-4**						
% Moisture		18.1	18.5		%	2.3	20	23-APR-19
WG3031536-2 LCS								
% Moisture			100.1		%		90-110	23-APR-19
WG3031536-1 MB								
% Moisture			<0.10		%		0.1	23-APR-19
Batch R4607767								
WG3031559-3 DUP		**L2260253-1**						
% Moisture		7.57	7.58		%	0.1	20	23-APR-19
WG3031559-2 LCS								
% Moisture			99.98		%		90-110	23-APR-19
WG3031559-1 MB								
% Moisture			<0.10		%		0.1	23-APR-19
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-10 DUP		**WG3032347-9**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,2-Dichloropropane		<0.050	<0.050					

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-10 DUP		**WG3032347-9**						
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-APR-19
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	24-APR-19
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-APR-19
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	24-APR-19
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-APR-19
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-APR-19
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-APR-19
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-APR-19
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	24-APR-19
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-APR-19
Trichloroethylene		0.120	0.120		ug/g	0.4	40	24-APR-19
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-APR-19
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-APR-19
WG3032347-8 LCS								
1,1,1,2-Tetrachloroethane			99.4		%		60-130	24-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-8 LCS								
1,1,2,2-Tetrachloroethane			107.8		%		60-130	24-APR-19
1,1,1-Trichloroethane			96.2		%		60-130	24-APR-19
1,1,2-Trichloroethane			102.9		%		60-130	24-APR-19
1,1-Dichloroethane			97.3		%		60-130	24-APR-19
1,1-Dichloroethylene			84.8		%		60-130	24-APR-19
1,2-Dibromoethane			102.6		%		70-130	24-APR-19
1,2-Dichlorobenzene			105.8		%		70-130	24-APR-19
1,2-Dichloroethane			106.1		%		60-130	24-APR-19
1,2-Dichloropropane			103.9		%		70-130	24-APR-19
1,3-Dichlorobenzene			106.1		%		70-130	24-APR-19
1,4-Dichlorobenzene			108.8		%		70-130	24-APR-19
Acetone			108.3		%		60-140	24-APR-19
Benzene			101.2		%		70-130	24-APR-19
Bromodichloromethane			103.5		%		50-140	24-APR-19
Bromoform			103.3		%		70-130	24-APR-19
Bromomethane			83.7		%		50-140	24-APR-19
Carbon tetrachloride			96.0		%		70-130	24-APR-19
Chlorobenzene			103.9		%		70-130	24-APR-19
Chloroform			101.4		%		70-130	24-APR-19
cis-1,2-Dichloroethylene			99.6		%		70-130	24-APR-19
cis-1,3-Dichloropropene			109.5		%		70-130	24-APR-19
Dibromochloromethane			102.1		%		60-130	24-APR-19
Dichlorodifluoromethane			110.6		%		50-140	24-APR-19
Ethylbenzene			97.4		%		70-130	24-APR-19
n-Hexane			75.5		%		70-130	24-APR-19
Methylene Chloride			99.3		%		70-130	24-APR-19
MTBE			100.7		%		70-130	24-APR-19
m+p-Xylenes			99.2		%		70-130	24-APR-19
Methyl Ethyl Ketone			108.4		%		60-140	24-APR-19
Methyl Isobutyl Ketone			104.4		%		60-140	24-APR-19
o-Xylene			97.5		%		70-130	24-APR-19
Styrene			100.6		%		70-130	24-APR-19
Tetrachloroethylene			99.99		%		60-130	24-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-8 LCS								
Toluene			98.6		%		70-130	24-APR-19
trans-1,2-Dichloroethylene			95.5		%		60-130	24-APR-19
trans-1,3-Dichloropropene			102.3		%		70-130	24-APR-19
Trichloroethylene			104.4		%		60-130	24-APR-19
Trichlorofluoromethane			78.7		%		50-140	24-APR-19
Vinyl chloride			51.6	MES	%		60-140	24-APR-19
WG3032347-7 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	24-APR-19
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	24-APR-19
1,1,1-Trichloroethane			<0.050		ug/g		0.05	24-APR-19
1,1,2-Trichloroethane			<0.050		ug/g		0.05	24-APR-19
1,1-Dichloroethane			<0.050		ug/g		0.05	24-APR-19
1,1-Dichloroethylene			<0.050		ug/g		0.05	24-APR-19
1,2-Dibromoethane			<0.050		ug/g		0.05	24-APR-19
1,2-Dichlorobenzene			<0.050		ug/g		0.05	24-APR-19
1,2-Dichloroethane			<0.050		ug/g		0.05	24-APR-19
1,2-Dichloropropane			<0.050		ug/g		0.05	24-APR-19
1,3-Dichlorobenzene			<0.050		ug/g		0.05	24-APR-19
1,4-Dichlorobenzene			<0.050		ug/g		0.05	24-APR-19
Acetone			<0.50		ug/g		0.5	24-APR-19
Benzene			<0.0068		ug/g		0.0068	24-APR-19
Bromodichloromethane			<0.050		ug/g		0.05	24-APR-19
Bromoform			<0.050		ug/g		0.05	24-APR-19
Bromomethane			<0.050		ug/g		0.05	24-APR-19
Carbon tetrachloride			<0.050		ug/g		0.05	24-APR-19
Chlorobenzene			<0.050		ug/g		0.05	24-APR-19
Chloroform			<0.050		ug/g		0.05	24-APR-19
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-APR-19
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	24-APR-19
Dibromochloromethane			<0.050		ug/g		0.05	24-APR-19
Dichlorodifluoromethane			<0.050		ug/g		0.05	24-APR-19
Ethylbenzene			<0.018		ug/g		0.018	24-APR-19
n-Hexane			<0.050		ug/g		0.05	24-APR-19
Methylene Chloride			<0.050		ug/g		0.05	24-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-7 MB								
MTBE			<0.050		ug/g		0.05	24-APR-19
m+p-Xylenes			<0.030		ug/g		0.03	24-APR-19
Methyl Ethyl Ketone			<0.50		ug/g		0.5	24-APR-19
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	24-APR-19
o-Xylene			<0.020		ug/g		0.02	24-APR-19
Styrene			<0.050		ug/g		0.05	24-APR-19
Tetrachloroethylene			<0.050		ug/g		0.05	24-APR-19
Toluene			<0.080		ug/g		0.08	24-APR-19
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-APR-19
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	24-APR-19
Trichloroethylene			<0.010		ug/g		0.01	24-APR-19
Trichlorofluoromethane			<0.050		ug/g		0.05	24-APR-19
Vinyl chloride			<0.020		ug/g		0.02	24-APR-19
Surrogate: 1,4-Difluorobenzene			104.5		%		50-140	24-APR-19
Surrogate: 4-Bromofluorobenzene			92.8		%		50-140	24-APR-19
WG3032347-11 MS		**L2259873-8**						
1,1,1,2-Tetrachloroethane			97.9		%		50-140	24-APR-19
1,1,2,2-Tetrachloroethane			101.2		%		50-140	24-APR-19
1,1,1-Trichloroethane			95.6		%		50-140	24-APR-19
1,1,2-Trichloroethane			100.6		%		50-140	24-APR-19
1,1-Dichloroethane			95.9		%		50-140	24-APR-19
1,1-Dichloroethylene			84.5		%		50-140	24-APR-19
1,2-Dibromoethane			99.0		%		50-140	24-APR-19
1,2-Dichlorobenzene			101.2		%		50-140	24-APR-19
1,2-Dichloroethane			101.8		%		50-140	24-APR-19
1,2-Dichloropropane			100.7		%		50-140	24-APR-19
1,3-Dichlorobenzene			100.6		%		50-140	24-APR-19
1,4-Dichlorobenzene			102.3		%		50-140	24-APR-19
Acetone			105.6		%		50-140	24-APR-19
Benzene			98.7		%		50-140	24-APR-19
Bromodichloromethane			99.6		%		50-140	24-APR-19
Bromoform			99.6		%		50-140	24-APR-19
Bromomethane			80.0		%		50-140	24-APR-19
Carbon tetrachloride			95.3		%		50-140	24-APR-19

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R4611475								
WG3032347-11 MS		**L2259873-8**						
Chlorobenzene			100.9		%		50-140	24-APR-19
Chloroform			99.3		%		50-140	24-APR-19
cis-1,2-Dichloroethylene			96.6		%		50-140	24-APR-19
cis-1,3-Dichloropropene			96.6		%		50-140	24-APR-19
Dibromochloromethane			99.8		%		50-140	24-APR-19
Dichlorodifluoromethane			122.0		%		50-140	24-APR-19
Ethylbenzene			95.7		%		50-140	24-APR-19
n-Hexane			77.2		%		50-140	24-APR-19
Methylene Chloride			96.3		%		50-140	24-APR-19
MTBE			98.1		%		50-140	24-APR-19
m+p-Xylenes			96.9		%		50-140	24-APR-19
Methyl Ethyl Ketone			96.8		%		50-140	24-APR-19
Methyl Isobutyl Ketone			96.4		%		50-140	24-APR-19
o-Xylene			95.3		%		50-140	24-APR-19
Styrene			95.8		%		50-140	24-APR-19
Tetrachloroethylene			98.0		%		50-140	24-APR-19
Toluene			97.5		%		50-140	24-APR-19
trans-1,2-Dichloroethylene			91.5		%		50-140	24-APR-19
trans-1,3-Dichloropropene			90.1		%		50-140	24-APR-19
Trichloroethylene			103.9		%		50-140	24-APR-19
Trichlorofluoromethane			80.2		%		50-140	24-APR-19
Vinyl chloride			52.0		%		50-140	24-APR-19

Quality Control Report

Workorder: L2259873 Report Date: 24-APR-19

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: JON GOWING

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
MES	Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2259873-COFC

COC Number: 17 - 623582

Page 1 of 2

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	JACOBS	Select Report Format: PDF EXCEL DD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Jon Gowing	Quality Control (QC) Report with Report: YES NO	PRIORITY (business days): 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St South Suite 2	Email 1 or Fax: ED.TAVES@JACOBS.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener ON	Email 2: Mike.Shirey@Jacobs.com	
Postal Code:	N2G 4Y9	Email 3:	
Invoice To	Same as Report To: YES NO	Invoice Distribution	
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2259873 ALS Contact: MATHY Sampler: J. Gowing

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	VOC	PHC/F	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	BH19-209 - 2.5	16-04-19	1150	Soil	X				3
	7		1200		X				3
	9.5		1210		X				3
	BH19-210 - 2.5		1240		X				3
	6		1250		X				3
	7.5		1300		X				3
	9.5		1305		X				3
	BH19-211 - 2.5		1330		X				3
	4		1340		X				3
	10		1350		X				3
	Soil - Dup1	—	—	↓	X				2
	TRIP BLANK	—	—	Matrix	X				1

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	use Moisture, Sample from BH19-209-7 for Soil Dup1
Are samples for human consumption/use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C	FINAL COOLER TEMPERATURES °C
	0.8

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 4/17/2019	Time: 1640	Received by:	Date:	Time:	Received by:	Date: Apr 17/19	Time: 16:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

[1] If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2259873-COFC

COC Number: 17 - 622539

Page 2 of 2

Report To	Contact and company name below will appear on the final report	Report Format / D.	Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	JACOBS	Select Report Format: PDF EXCEL ECD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Jon Gowing	Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days) 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-50%] EMERGENCY 1 Business day [E-100%] Same Day, Weekend or Statutory holiday [E2-200%] (Laboratory opening fees may apply)]
Phone:		Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	
Street:		Email 1 or Fax	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	SEE Pg 1	Email 2 See Pg 1	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code		Email 3	

Invoice To		Invoice Distribution	
	Same as Report To YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
	Copy of Invoice with Report YES NO		
Company:		Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#:
Job #:	694757	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2259873 ALS Contact: MATT H Sampler: J. Gowing

Analysis Request — indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	P4H	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	OW25	17-04-19	1145	WATER	X			2

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	Do not analyze Duplicate Sample.
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	X	Ice Cubes X	Custody seal intact	Yes	No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				8.7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 4/17/19	Time: 1645	Received by:	Date:	Time	Received by:	Date: Apr 17/19	Time: 16:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

[1] If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Jacobs Consultancy Canada Inc.
ATTN: MICHAEL SHIRY
CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 21-FEB-20
Report Date: 19-APR-21 15:10 (MT)
Version: FINAL REV. 4

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2419793

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH
C of C Numbers: 17-795231
Legal Site Desc:

Comments: 19-APR-21:
L2419793-1, 3, 5, 7, 8, 9, 11, 12, 13, 16, 17, 18, 20, 21 - results for Bismuth, Iron, Calcium and Magnesium included.

Mathy Mahadeva
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-1 TP20-324-1-1.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 09:00							
Matrix: SOIL							
Physical Tests							
Conductivity	0.0777		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	4.67		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10	SAR:DL	0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	6.63		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	0.69		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	<0.50		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	2.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	18.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	5.4		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	0.75		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	98600		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	9.6		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	3.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	13.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	10900		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	54.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	34000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0099		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	8.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	18.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	777		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-1 TP20-324-1-1.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 09:00							
Matrix: SOIL							
Volatile Organic Compounds							
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	92.9		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	105.9		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-1 TP20-324-1-1.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 09:00							
Matrix: SOIL							
Hydrocarbons							
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	<10		10	ug/g	24-FEB-20	25-FEB-20	R5008228
F2-Naphth	<10		10	ug/g		27-FEB-20	
F3 (C16-C34)	<50		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F3-PAH	<50		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	25-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	<72		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	25-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	82.6		60-140	%	24-FEB-20	25-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	75.2		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	<0.013		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	<0.046		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	90.2		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	89.8		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-3 TP20-323-2-2.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 10:07							
Matrix: SOIL							
Physical Tests							
Conductivity	0.139		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	10.2		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10	SAR:DL	0.10	SAR		25-FEB-20	R5004988

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-3 TP20-323-2-2.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 10:07							
Matrix: SOIL							
Saturated Paste Extractables							
Calcium (Ca)	15.7		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	1.31		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	<0.50		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	1.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	4.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	37.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	5.4		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.20		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	12300		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	14.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	3.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	21.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	24400		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	87.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	3890		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0246		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	10.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	20.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	92.2		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	0.098		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	0.100		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	0.231		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	0.130		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	0.064		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.159		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	0.160		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-3 TP20-323-2-2.5' Sampled By: V.PETERS on 20-FEB-20 @ 10:07 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	0.104		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	0.416		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.187		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	0.230		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.182		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.233		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	0.131		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	98.8		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	100.2		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-5 TP20-322-2-2.5' Sampled By: V.PETERS on 20-FEB-20 @ 11:10 Matrix: SOIL							
Physical Tests							
Conductivity	0.116		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	8.53		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	11.2		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	1.28		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	0.51		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	1.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	5.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	26.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	<5.0		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.23		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	11200		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	13.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	4.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	21.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	40300		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	40.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	3920		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0197		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	10.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-5 TP20-322-2-2.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 11:10							
Matrix: SOIL							
Metals							
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	18.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	183		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	0.0081		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-5 TP20-322-2-2.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 11:10							
Matrix: SOIL							
Volatile Organic Compounds							
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	0.072		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	0.070		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	0.141		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	83.2		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	95.8		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	<10		10	ug/g	24-FEB-20	26-FEB-20	R5008228
F2-Naphth	<10		10	ug/g		27-FEB-20	
F3 (C16-C34)	61		50	ug/g	24-FEB-20	26-FEB-20	R5008228
F3-PAH	59		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	<72		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	26-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	81.6		60-140	%	24-FEB-20	26-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	61.8		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.054		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	0.086		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	0.194		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	0.143		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	0.295		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	0.136		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	0.077		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.246		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	0.398		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	0.110		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	0.276		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.122		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	0.155		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-5 TP20-322-2-2.5'							
Sampled By: V.PETERS on 20-FEB-20 @ 11:10							
Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Naphthalene	0.138		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.397		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	0.319		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	98.7		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	100.3		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-7 TP20-321-2.75-3.25'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:00							
Matrix: SOIL							
Physical Tests							
Conductivity	0.123		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	4.32		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	0.15		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	9.12		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	2.49		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	1.92		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	2.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	16.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	14.9		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	2.21		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	174000		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	7.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	4.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	11.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	7550		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	308		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	91800		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0595		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	9.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	1.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	15.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-7 TP20-321-2.75-3.25'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:00							
Matrix: SOIL							
Metals							
Zinc (Zn)	1000		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-7 TP20-321-2.75-3.25'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:00							
Matrix: SOIL							
Volatile Organic Compounds							
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	106.6		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	121.2		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	19		10	ug/g	24-FEB-20	25-FEB-20	R5008228
F2-Naphth	19		10	ug/g		27-FEB-20	
F3 (C16-C34)	112		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F3-PAH	112		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	25-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	131		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	25-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	80.3		60-140	%	24-FEB-20	25-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	76.3		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.054		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	<0.013		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.077		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	92.0		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	95.9		50-140	%	22-FEB-20	25-FEB-20	R5004428

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-8 TP20-321-4.5-5'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:15							
Matrix: SOIL							
Physical Tests							
Conductivity	1.64		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	9.88		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	439		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	12.0		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	2.69		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	2.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	21.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	18.4		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	<0.10		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	3.03		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	205000		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	6.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	4.6		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	11.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	6830		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	149		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	111000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0773		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	1.6		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	9.3		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	1.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	14.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	1310		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-8 TP20-321-4.5-5'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:15							
Matrix: SOIL							
Volatile Organic Compounds							
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	94.7		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	107.0		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-8 TP20-321-4.5-5'							
Sampled By: V.PETERS on 20-FEB-20 @ 12:15							
Matrix: SOIL							
Hydrocarbons							
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	<10		10	ug/g	24-FEB-20	26-FEB-20	R5008228
F2-Naphth	<10		10	ug/g		27-FEB-20	
F3 (C16-C34)	61		50	ug/g	24-FEB-20	26-FEB-20	R5008228
F3-PAH	61		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	<72		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	26-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	87.0		60-140	%	24-FEB-20	26-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	75.3		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.056		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.031		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.018		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.071		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	89.8		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	94.2		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-9 TP20-320-2.5-3'							
Sampled By: V.PETERS on 20-FEB-20 @ 13:00							
Matrix: SOIL							
Physical Tests							
Conductivity	2.13		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	4.65		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10		0.10	SAR		25-FEB-20	R5004988

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-9 TP20-320-2.5-3'							
Sampled By: V.PETERS on 20-FEB-20 @ 13:00							
Matrix: SOIL							
Saturated Paste Extractables							
Calcium (Ca)	650		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	10.1		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	1.88		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	2.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	24.3		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	20.5		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.12		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	2.58		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	222000		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	6.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	4.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	10.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	6170		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	147		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	117000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0709		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	1.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	9.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	2.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	12.3		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	1060		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-9 TP20-320-2.5-3'							
Sampled By: V.PETERS on 20-FEB-20 @ 13:00							
Matrix: SOIL							
Volatile Organic Compounds							
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	101.8		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	117.1		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	16		10	ug/g	24-FEB-20	25-FEB-20	R5008228
F2-Naphth	16		10	ug/g		27-FEB-20	
F3 (C16-C34)	117		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F3-PAH	117		50	ug/g		27-FEB-20	
F4 (C34-C50)	54		50	ug/g	24-FEB-20	25-FEB-20	R5008228

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-9 TP20-320-2.5-3'							
Sampled By: V.PETERS on 20-FEB-20 @ 13:00							
Matrix: SOIL							
Hydrocarbons							
Total Hydrocarbons (C6-C50)	188		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	25-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	84.6		60-140	%	24-FEB-20	25-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	80.1		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.058		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.034		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	<0.013		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.057		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	91.7		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	95.5		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-11 DUP1							
Sampled By: V.PETERS on 20-FEB-20							
Matrix: SOIL							
Physical Tests							
Conductivity	0.112		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	10.7		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10	SAR:DL	0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	11.2		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	1.27		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	<0.50		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	1.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	5.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-11 DUP1 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Metals							
Barium (Ba)	30.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	6.2		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.22		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	9550		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	12.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	5.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	19.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	44900		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	40.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	3440		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0167		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	10.6		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	22.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	178		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-11 DUP1 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	0.055		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	0.057		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	0.112		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	89.5		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	102.5		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	<10		10	ug/g	24-FEB-20	26-FEB-20	R5008228
F2-Naphth	<10		10	ug/g		27-FEB-20	
F3 (C16-C34)	68		50	ug/g	24-FEB-20	26-FEB-20	R5008228
F3-PAH	57		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	<72		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	26-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	79.6		60-140	%	24-FEB-20	26-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	77.8		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-11 DUP1 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	0.181		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	1.41		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	1.30		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	1.89		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	0.932		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	0.553		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	1.51		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	0.261		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	2.15		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	0.884		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	0.209		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.091		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	0.118		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.095		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.611		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	2.06		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	98.1		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	100.4		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-12 DUP2 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Physical Tests							
Conductivity	2.19		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	4.62		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	663		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	9.41		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	2.12		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	2.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	23.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	18.4		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.15		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-12 DUP2 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Metals							
Cadmium (Cd)	2.13		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	212000		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	6.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	4.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	10.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	5920		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	135		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	113000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0706		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	1.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	9.3		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	2.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	13.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	862		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-12 DUP2 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Volatile Organic Compounds							
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	100.0		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	110.9		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	16		10	ug/g	24-FEB-20	25-FEB-20	R5008228
F2-Naphth	16		10	ug/g		27-FEB-20	
F3 (C16-C34)	119		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F3-PAH	119		50	ug/g		27-FEB-20	
F4 (C34-C50)	54		50	ug/g	24-FEB-20	25-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	189		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	25-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	83.1		60-140	%	24-FEB-20	25-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	84.2		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-12 DUP2 Sampled By: V.PETERS on 20-FEB-20 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	<0.013		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	<0.046		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	89.1		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	91.3		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-13 BH20-213-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 14:30 Matrix: SOIL							
Physical Tests							
Conductivity	0.533		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	11.7		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	<0.10		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	76.7		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	8.47		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	1.42		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	1.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	7.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	48.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	5.6		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.61		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	3120		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	16.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	7.3		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	30.6		1.0	ug/g	24-FEB-20	14-APR-21	R5005066

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-13 BH20-213-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 14:30 Matrix: SOIL							
Metals							
Iron (Fe)	96600		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	42.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	1490		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.0394		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	1.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	16.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	23.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	63.7		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Polycyclic Aromatic Hydrocarbons							
1+2-Methylnaphthalenes	0.242		0.042	ug/g		02-MAR-20	
Semi-Volatile Organics							
Acenaphthene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Acenaphthylene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Anthracene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Benzo(a)anthracene	0.054		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Benzo(a)pyrene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Benzo(b)fluoranthene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Benzo(ghi)perylene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Benzo(k)fluoranthene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Biphenyl	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
4-Chloroaniline	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Bis(2-chloroethyl)ether	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Bis(2-chloroisopropyl)ether	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2-Chlorophenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Chrysene	0.058		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Dibenzo(a,h)anthracene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
3,3'-Dichlorobenzidine	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4-Dichlorophenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Diethylphthalate	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Dimethylphthalate	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4-Dimethylphenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4-Dinitrophenol	<1.0		1.0	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4-Dinitrotoluene	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,6-Dinitrotoluene	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4+2,6-Dinitrotoluene	<0.14		0.14	ug/g		02-MAR-20	
Bis(2-ethylhexyl)phthalate	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-13 BH20-213-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 14:30 Matrix: SOIL							
Semi-Volatile Organics							
Fluoranthene	0.066		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Fluorene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
1-Methylnaphthalene	0.110		0.030	ug/g	27-FEB-20	02-MAR-20	R5012104
2-Methylnaphthalene	0.133		0.030	ug/g	27-FEB-20	02-MAR-20	R5012104
Naphthalene	0.088		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Pentachlorophenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Phenanthrene	0.125		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
Phenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Pyrene	0.061		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
1,2,4-Trichlorobenzene	<0.050		0.050	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4,5-Trichlorophenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
2,4,6-Trichlorophenol	<0.10		0.10	ug/g	27-FEB-20	02-MAR-20	R5012104
Surrogate: 2-Fluorobiphenyl	115.2		50-140	%	27-FEB-20	02-MAR-20	R5012104
Surrogate: Nitrobenzene d5	118.5		50-140	%	27-FEB-20	02-MAR-20	R5012104
Surrogate: p-Terphenyl d14	114.4		50-140	%	27-FEB-20	02-MAR-20	R5012104
Surrogate: 2,4,6-Tribromophenol	109.1		50-140	%	27-FEB-20	02-MAR-20	R5012104
L2419793-15 BH18-207I-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 09:55 Matrix: SOIL							
Physical Tests							
% Moisture	12.1		0.25	%	22-FEB-20	23-FEB-20	R5001687
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	0.0320		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-15 BH18-207I-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 09:55 Matrix: SOIL							
Volatile Organic Compounds							
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	0.097		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	35.4		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	0.099		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	0.128		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	0.226		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	93.2		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	110.6		50-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	0.057		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.062		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	0.081		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	<0.042		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-15 BH18-207I-0.5-2.5 Sampled By: V.PETERS on 21-FEB-20 @ 09:55 Matrix: SOIL							
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	<0.030		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.020		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.064		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	0.084		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	98.2		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	99.7		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-16 BH18-207I-5-7 Sampled By: V.PETERS on 21-FEB-20 @ 10:20 Matrix: SOIL							
Physical Tests							
% Moisture	6.59		0.25	%	25-FEB-20	26-FEB-20	R5006471
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Arsenic (As)	4.6		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Barium (Ba)	21.1		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	19-APR-21	R5005288
Boron (B)	7.4		5.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Cadmium (Cd)	1.38		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Calcium (Ca)	146000		50	ug/g	24-FEB-20	19-APR-21	R5005288
Chromium (Cr)	8.5		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Cobalt (Co)	3.7		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Copper (Cu)	24.4		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Iron (Fe)	11100		50	ug/g	24-FEB-20	19-APR-21	R5005288
Lead (Pb)	109		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Magnesium (Mg)	62700		20	ug/g	24-FEB-20	19-APR-21	R5005288
Molybdenum (Mo)	1.1		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Nickel (Ni)	10.2		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	25-FEB-20	R5005288
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Vanadium (V)	13.5		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Zinc (Zn)	2870		5.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Zinc (Zn)	2500	DLHC	40	ug/g	24-FEB-20	25-FEB-20	R5005288
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
Benzene	<0.0068		0.0068	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromodichloromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromoform	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromomethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Carbon tetrachloride	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-16 BH18-207I-5-7 Sampled By: V.PETERS on 21-FEB-20 @ 10:20 Matrix: SOIL							
Volatile Organic Compounds							
Chlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Dibromochloromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Chloroform	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dibromoethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,3-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,4-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Dichlorodifluoromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1-Dichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Methylene Chloride	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichloropropane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		27-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	26-FEB-20	27-FEB-20	R5009106
n-Hexane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Methyl Ethyl Ketone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
MTBE	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Styrene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Tetrachloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Toluene	<0.080		0.080	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,1-Trichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,2-Trichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Trichloroethylene	0.308		0.010	ug/g	26-FEB-20	27-FEB-20	R5009106
Trichlorofluoromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Vinyl chloride	<0.020		0.020	ug/g	26-FEB-20	27-FEB-20	R5009106
o-Xylene	<0.020		0.020	ug/g	26-FEB-20	27-FEB-20	R5009106
m+p-Xylenes	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
Xylenes (Total)	<0.050		0.050	ug/g		27-FEB-20	
Surrogate: 4-Bromofluorobenzene	97.1		50-140	%	26-FEB-20	27-FEB-20	R5009106
Surrogate: 1,4-Difluorobenzene	109.5		50-140	%	26-FEB-20	27-FEB-20	R5009106
L2419793-17 BH18-207I-7.5-9.5 Sampled By: V.PETERS on 21-FEB-20 @ 10:40 Matrix: SOIL							
Physical Tests							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-17 BH18-207I-7.5-9.5 Sampled By: V.PETERS on 21-FEB-20 @ 10:40 Matrix: SOIL							
Physical Tests							
% Moisture	8.08		0.25	%	25-FEB-20	26-FEB-20	R5006471
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Arsenic (As)	4.3		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Barium (Ba)	21.8		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	19-APR-21	R5005288
Boron (B)	10.8		5.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Cadmium (Cd)	5.30		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Calcium (Ca)	150000		50	ug/g	24-FEB-20	19-APR-21	R5005288
Chromium (Cr)	11.2		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Cobalt (Co)	3.6		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Copper (Cu)	46.9		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Iron (Fe)	67500		50	ug/g	24-FEB-20	19-APR-21	R5005288
Lead (Pb)	93.8		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Magnesium (Mg)	61300		20	ug/g	24-FEB-20	19-APR-21	R5005288
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Nickel (Ni)	15.3		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	25-FEB-20	R5005288
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005288
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Vanadium (V)	14.9		1.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Zinc (Zn)	8190		5.0	ug/g	24-FEB-20	25-FEB-20	R5005288
Zinc (Zn)	8650	DLHC	40	ug/g	24-FEB-20	25-FEB-20	R5005288
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
Benzene	<0.0068		0.0068	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromodichloromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromoform	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Bromomethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Carbon tetrachloride	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Chlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Dibromochloromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Chloroform	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dibromoethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,3-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,4-Dichlorobenzene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Dichlorodifluoromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1-Dichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-17 BH18-207I-7.5-9.5 Sampled By: V.PETERS on 21-FEB-20 @ 10:40 Matrix: SOIL							
Volatile Organic Compounds							
1,1-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Methylene Chloride	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,2-Dichloropropane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		27-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	26-FEB-20	27-FEB-20	R5009106
n-Hexane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Methyl Ethyl Ketone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	26-FEB-20	27-FEB-20	R5009106
MTBE	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Styrene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Tetrachloroethylene	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Toluene	<0.080		0.080	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,1-Trichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
1,1,2-Trichloroethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Trichloroethylene	0.040		0.010	ug/g	26-FEB-20	27-FEB-20	R5009106
Trichlorofluoromethane	<0.050		0.050	ug/g	26-FEB-20	27-FEB-20	R5009106
Vinyl chloride	<0.020		0.020	ug/g	26-FEB-20	27-FEB-20	R5009106
o-Xylene	<0.020		0.020	ug/g	26-FEB-20	27-FEB-20	R5009106
m+p-Xylenes	<0.030		0.030	ug/g	26-FEB-20	27-FEB-20	R5009106
Xylenes (Total)	<0.050		0.050	ug/g		27-FEB-20	
Surrogate: 4-Bromofluorobenzene	116.2		50-140	%	26-FEB-20	27-FEB-20	R5009106
Surrogate: 1,4-Difluorobenzene	123.4		50-140	%	26-FEB-20	27-FEB-20	R5009106
L2419793-18 BH20-212-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 12:15 Matrix: SOIL							
Physical Tests							
Conductivity	0.136		0.0040	mS/cm		25-FEB-20	R5006028
% Moisture	15.4		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617
Saturated Paste Extractables							
SAR	0.29		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	8.50		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	2.77		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	3.75		0.50	mg/L		25-FEB-20	R5004988
Metals							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-18 BH20-212-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 12:15 Matrix: SOIL							
Metals							
Antimony (Sb)	1.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Antimony (Sb)	1.2		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Arsenic (As)	4.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	4.9		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Barium (Ba)	23.1		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Barium (Ba)	23.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	6.2		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	6.2		5.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Boron (B), Hot Water Ext.	0.24		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005066
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	14900		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	14.7		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	14.7		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Cobalt (Co)	5.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	5.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Copper (Cu)	25.9		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Copper (Cu)	25.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	70900		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	23.4		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Lead (Pb)	23.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	3000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	<0.0050		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Molybdenum (Mo)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	11.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	11.5		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	25-FEB-20	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	28.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	28.8		1.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Zinc (Zn)	56.2		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	56.2		5.0	ug/g	24-FEB-20	25-FEB-20	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-18 BH20-212-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 12:15 Matrix: SOIL							
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-18 BH20-212-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 12:15 Matrix: SOIL							
Volatile Organic Compounds							
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	87.2		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	98.8		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	<10		10	ug/g	24-FEB-20	26-FEB-20	R5008228
F2-Naphth	<10		10	ug/g		27-FEB-20	
F3 (C16-C34)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
F3-PAH	<50		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	<72		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	26-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	79.1		60-140	%	24-FEB-20	26-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	76.6		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	0.070		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.038		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	0.032		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.014		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	<0.046		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	99.9		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	98.0		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-20 BH20-214-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 13:30 Matrix: SOIL							
Physical Tests							
Conductivity	0.445		0.0040	mS/cm		25-FEB-20	R5006028

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-20 BH20-214-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 13:30 Matrix: SOIL							
Physical Tests							
% Moisture	12.3		0.25	%	25-FEB-20	26-FEB-20	R5006167
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	24-FEB-20	25-FEB-20	R5005149
Saturated Paste Extractables							
SAR	0.32		0.10	SAR		25-FEB-20	R5004988
Calcium (Ca)	64.1		0.50	mg/L		25-FEB-20	R5004988
Magnesium (Mg)	10.1		0.50	mg/L		25-FEB-20	R5004988
Sodium (Na)	10.5		0.50	mg/L		25-FEB-20	R5004988
Metals							
Antimony (Sb)	3.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Arsenic (As)	9.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Barium (Ba)	54.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B)	9.5		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Boron (B), Hot Water Ext.	0.37		0.10	ug/g	24-FEB-20	25-FEB-20	R5004990
Cadmium (Cd)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Calcium (Ca)	40500		50	ug/g	24-FEB-20	14-APR-21	R5005066
Chromium (Cr)	9.4		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Cobalt (Co)	5.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Copper (Cu)	26.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Iron (Fe)	20700		50	ug/g	24-FEB-20	14-APR-21	R5005066
Lead (Pb)	67.2		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Magnesium (Mg)	13000		20	ug/g	24-FEB-20	14-APR-21	R5005066
Mercury (Hg)	0.185		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004991
Molybdenum (Mo)	1.1		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Nickel (Ni)	10.5		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Selenium (Se)	1.9		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	14-APR-21	R5005066
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	14-APR-21	R5005066
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Vanadium (V)	13.8		1.0	ug/g	24-FEB-20	14-APR-21	R5005066
Zinc (Zn)	175		5.0	ug/g	24-FEB-20	14-APR-21	R5005066
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	24-FEB-20	25-FEB-20	R5006914
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	25-FEB-20	26-FEB-20	R5006956
Benzene	0.0322		0.0068	ug/g	25-FEB-20	26-FEB-20	R5006956
Bromodichloromethane	<4.1	DLVH	4.1	ug/g	25-FEB-20	26-FEB-20	R5006956
Bromoform	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Bromomethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Carbon tetrachloride	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-20 BH20-214-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 13:30 Matrix: SOIL							
Volatile Organic Compounds							
Chlorobenzene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Dibromochloromethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Chloroform	<0.15	DLVH	0.15	ug/g	25-FEB-20	26-FEB-20	R5006956
1,2-Dibromoethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,2-Dichlorobenzene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,3-Dichlorobenzene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,4-Dichlorobenzene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Dichlorodifluoromethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1-Dichloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,2-Dichloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1-Dichloroethylene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Methylene Chloride	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,2-Dichloropropane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	25-FEB-20	26-FEB-20	R5006956
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	25-FEB-20	26-FEB-20	R5006956
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		26-FEB-20	
Ethylbenzene	0.234		0.018	ug/g	25-FEB-20	26-FEB-20	R5006956
n-Hexane	0.254		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Methyl Ethyl Ketone	<0.70	RRR	0.70	ug/g	25-FEB-20	26-FEB-20	R5006956
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	25-FEB-20	26-FEB-20	R5006956
MTBE	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Styrene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Tetrachloroethylene	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Toluene	0.611		0.080	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1,1-Trichloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
1,1,2-Trichloroethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Trichloroethylene	<0.010		0.010	ug/g	25-FEB-20	26-FEB-20	R5006956
Trichlorofluoromethane	<0.050		0.050	ug/g	25-FEB-20	26-FEB-20	R5006956
Vinyl chloride	<0.020		0.020	ug/g	25-FEB-20	26-FEB-20	R5006956
o-Xylene	1.32		0.020	ug/g	25-FEB-20	26-FEB-20	R5006956
m+p-Xylenes	1.27		0.030	ug/g	25-FEB-20	26-FEB-20	R5006956
Xylenes (Total)	2.59		0.050	ug/g		26-FEB-20	
Xylenes (Total)	2.59		0.050	ug/g		26-FEB-20	
Surrogate: 4-Bromofluorobenzene	74.3		50-140	%	25-FEB-20	26-FEB-20	R5006956
Surrogate: 1,4-Difluorobenzene	100.0		50-140	%	25-FEB-20	26-FEB-20	R5006956
Hydrocarbons							
F1 (C6-C10)	36.6		5.0	ug/g	25-FEB-20	27-FEB-20	R5006956

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-20 BH20-214-0.5-2 Sampled By: V.PETERS on 21-FEB-20 @ 13:30 Matrix: SOIL							
Hydrocarbons							
F1-BTEX	33.1		5.0	ug/g		16-MAR-20	
F2 (C10-C16)	52		10	ug/g	24-FEB-20	25-FEB-20	R5008228
F2-Naphth	50		10	ug/g		16-MAR-20	
F3 (C16-C34)	193		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F3-PAH	185		50	ug/g		16-MAR-20	
F4 (C34-C50)	61		50	ug/g	24-FEB-20	25-FEB-20	R5008228
F4G-SG (GHH-Silica)	290		250	ug/g	25-FEB-20	25-FEB-20	R5011338
Total Hydrocarbons (C6-C50)	342		72	ug/g		16-MAR-20	
Chrom. to baseline at nC50	NO				24-FEB-20	25-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	80.5		60-140	%	24-FEB-20	25-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	60.4		60-140	%	25-FEB-20	27-FEB-20	R5006956
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	0.186		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Acenaphthylene	<0.050		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Anthracene	0.328		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Benzo(a)anthracene	0.762		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Benzo(a)pyrene	0.504		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Benzo(b)fluoranthene	0.847		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Benzo(g,h,i)perylene	0.325		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Benzo(k)fluoranthene	0.224		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Chrysene	1.03		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Dibenzo(ah)anthracene	0.103		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Fluoranthene	1.56		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Fluorene	0.210		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Indeno(1,2,3-cd)pyrene	0.253		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
1+2-Methylnaphthalenes	3.76		0.042	ug/g		16-MAR-20	
1-Methylnaphthalene	1.73		0.030	ug/g	24-FEB-20	25-FEB-20	R5005211
2-Methylnaphthalene	2.04		0.030	ug/g	24-FEB-20	25-FEB-20	R5005211
Naphthalene	1.18		0.013	ug/g	24-FEB-20	25-FEB-20	R5005211
Phenanthrene	2.58		0.046	ug/g	24-FEB-20	25-FEB-20	R5005211
Pyrene	1.27		0.050	ug/g	24-FEB-20	25-FEB-20	R5005211
Surrogate: 2-Fluorobiphenyl	61.9		50-140	%	24-FEB-20	25-FEB-20	R5005211
Surrogate: p-Terphenyl d14	71.4		50-140	%	24-FEB-20	25-FEB-20	R5005211
Report Remarks : RRR: LOR raised due to possible false positive.							
L2419793-21 BH20-214-2.5-3 Sampled By: V.PETERS on 21-FEB-20 @ 13:45 Matrix: SOIL							
Physical Tests							
Conductivity	0.373		0.0040	mS/cm		26-FEB-20	R5008606
% Moisture	16.0		0.25	%	22-FEB-20	23-FEB-20	R5001687
Cyanides							
Cyanide, Weak Acid Diss	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002617

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-21 BH20-214-2.5-3 Sampled By: V.PETERS on 21-FEB-20 @ 13:45 Matrix: SOIL							
Cyanides							
Saturated Paste Extractables							
SAR	0.51		0.10	SAR		25-FEB-20	R5006107
Calcium (Ca)	43.8		0.50	mg/L		25-FEB-20	R5006107
Magnesium (Mg)	6.22		0.50	mg/L		25-FEB-20	R5006107
Sodium (Na)	13.5		0.50	mg/L		25-FEB-20	R5006107
Metals							
Antimony (Sb)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Arsenic (As)	8.5		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Barium (Ba)	51.3		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Beryllium (Be)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005001
Bismuth (Bi)	<1.0		1.0	ug/g	24-FEB-20	19-APR-21	R5005001
Boron (B)	10.4		5.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Boron (B), Hot Water Ext.	0.43		0.10	ug/g	25-FEB-20	25-FEB-20	R5005666
Cadmium (Cd)	0.89		0.50	ug/g	24-FEB-20	25-FEB-20	R5005001
Calcium (Ca)	98300		50	ug/g	24-FEB-20	19-APR-21	R5005001
Chromium (Cr)	15.6		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Cobalt (Co)	5.7		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Copper (Cu)	21.9		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Iron (Fe)	30100		50	ug/g	24-FEB-20	19-APR-21	R5005001
Lead (Pb)	133		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Magnesium (Mg)	52300		20	ug/g	24-FEB-20	19-APR-21	R5005001
Mercury (Hg)	0.0751		0.0050	ug/g	24-FEB-20	25-FEB-20	R5004997
Molybdenum (Mo)	1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Nickel (Ni)	14.2		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Selenium (Se)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Silver (Ag)	<0.20		0.20	ug/g	24-FEB-20	25-FEB-20	R5005001
Thallium (Tl)	<0.50		0.50	ug/g	24-FEB-20	25-FEB-20	R5005001
Uranium (U)	<1.0		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Vanadium (V)	26.1		1.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Zinc (Zn)	567		5.0	ug/g	24-FEB-20	25-FEB-20	R5005001
Speciated Metals							
Chromium, Hexavalent	<0.20		0.20	ug/g	22-FEB-20	24-FEB-20	R5006648
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-21 BH20-214-2.5-3 Sampled By: V.PETERS on 21-FEB-20 @ 13:45 Matrix: SOIL							
Volatile Organic Compounds							
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	91.8		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	105.0		50-140	%	22-FEB-20	24-FEB-20	R5002212
Hydrocarbons							
F1 (C6-C10)	<5.0		5.0	ug/g	22-FEB-20	24-FEB-20	R5002212
F1-BTEX	<5.0		5.0	ug/g		27-FEB-20	
F2 (C10-C16)	12		10	ug/g	24-FEB-20	26-FEB-20	R5008228
F2-Naphth	12		10	ug/g		27-FEB-20	
F3 (C16-C34)	68		50	ug/g	24-FEB-20	26-FEB-20	R5008228

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-21 BH20-214-2.5-3 Sampled By: V.PETERS on 21-FEB-20 @ 13:45 Matrix: SOIL							
Hydrocarbons							
F3-PAH	68		50	ug/g		27-FEB-20	
F4 (C34-C50)	<50		50	ug/g	24-FEB-20	26-FEB-20	R5008228
Total Hydrocarbons (C6-C50)	80		72	ug/g		27-FEB-20	
Chrom. to baseline at nC50	YES				24-FEB-20	26-FEB-20	R5008228
Surrogate: 2-Bromobenzotrifluoride	75.0		60-140	%	24-FEB-20	26-FEB-20	R5008228
Surrogate: 3,4-Dichlorotoluene	72.5		60-140	%	22-FEB-20	24-FEB-20	R5002212
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Acenaphthylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(a)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(b)fluoranthene	0.056		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(g,h,i)perylene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Benzo(k)fluoranthene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Chrysene	0.064		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Dibenzo(ah)anthracene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluoranthene	0.080		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Fluorene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Indeno(1,2,3-cd)pyrene	<0.050		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
1+2-Methylnaphthalenes	0.368		0.042	ug/g		25-FEB-20	
1-Methylnaphthalene	0.166		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
2-Methylnaphthalene	0.202		0.030	ug/g	22-FEB-20	25-FEB-20	R5004428
Naphthalene	0.120		0.013	ug/g	22-FEB-20	25-FEB-20	R5004428
Phenanthrene	0.168		0.046	ug/g	22-FEB-20	25-FEB-20	R5004428
Pyrene	0.069		0.050	ug/g	22-FEB-20	25-FEB-20	R5004428
Surrogate: 2-Fluorobiphenyl	98.7		50-140	%	22-FEB-20	25-FEB-20	R5004428
Surrogate: p-Terphenyl d14	101.1		50-140	%	22-FEB-20	25-FEB-20	R5004428
L2419793-22 TB-001 Sampled By: V.PETERS on 21-FEB-20 Matrix: SOIL							
Physical Tests							
% Moisture	<0.25		0.25	%	22-FEB-20	23-FEB-20	R5001687
Volatile Organic Compounds							
Acetone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Benzene	<0.0068		0.0068	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromodichloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromoform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Bromomethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Carbon tetrachloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Chlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dibromochloromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2419793-22 TB-001 Sampled By: V.PETERS on 21-FEB-20 Matrix: SOIL							
Volatile Organic Compounds							
Chloroform	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dibromoethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,4-Dichlorobenzene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Dichlorodifluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,2-Dichloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methylene Chloride	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,2-Dichloropropane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
cis-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
trans-1,3-Dichloropropene	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
1,3-Dichloropropene (cis & trans)	<0.042		0.042	ug/g		24-FEB-20	
Ethylbenzene	<0.018		0.018	ug/g	22-FEB-20	24-FEB-20	R5002212
n-Hexane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Ethyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
Methyl Isobutyl Ketone	<0.50		0.50	ug/g	22-FEB-20	24-FEB-20	R5002212
MTBE	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Styrene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2,2-Tetrachloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Tetrachloroethylene	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Toluene	<0.080		0.080	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,1-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
1,1,2-Trichloroethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichloroethylene	<0.010		0.010	ug/g	22-FEB-20	24-FEB-20	R5002212
Trichlorofluoromethane	<0.050		0.050	ug/g	22-FEB-20	24-FEB-20	R5002212
Vinyl chloride	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
o-Xylene	<0.020		0.020	ug/g	22-FEB-20	24-FEB-20	R5002212
m+p-Xylenes	<0.030		0.030	ug/g	22-FEB-20	24-FEB-20	R5002212
Xylenes (Total)	<0.050		0.050	ug/g		24-FEB-20	
Surrogate: 4-Bromofluorobenzene	92.5		50-140	%	22-FEB-20	24-FEB-20	R5002212
Surrogate: 1,4-Difluorobenzene	104.9		50-140	%	22-FEB-20	24-FEB-20	R5002212

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Laboratory Control Sample	3,3'-Dichlorobenzidine	LCS-L	L2419793-13

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLVH	Detection Limit raised due to interference from Volatile Hydrocarbons on VOC method. Chromatographic elution of interfering peaks in the same region as test analytes prevents a determination of whether VOC analyte is present or absent (above/below regular detection limits).
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RRR	Refer to Report Remarks for issues regarding this analysis
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DINITROTOL-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
EC-WT	Soil	Conductivity (EC)	MOEE E3138

A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

Reference Information

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT Soil F1-O.Reg 153/04 (July 2011) E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT Soil F2-F4-O.Reg 153/04 (July 2011) CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F4G-ADD-511-WT Soil F4G SG-O.Reg 153/04 (July 2011) MOE DECPH-E3398/CCME TIER 1

F4G, gravimetric analysis, is determined if the chromatogram does not return to baseline at or before C50. A soil sample is extracted with a solvent mix, the solvent is evaporated and the weight of the residue is determined.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-200.2-CVAA-WT Soil Mercury in Soil by CVAAS EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-200.2-CCMS-WT Soil Metals in Soil by CRC ICPMS EPA 200.2/6020B (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG

Reference Information

must be reported).

METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

VOC-1,3-DCP-CALC-WT	Soil	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-795231

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R5012104								
WG3283089-3 DUP		**WG3283089-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-MAR-20
1,2,4-Trichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
2-Chlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4-Dichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4-Dimethylphenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4-Dinitrophenol		<1.0	<1.0	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4-Dinitrotoluene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4,5-Trichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2,4,6-Trichlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
2,6-Dinitrotoluene		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
3,3'-Dichlorobenzidine		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
4-Chloroaniline		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Benzo(ghi)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Biphenyl		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Bis(2-chloroethyl)ether		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Bis(2-chloroisopropyl)ether		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Bis(2-ethylhexyl)phthalate		<0.10	<0.20	RPD-NA	ug/g	N/A	40	02-MAR-20
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Dibenzo(a,h)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Diethylphthalate		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Dimethylphthalate		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Naphthalene		<0.050	<0.050		ug/g			02-MAR-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R5012104								
WG3283089-3 DUP		**WG3283089-5**						
Naphthalene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Pentachlorophenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Phenanthrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
Phenol		<0.10	<0.10	RPD-NA	ug/g	N/A	40	02-MAR-20
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	02-MAR-20
WG3283089-2 LCS								
1-Methylnaphthalene			99.5		%		50-140	02-MAR-20
1,2,4-Trichlorobenzene			86.6		%		50-140	02-MAR-20
2-Chlorophenol			95.0		%		50-140	02-MAR-20
2-Methylnaphthalene			98.4		%		50-140	02-MAR-20
2,4-Dichlorophenol			97.5		%		50-140	02-MAR-20
2,4-Dimethylphenol			94.4		%		30-130	02-MAR-20
2,4-Dinitrophenol			84.6		%		30-130	02-MAR-20
2,4-Dinitrotoluene			101.6		%		50-140	02-MAR-20
2,4,5-Trichlorophenol			97.9		%		50-140	02-MAR-20
2,4,6-Trichlorophenol			98.5		%		50-140	02-MAR-20
2,6-Dinitrotoluene			96.4		%		50-140	02-MAR-20
3,3'-Dichlorobenzidine			21.4	LCS-L	%		30-130	02-MAR-20
4-Chloroaniline			68.9		%		30-130	02-MAR-20
Acenaphthene			95.5		%		50-140	02-MAR-20
Acenaphthylene			86.7		%		50-140	02-MAR-20
Anthracene			92.2		%		50-140	02-MAR-20
Benzo(a)anthracene			97.0		%		50-140	02-MAR-20
Benzo(a)pyrene			99.3		%		50-140	02-MAR-20
Benzo(b)fluoranthene			95.2		%		50-140	02-MAR-20
Benzo(ghi)perylene			108.9		%		50-140	02-MAR-20
Benzo(k)fluoranthene			115.6		%		50-140	02-MAR-20
Biphenyl			96.4		%		50-140	02-MAR-20
Bis(2-chloroethyl)ether			89.7		%		50-140	02-MAR-20
Bis(2-chloroisopropyl)ether			88.0		%		50-140	02-MAR-20
Bis(2-ethylhexyl)phthalate			95.2		%		50-140	02-MAR-20
Chrysene			104.2		%		50-140	02-MAR-20
Dibenzo(a,h)anthracene			109.7		%		50-140	02-MAR-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R5012104								
WG3283089-2 LCS								
Diethylphthalate			91.9		%		50-140	02-MAR-20
Dimethylphthalate			90.9		%		50-140	02-MAR-20
Fluoranthene			96.4		%		50-140	02-MAR-20
Fluorene			92.9		%		50-140	02-MAR-20
Indeno(1,2,3-cd)pyrene			102.5		%		50-140	02-MAR-20
Naphthalene			91.5		%		50-140	02-MAR-20
Pentachlorophenol			96.7		%		50-140	02-MAR-20
Phenanthrene			95.1		%		50-140	02-MAR-20
Phenol			86.7		%		30-130	02-MAR-20
Pyrene			95.0		%		50-140	02-MAR-20
WG3283089-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	02-MAR-20
1,2,4-Trichlorobenzene			<0.050		ug/g		0.05	02-MAR-20
2-Chlorophenol			<0.10		ug/g		0.1	02-MAR-20
2-Methylnaphthalene			<0.030		ug/g		0.03	02-MAR-20
2,4-Dichlorophenol			<0.10		ug/g		0.1	02-MAR-20
2,4-Dimethylphenol			<0.10		ug/g		0.1	02-MAR-20
2,4-Dinitrophenol			<1.0		ug/g		1	02-MAR-20
2,4-Dinitrotoluene			<0.10		ug/g		0.1	02-MAR-20
2,4,5-Trichlorophenol			<0.10		ug/g		0.1	02-MAR-20
2,4,6-Trichlorophenol			<0.10		ug/g		0.1	02-MAR-20
2,6-Dinitrotoluene			<0.10		ug/g		0.1	02-MAR-20
3,3'-Dichlorobenzidine			<0.10		ug/g		0.1	02-MAR-20
4-Chloroaniline			<0.10		ug/g		0.1	02-MAR-20
Acenaphthene			<0.050		ug/g		0.05	02-MAR-20
Acenaphthylene			<0.050		ug/g		0.05	02-MAR-20
Anthracene			<0.050		ug/g		0.05	02-MAR-20
Benzo(a)anthracene			<0.050		ug/g		0.05	02-MAR-20
Benzo(a)pyrene			<0.050		ug/g		0.05	02-MAR-20
Benzo(b)fluoranthene			<0.050		ug/g		0.05	02-MAR-20
Benzo(ghi)perylene			<0.050		ug/g		0.05	02-MAR-20
Benzo(k)fluoranthene			<0.050		ug/g		0.05	02-MAR-20
Biphenyl			<0.050		ug/g		0.05	02-MAR-20
Bis(2-chloroethyl)ether			<0.10		ug/g		0.1	02-MAR-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R5012104								
WG3283089-1 MB								
Bis(2-chloroisopropyl)ether			<0.10		ug/g		0.1	02-MAR-20
Bis(2-ethylhexyl)phthalate			<0.10		ug/g		0.1	02-MAR-20
Chrysene			<0.050		ug/g		0.05	02-MAR-20
Dibenzo(a,h)anthracene			<0.050		ug/g		0.05	02-MAR-20
Diethylphthalate			<0.10		ug/g		0.1	02-MAR-20
Dimethylphthalate			<0.10		ug/g		0.1	02-MAR-20
Fluoranthene			<0.050		ug/g		0.05	02-MAR-20
Fluorene			<0.050		ug/g		0.05	02-MAR-20
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	02-MAR-20
Naphthalene			<0.050		ug/g		0.05	02-MAR-20
Pentachlorophenol			<0.10		ug/g		0.1	02-MAR-20
Phenanthrene			<0.050		ug/g		0.05	02-MAR-20
Phenol			<0.10		ug/g		0.1	02-MAR-20
Pyrene			<0.050		ug/g		0.05	02-MAR-20
Surrogate: 2-Fluorobiphenyl			107.3		%		50-140	02-MAR-20
Surrogate: 2,4,6-Tribromophenol			63.3		%		50-140	02-MAR-20
Surrogate: Nitrobenzene d5			100.0		%		50-140	02-MAR-20
Surrogate: p-Terphenyl d14			141.0	SURQC	%		50-140	02-MAR-20
WG3283089-4 MS		**WG3283089-5**						
1-Methylnaphthalene			103.1		%		50-140	02-MAR-20
1,2,4-Trichlorobenzene			88.4		%		50-140	02-MAR-20
2-Chlorophenol			98.2		%		50-140	02-MAR-20
2-Methylnaphthalene			102.1		%		50-140	02-MAR-20
2,4-Dichlorophenol			99.4		%		50-140	02-MAR-20
2,4-Dimethylphenol			87.1		%		30-150	02-MAR-20
2,4-Dinitrophenol			92.5		%		30-150	02-MAR-20
2,4-Dinitrotoluene			107.0		%		50-140	02-MAR-20
2,4,5-Trichlorophenol			103.1		%		50-140	02-MAR-20
2,4,6-Trichlorophenol			103.0		%		50-140	02-MAR-20
2,6-Dinitrotoluene			101.9		%		50-140	02-MAR-20
3,3'-Dichlorobenzidine			97.2		%		30-130	02-MAR-20
4-Chloroaniline			85.7		%		30-130	02-MAR-20
Acenaphthene			98.2		%		50-140	02-MAR-20
Acenaphthylene			91.4		%		50-140	02-MAR-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Soil**							
Batch R5012104								
WG3283089-4 MS		**WG3283089-5**						
Anthracene			98.3		%		50-140	02-MAR-20
Benzo(a)anthracene			112.8		%		50-140	02-MAR-20
Benzo(a)pyrene			100.1		%		50-140	02-MAR-20
Benzo(b)fluoranthene			87.4		%		50-140	02-MAR-20
Benzo(ghi)perylene			102.5		%		50-140	02-MAR-20
Benzo(k)fluoranthene			104.1		%		50-140	02-MAR-20
Biphenyl			98.9		%		50-140	02-MAR-20
Bis(2-chloroethyl)ether			93.7		%		50-140	02-MAR-20
Bis(2-chloroisopropyl)ether			90.6		%		50-140	02-MAR-20
Bis(2-ethylhexyl)phthalate			122.2		%		50-140	02-MAR-20
Chrysene			101.0		%		50-140	02-MAR-20
Dibenzo(a,h)anthracene			93.5		%		50-140	02-MAR-20
Diethylphthalate			91.9		%		50-140	02-MAR-20
Dimethylphthalate			93.8		%		50-140	02-MAR-20
Fluoranthene			97.7		%		50-140	02-MAR-20
Fluorene			94.5		%		50-140	02-MAR-20
Indeno(1,2,3-cd)pyrene			95.3		%		50-140	02-MAR-20
Naphthalene			94.0		%		50-140	02-MAR-20
Pentachlorophenol			98.8		%		50-140	02-MAR-20
Phenanthrene			96.7		%		50-140	02-MAR-20
Phenol			90.0		%		30-130	02-MAR-20
Pyrene			97.0		%		50-140	02-MAR-20
B-HWS-R511-WT	**Soil**							
Batch R5004990								
WG3281013-4 DUP		**L2419793-5**						
Boron (B), Hot Water Ext.		0.23	0.21		ug/g	7.6	30	25-FEB-20
WG3281013-2 IRM		**WT SAR3**						
Boron (B), Hot Water Ext.			90.2		%		70-130	25-FEB-20
WG3281013-3 LCS								
Boron (B), Hot Water Ext.			102.0		%		70-130	25-FEB-20
WG3281013-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
B-HWS-R511-WT	**Soil**							
Batch R5005666								
WG3281016-4 DUP		**L2419876-7**						
Boron (B), Hot Water Ext.		0.17	0.18		ug/g	3.4	30	25-FEB-20
WG3281016-2 IRM		**WT SAR3**						
Boron (B), Hot Water Ext.			99.1		%		70-130	25-FEB-20
WG3281016-3 LCS								
Boron (B), Hot Water Ext.			102.0		%		70-130	25-FEB-20
WG3281016-1 MB								
Boron (B), Hot Water Ext.			<0.10		ug/g		0.1	25-FEB-20
CN-WAD-R511-WT	**Soil**							
Batch R5002617								
WG3279038-3 DUP		**L2418765-7**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	24-FEB-20
WG3279038-2 LCS								
Cyanide, Weak Acid Diss			91.5		%		80-120	24-FEB-20
WG3279038-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	24-FEB-20
WG3279038-4 MS		**L2418765-7**						
Cyanide, Weak Acid Diss			100.4		%		70-130	24-FEB-20
Batch R5005149								
WG3280381-3 DUP		**WG3280381-5**						
Cyanide, Weak Acid Diss		<0.050	<0.050	RPD-NA	ug/g	N/A	35	25-FEB-20
WG3280381-2 LCS								
Cyanide, Weak Acid Diss			100.3		%		80-120	25-FEB-20
WG3280381-1 MB								
Cyanide, Weak Acid Diss			<0.050		ug/g		0.05	25-FEB-20
WG3280381-4 MS		**WG3280381-5**						
Cyanide, Weak Acid Diss			122.5		%		70-130	25-FEB-20
CR-CR6-IC-WT	**Soil**							
Batch R5006648								
WG3279901-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			92.4		%		70-130	24-FEB-20
WG3279901-3 DUP		**L2419793-18**						
Chromium, Hexavalent		<0.20	<0.20	RPD-NA	ug/g	N/A	35	24-FEB-20
WG3279901-2 LCS								
Chromium, Hexavalent			87.7		%		80-120	24-FEB-20
WG3279901-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	**Soil**							
Batch R5006914								
WG3280630-4 CRM		**WT-SQC012**						
Chromium, Hexavalent			93.7		%		70-130	25-FEB-20
WG3280630-3 DUP		**L2419312-1**						
Chromium, Hexavalent		0.36	<0.20	RPD-NA	ug/g	N/A	35	25-FEB-20
WG3280630-2 LCS								
Chromium, Hexavalent			93.4		%		80-120	25-FEB-20
WG3280630-1 MB								
Chromium, Hexavalent			<0.20		ug/g		0.2	25-FEB-20
EC-WT	**Soil**							
Batch R5006028								
WG3281014-4 DUP		**WG3281014-3**						
Conductivity		0.320	0.333		mS/cm	4.0	20	25-FEB-20
WG3281014-2 IRM		**WT SAR3**						
Conductivity			98.1		%		70-130	25-FEB-20
WG3281292-1 LCS								
Conductivity			99.9		%		90-110	25-FEB-20
WG3281014-1 MB								
Conductivity			<0.0040		mS/cm		0.004	25-FEB-20
Batch R5008606								
WG3281021-4 DUP		**WG3281021-3**						
Conductivity		0.766	0.788		mS/cm	2.8	20	26-FEB-20
WG3281021-2 IRM		**WT SAR3**						
Conductivity			108.7		%		70-130	26-FEB-20
WG3281294-1 LCS								
Conductivity			100.3		%		90-110	26-FEB-20
WG3281021-1 MB								
Conductivity			<0.0040		mS/cm		0.004	26-FEB-20
F1-HS-511-WT	**Soil**							
Batch R5002212								
WG3279894-4 DUP		**WG3279894-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	24-FEB-20
WG3279894-2 LCS								
F1 (C6-C10)			107.3		%		80-120	24-FEB-20
WG3279894-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	24-FEB-20
Surrogate: 3,4-Dichlorotoluene			93.5		%		60-140	24-FEB-20
WG3279894-6 MS		**L2419680-3**						

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Soil**							
Batch R5002212								
WG3279894-6 MS		**L2419680-3**						
F1 (C6-C10)			102.9		%		60-140	24-FEB-20
Batch R5006956								
WG3281118-4 DUP		**WG3281118-3**						
F1 (C6-C10)		<5.0	<5.0	RPD-NA	ug/g	N/A	30	26-FEB-20
WG3281118-2 LCS								
F1 (C6-C10)			107.6		%		80-120	26-FEB-20
WG3281118-1 MB								
F1 (C6-C10)			<5.0		ug/g		5	26-FEB-20
Surrogate: 3,4-Dichlorotoluene			88.1		%		60-140	26-FEB-20
WG3281118-6 MS		**L2419275-2**						
F1 (C6-C10)			119.0		%		60-140	26-FEB-20
F2-F4-511-WT	**Soil**							
Batch R5008228								
WG3280548-3 DUP		**WG3280548-5**						
F2 (C10-C16)		<10	<10	RPD-NA	ug/g	N/A	30	25-FEB-20
F3 (C16-C34)		<50	<50	RPD-NA	ug/g	N/A	30	25-FEB-20
F4 (C34-C50)		<50	<50	RPD-NA	ug/g	N/A	30	25-FEB-20
WG3280548-2 LCS								
F2 (C10-C16)			96.5		%		80-120	26-FEB-20
F3 (C16-C34)			101.0		%		80-120	26-FEB-20
F4 (C34-C50)			97.9		%		80-120	26-FEB-20
WG3280548-1 MB								
F2 (C10-C16)			<10		ug/g		10	25-FEB-20
F3 (C16-C34)			<50		ug/g		50	25-FEB-20
F4 (C34-C50)			<50		ug/g		50	25-FEB-20
Surrogate: 2-Bromobenzotrifluoride			71.7		%		60-140	25-FEB-20
WG3280548-4 MS		**WG3280548-5**						
F2 (C10-C16)			96.1		%		60-140	26-FEB-20
F3 (C16-C34)			95.7		%		60-140	26-FEB-20
F4 (C34-C50)			94.2		%		60-140	26-FEB-20
F4G-ADD-511-WT	**Soil**							
Batch R5011338								
WG3283902-2 LCS								
F4G-SG (GHH-Silica)			84.6		%		60-140	25-FEB-20
WG3283902-1 MB								

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F4G-ADD-511-WT	**Soil**							
Batch R5011338								
WG3283902-1 MB								
F4G-SG (GHH-Silica)			<250		ug/g		250	25-FEB-20
HG-200.2-CVAA-WT	**Soil**							
Batch R5004991								
WG3281001-2 CRM		**WT-CANMET-TILL2**						
Mercury (Hg)			113.5		%		70-130	25-FEB-20
WG3281001-6 DUP		**WG3281001-5**						
Mercury (Hg)		0.0262	0.0248		ug/g	5.7	40	25-FEB-20
WG3281001-3 LCS								
Mercury (Hg)			111.0		%		80-120	25-FEB-20
WG3281001-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	25-FEB-20
Batch R5004997								
WG3281003-2 CRM		**WT-CANMET-TILL2**						
Mercury (Hg)			109.4		%		70-130	25-FEB-20
WG3281003-6 DUP		**WG3281003-5**						
Mercury (Hg)		0.0240	0.0246		ug/g	2.8	40	25-FEB-20
WG3281003-3 LCS								
Mercury (Hg)			117.5		%		80-120	25-FEB-20
WG3281003-1 MB								
Mercury (Hg)			<0.0050		mg/kg		0.005	25-FEB-20
MET-200.2-CCMS-WT	**Soil**							
Batch R5005001								
WG3281003-2 CRM		**WT-CANMET-TILL2**						
Antimony (Sb)			100.7		%		70-130	25-FEB-20
Arsenic (As)			97.7		%		70-130	25-FEB-20
Barium (Ba)			95.4		%		70-130	25-FEB-20
Beryllium (Be)			98.6		%		70-130	25-FEB-20
Bismuth (Bi)			93.2		%		70-130	25-FEB-20
Boron (B)			3.3		mg/kg		0-8.6	25-FEB-20
Cadmium (Cd)			96.1		%		70-130	25-FEB-20
Calcium (Ca)			98.2		%		70-130	25-FEB-20
Chromium (Cr)			96.0		%		70-130	25-FEB-20
Cobalt (Co)			97.2		%		70-130	25-FEB-20
Copper (Cu)			97.7		%		70-130	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005001								
WG3281003-2 CRM		**WT-CANMET-TILL2**						
Iron (Fe)			97.0		%		70-130	25-FEB-20
Lead (Pb)			94.1		%		70-130	25-FEB-20
Magnesium (Mg)			92.8		%		70-130	25-FEB-20
Molybdenum (Mo)			98.3		%		70-130	25-FEB-20
Nickel (Ni)			98.1		%		70-130	25-FEB-20
Selenium (Se)			0.32		mg/kg		0.15-0.55	25-FEB-20
Silver (Ag)			0.26		mg/kg		0.16-0.36	25-FEB-20
Thallium (Tl)			93.5		%		70-130	25-FEB-20
Uranium (U)			91.2		%		70-130	25-FEB-20
Vanadium (V)			96.5		%		70-130	25-FEB-20
Zinc (Zn)			95.3		%		70-130	25-FEB-20
WG3281003-6 DUP		**WG3281003-5**						
Antimony (Sb)		0.28	0.34		ug/g	19	30	25-FEB-20
Arsenic (As)		5.32	5.64		ug/g	5.9	30	25-FEB-20
Barium (Ba)		74.6	79.2		ug/g	6.0	40	25-FEB-20
Beryllium (Be)		0.48	0.50		ug/g	3.5	30	25-FEB-20
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	25-FEB-20
Boron (B)		14.0	14.8		ug/g	5.2	30	25-FEB-20
Cadmium (Cd)		0.147	0.145		ug/g	1.1	30	25-FEB-20
Calcium (Ca)		103000	106000		ug/g	2.4	30	25-FEB-20
Chromium (Cr)		17.1	17.9		ug/g	5.0	30	25-FEB-20
Cobalt (Co)		5.98	6.22		ug/g	4.0	30	25-FEB-20
Copper (Cu)		12.5	12.7		ug/g	1.4	30	25-FEB-20
Iron (Fe)		15000	15800		ug/g	5.2	30	25-FEB-20
Lead (Pb)		6.04	6.11		ug/g	1.2	40	25-FEB-20
Magnesium (Mg)		33600	35300		ug/g	4.8	30	25-FEB-20
Molybdenum (Mo)		3.41	3.57		ug/g	4.7	40	25-FEB-20
Nickel (Ni)		18.2	19.2		ug/g	5.0	30	25-FEB-20
Selenium (Se)		0.22	0.23		ug/g	4.1	30	25-FEB-20
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	25-FEB-20
Thallium (Tl)		0.151	0.152		ug/g	0.8	30	25-FEB-20
Uranium (U)		1.04	1.04		ug/g	0.5	30	25-FEB-20
Vanadium (V)		23.4	24.8		ug/g	5.8	30	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005001								
WG3281003-6 DUP		**WG3281003-5**						
Zinc (Zn)		32.1	32.3		ug/g	0.8	30	25-FEB-20
WG3281003-4 LCS								
Antimony (Sb)			107.3		%		80-120	25-FEB-20
Arsenic (As)			99.0		%		80-120	25-FEB-20
Barium (Ba)			99.4		%		80-120	25-FEB-20
Beryllium (Be)			102.6		%		80-120	25-FEB-20
Bismuth (Bi)			96.8		%		80-120	25-FEB-20
Boron (B)			98.1		%		80-120	25-FEB-20
Cadmium (Cd)			98.1		%		80-120	25-FEB-20
Calcium (Ca)			99.4		%		80-120	25-FEB-20
Chromium (Cr)			97.3		%		80-120	25-FEB-20
Cobalt (Co)			97.4		%		80-120	25-FEB-20
Copper (Cu)			96.7		%		80-120	25-FEB-20
Iron (Fe)			100.8		%		80-120	25-FEB-20
Lead (Pb)			96.8		%		80-120	25-FEB-20
Magnesium (Mg)			96.1		%		80-120	25-FEB-20
Molybdenum (Mo)			101.9		%		80-120	25-FEB-20
Nickel (Ni)			96.9		%		80-120	25-FEB-20
Selenium (Se)			98.8		%		80-120	25-FEB-20
Silver (Ag)			100.8		%		80-120	25-FEB-20
Thallium (Tl)			98.5		%		80-120	25-FEB-20
Uranium (U)			95.9		%		80-120	25-FEB-20
Vanadium (V)			99.9		%		80-120	25-FEB-20
Zinc (Zn)			96.7		%		80-120	25-FEB-20
WG3281003-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	25-FEB-20
Arsenic (As)			<0.10		mg/kg		0.1	25-FEB-20
Barium (Ba)			<0.50		mg/kg		0.5	25-FEB-20
Beryllium (Be)			<0.10		mg/kg		0.1	25-FEB-20
Bismuth (Bi)			<0.20		mg/kg		0.2	25-FEB-20
Boron (B)			<5.0		mg/kg		5	25-FEB-20
Cadmium (Cd)			<0.020		mg/kg		0.02	25-FEB-20
Calcium (Ca)			<50		mg/kg		50	25-FEB-20
Chromium (Cr)			<0.50		mg/kg		0.5	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005001								
WG3281003-1 MB								
Cobalt (Co)			<0.10		mg/kg		0.1	25-FEB-20
Copper (Cu)			<0.50		mg/kg		0.5	25-FEB-20
Iron (Fe)			<50		mg/kg		50	25-FEB-20
Lead (Pb)			<0.50		mg/kg		0.5	25-FEB-20
Magnesium (Mg)			<20		mg/kg		20	25-FEB-20
Molybdenum (Mo)			<0.10		mg/kg		0.1	25-FEB-20
Nickel (Ni)			<0.50		mg/kg		0.5	25-FEB-20
Selenium (Se)			<0.20		mg/kg		0.2	25-FEB-20
Silver (Ag)			<0.10		mg/kg		0.1	25-FEB-20
Thallium (Tl)			<0.050		mg/kg		0.05	25-FEB-20
Uranium (U)			<0.050		mg/kg		0.05	25-FEB-20
Vanadium (V)			<0.20		mg/kg		0.2	25-FEB-20
Zinc (Zn)			<2.0		mg/kg		2	25-FEB-20
Batch R5005066								
WG3281001-2 CRM		**WT-CANMET-TILL2**						
Antimony (Sb)			83.0		%		70-130	25-FEB-20
Arsenic (As)			84.8		%		70-130	25-FEB-20
Barium (Ba)			87.2		%		70-130	25-FEB-20
Beryllium (Be)			82.4		%		70-130	25-FEB-20
Bismuth (Bi)			83.0		%		70-130	25-FEB-20
Boron (B)			2.9		mg/kg		0-8.6	25-FEB-20
Cadmium (Cd)			81.0		%		70-130	25-FEB-20
Calcium (Ca)			86.8		%		70-130	25-FEB-20
Chromium (Cr)			87.5		%		70-130	25-FEB-20
Cobalt (Co)			86.2		%		70-130	25-FEB-20
Copper (Cu)			85.9		%		70-130	25-FEB-20
Iron (Fe)			87.7		%		70-130	25-FEB-20
Lead (Pb)			84.2		%		70-130	25-FEB-20
Magnesium (Mg)			82.4		%		70-130	25-FEB-20
Molybdenum (Mo)			88.2		%		70-130	25-FEB-20
Nickel (Ni)			87.4		%		70-130	25-FEB-20
Selenium (Se)			0.28		mg/kg		0.15-0.55	25-FEB-20
Silver (Ag)			0.22		mg/kg		0.16-0.36	25-FEB-20
Thallium (Tl)			85.8		%		70-130	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005066								
WG3281001-2 CRM		**WT-CANMET-TILL2**						
Uranium (U)			83.9		%		70-130	25-FEB-20
Vanadium (V)			86.7		%		70-130	25-FEB-20
Zinc (Zn)			81.0		%		70-130	25-FEB-20
WG3281001-6 DUP		**WG3281001-5**						
Antimony (Sb)		0.37	0.42		ug/g	12	30	25-FEB-20
Arsenic (As)		5.96	6.16		ug/g	3.3	30	25-FEB-20
Barium (Ba)		76.9	79.6		ug/g	3.4	40	25-FEB-20
Beryllium (Be)		0.82	0.83		ug/g	0.9	30	25-FEB-20
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	25-FEB-20
Boron (B)		11.6	16.5	J	ug/g	4.9	10	25-FEB-20
Cadmium (Cd)		0.122	0.127		ug/g	4.1	30	25-FEB-20
Calcium (Ca)		9740	9680		ug/g	0.6	30	25-FEB-20
Chromium (Cr)		26.0	27.0		ug/g	3.7	30	25-FEB-20
Cobalt (Co)		13.0	13.1		ug/g	0.7	30	25-FEB-20
Copper (Cu)		10.7	10.7		ug/g	0.1	30	25-FEB-20
Iron (Fe)		31500	32400		ug/g	2.6	30	25-FEB-20
Lead (Pb)		17.8	17.8		ug/g	0.0	40	25-FEB-20
Magnesium (Mg)		7290	7550		ug/g	3.5	30	25-FEB-20
Molybdenum (Mo)		0.89	0.93		ug/g	4.0	40	25-FEB-20
Nickel (Ni)		26.3	26.6		ug/g	1.0	30	25-FEB-20
Selenium (Se)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	25-FEB-20
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	25-FEB-20
Thallium (Tl)		0.128	0.143		ug/g	11	30	25-FEB-20
Uranium (U)		0.596	0.607		ug/g	1.8	30	25-FEB-20
Vanadium (V)		32.0	34.1		ug/g	6.5	30	25-FEB-20
Zinc (Zn)		72.6	75.4		ug/g	3.8	30	25-FEB-20
WG3281001-4 LCS								
Antimony (Sb)			100.1		%		80-120	25-FEB-20
Arsenic (As)			96.2		%		80-120	25-FEB-20
Barium (Ba)			100.7		%		80-120	25-FEB-20
Beryllium (Be)			91.4		%		80-120	25-FEB-20
Bismuth (Bi)			98.0		%		80-120	25-FEB-20
Boron (B)			92.5		%		80-120	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005066								
WG3281001-4 LCS								
Cadmium (Cd)			92.6		%		80-120	25-FEB-20
Calcium (Ca)			101.6		%		80-120	25-FEB-20
Chromium (Cr)			103.5		%		80-120	25-FEB-20
Cobalt (Co)			100.7		%		80-120	25-FEB-20
Copper (Cu)			99.8		%		80-120	25-FEB-20
Iron (Fe)			112.1		%		80-120	25-FEB-20
Lead (Pb)			99.95		%		80-120	25-FEB-20
Magnesium (Mg)			104.5		%		80-120	25-FEB-20
Molybdenum (Mo)			102.0		%		80-120	25-FEB-20
Nickel (Ni)			99.8		%		80-120	25-FEB-20
Selenium (Se)			90.9		%		80-120	25-FEB-20
Silver (Ag)			93.6		%		80-120	25-FEB-20
Thallium (Tl)			98.7		%		80-120	25-FEB-20
Uranium (U)			97.3		%		80-120	25-FEB-20
Vanadium (V)			103.1		%		80-120	25-FEB-20
Zinc (Zn)			95.7		%		80-120	25-FEB-20
WG3281001-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	25-FEB-20
Arsenic (As)			<0.10		mg/kg		0.1	25-FEB-20
Barium (Ba)			<0.50		mg/kg		0.5	25-FEB-20
Beryllium (Be)			<0.10		mg/kg		0.1	25-FEB-20
Bismuth (Bi)			<0.20		mg/kg		0.2	25-FEB-20
Boron (B)			<5.0		mg/kg		5	25-FEB-20
Cadmium (Cd)			<0.020		mg/kg		0.02	25-FEB-20
Calcium (Ca)			<50		mg/kg		50	25-FEB-20
Chromium (Cr)			<0.50		mg/kg		0.5	25-FEB-20
Cobalt (Co)			<0.10		mg/kg		0.1	25-FEB-20
Copper (Cu)			<0.50		mg/kg		0.5	25-FEB-20
Iron (Fe)			<50		mg/kg		50	25-FEB-20
Lead (Pb)			<0.50		mg/kg		0.5	25-FEB-20
Magnesium (Mg)			<20		mg/kg		20	25-FEB-20
Molybdenum (Mo)			<0.10		mg/kg		0.1	25-FEB-20
Nickel (Ni)			<0.50		mg/kg		0.5	25-FEB-20
Selenium (Se)			<0.20		mg/kg		0.2	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005066								
WG3281001-1 MB								
Silver (Ag)			<0.10		mg/kg		0.1	25-FEB-20
Thallium (Tl)			<0.050		mg/kg		0.05	25-FEB-20
Uranium (U)			<0.050		mg/kg		0.05	25-FEB-20
Vanadium (V)			<0.20		mg/kg		0.2	25-FEB-20
Zinc (Zn)			<2.0		mg/kg		2	25-FEB-20
Batch R5005288								
WG3280990-2 CRM		**WT-CANMET-TILL2**						
Antimony (Sb)			96.1		%		70-130	25-FEB-20
Arsenic (As)			99.2		%		70-130	25-FEB-20
Barium (Ba)			100.5		%		70-130	25-FEB-20
Beryllium (Be)			87.9		%		70-130	25-FEB-20
Bismuth (Bi)			93.4		%		70-130	25-FEB-20
Boron (B)			3.0		mg/kg		0-8.6	25-FEB-20
Cadmium (Cd)			89.9		%		70-130	25-FEB-20
Calcium (Ca)			94.4		%		70-130	25-FEB-20
Chromium (Cr)			99.9		%		70-130	25-FEB-20
Cobalt (Co)			99.2		%		70-130	25-FEB-20
Copper (Cu)			99.1		%		70-130	25-FEB-20
Iron (Fe)			97.9		%		70-130	25-FEB-20
Lead (Pb)			94.9		%		70-130	25-FEB-20
Magnesium (Mg)			95.4		%		70-130	25-FEB-20
Molybdenum (Mo)			99.4		%		70-130	25-FEB-20
Nickel (Ni)			100.5		%		70-130	25-FEB-20
Selenium (Se)			0.32		mg/kg		0.15-0.55	25-FEB-20
Silver (Ag)			0.24		mg/kg		0.16-0.36	25-FEB-20
Thallium (Tl)			95.4		%		70-130	25-FEB-20
Uranium (U)			91.0		%		70-130	25-FEB-20
Vanadium (V)			99.8		%		70-130	25-FEB-20
Zinc (Zn)			95.1		%		70-130	25-FEB-20
WG3280990-6 DUP		**WG3280990-5**						
Antimony (Sb)		0.28	0.29		ug/g	3.5	30	25-FEB-20
Arsenic (As)		4.71	4.69		ug/g	0.6	30	25-FEB-20
Barium (Ba)		58.6	59.0		ug/g	0.7	40	25-FEB-20
Beryllium (Be)		0.45	0.46		ug/g	2.7	30	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005288								
WG3280990-6 DUP		**WG3280990-5**						
Bismuth (Bi)		<0.20	<0.20	RPD-NA	ug/g	N/A	30	25-FEB-20
Boron (B)		16.1	15.0		ug/g	7.2	30	25-FEB-20
Cadmium (Cd)		0.145	0.142		ug/g	2.4	30	25-FEB-20
Calcium (Ca)		112000	109000		ug/g	2.4	30	25-FEB-20
Chromium (Cr)		19.9	19.3		ug/g	3.0	30	25-FEB-20
Cobalt (Co)		6.98	7.03		ug/g	0.7	30	25-FEB-20
Copper (Cu)		13.3	13.2		ug/g	0.3	30	25-FEB-20
Iron (Fe)		16000	15500		ug/g	2.6	30	25-FEB-20
Lead (Pb)		5.94	5.89		ug/g	0.9	40	25-FEB-20
Magnesium (Mg)		36600	35700		ug/g	2.4	30	25-FEB-20
Molybdenum (Mo)		2.52	2.69		ug/g	6.5	40	25-FEB-20
Nickel (Ni)		20.3	20.1		ug/g	0.7	30	25-FEB-20
Selenium (Se)		<0.20	0.21	RPD-NA	ug/g	N/A	30	25-FEB-20
Silver (Ag)		<0.10	<0.10	RPD-NA	ug/g	N/A	40	25-FEB-20
Thallium (Tl)		0.161	0.163		ug/g	1.4	30	25-FEB-20
Uranium (U)		1.30	1.29		ug/g	1.2	30	25-FEB-20
Vanadium (V)		27.2	26.0		ug/g	4.6	30	25-FEB-20
Zinc (Zn)		33.6	33.3		ug/g	0.9	30	25-FEB-20
WG3280990-4 LCS								
Antimony (Sb)			100.7		%		80-120	25-FEB-20
Arsenic (As)			97.2		%		80-120	25-FEB-20
Barium (Ba)			98.6		%		80-120	25-FEB-20
Beryllium (Be)			90.7		%		80-120	25-FEB-20
Bismuth (Bi)			94.7		%		80-120	25-FEB-20
Boron (B)			88.3		%		80-120	25-FEB-20
Cadmium (Cd)			93.9		%		80-120	25-FEB-20
Calcium (Ca)			96.3		%		80-120	25-FEB-20
Chromium (Cr)			100.4		%		80-120	25-FEB-20
Cobalt (Co)			98.5		%		80-120	25-FEB-20
Copper (Cu)			97.4		%		80-120	25-FEB-20
Iron (Fe)			97.2		%		80-120	25-FEB-20
Lead (Pb)			97.6		%		80-120	25-FEB-20
Magnesium (Mg)			98.9		%		80-120	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-CCMS-WT	**Soil**							
Batch R5005288								
WG3280990-4 LCS								
Molybdenum (Mo)			101.9		%		80-120	25-FEB-20
Nickel (Ni)			98.4		%		80-120	25-FEB-20
Selenium (Se)			94.5		%		80-120	25-FEB-20
Silver (Ag)			93.6		%		80-120	25-FEB-20
Thallium (Tl)			97.4		%		80-120	25-FEB-20
Uranium (U)			92.4		%		80-120	25-FEB-20
Vanadium (V)			101.1		%		80-120	25-FEB-20
Zinc (Zn)			95.8		%		80-120	25-FEB-20
WG3280990-1 MB								
Antimony (Sb)			<0.10		mg/kg		0.1	25-FEB-20
Arsenic (As)			<0.10		mg/kg		0.1	25-FEB-20
Barium (Ba)			<0.50		mg/kg		0.5	25-FEB-20
Beryllium (Be)			<0.10		mg/kg		0.1	25-FEB-20
Bismuth (Bi)			<0.20		mg/kg		0.2	25-FEB-20
Boron (B)			<5.0		mg/kg		5	25-FEB-20
Cadmium (Cd)			<0.020		mg/kg		0.02	25-FEB-20
Calcium (Ca)			<50		mg/kg		50	25-FEB-20
Chromium (Cr)			<0.50		mg/kg		0.5	25-FEB-20
Cobalt (Co)			<0.10		mg/kg		0.1	25-FEB-20
Copper (Cu)			<0.50		mg/kg		0.5	25-FEB-20
Iron (Fe)			<50		mg/kg		50	25-FEB-20
Lead (Pb)			<0.50		mg/kg		0.5	25-FEB-20
Magnesium (Mg)			<20		mg/kg		20	25-FEB-20
Molybdenum (Mo)			<0.10		mg/kg		0.1	25-FEB-20
Nickel (Ni)			<0.50		mg/kg		0.5	25-FEB-20
Selenium (Se)			<0.20		mg/kg		0.2	25-FEB-20
Silver (Ag)			<0.10		mg/kg		0.1	25-FEB-20
Thallium (Tl)			<0.050		mg/kg		0.05	25-FEB-20
Uranium (U)			<0.050		mg/kg		0.05	25-FEB-20
Vanadium (V)			<0.20		mg/kg		0.2	25-FEB-20
Zinc (Zn)			<2.0		mg/kg		2	25-FEB-20
MOISTURE-WT	**Soil**							

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MOISTURE-WT	**Soil**							
Batch R5001687								
WG3279958-3 DUP		**L2419680-1**						
% Moisture		9.39	9.84		%	4.7	20	23-FEB-20
WG3279958-2 LCS								
% Moisture			100.5		%		90-110	23-FEB-20
WG3279958-1 MB								
% Moisture			<0.25		%		0.25	23-FEB-20
Batch R5006167								
WG3281070-3 DUP		**L2420033-1**						
% Moisture		12.3	12.0		%	2.1	20	26-FEB-20
WG3281070-2 LCS								
% Moisture			100.0		%		90-110	26-FEB-20
WG3281070-1 MB								
% Moisture			<0.25		%		0.25	26-FEB-20
Batch R5006471								
WG3281729-3 DUP		**L2420795-2**						
% Moisture		5.42	5.37		%	1.0	20	26-FEB-20
WG3281729-2 LCS								
% Moisture			100.3		%		90-110	26-FEB-20
WG3281729-1 MB								
% Moisture			<0.25		%		0.25	26-FEB-20
PAH-511-WT	**Soil**							
Batch R5004428								
WG3279857-3 DUP		**WG3279857-5**						
1-Methylnaphthalene		0.163	0.158		ug/g	3.4	40	25-FEB-20
2-Methylnaphthalene		0.190	0.179		ug/g	5.7	40	25-FEB-20
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5004428								
WG3279857-3 DUP		**WG3279857-5**						
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Naphthalene		0.111	0.108		ug/g	2.9	40	25-FEB-20
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	25-FEB-20
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
WG3279857-2 LCS								
1-Methylnaphthalene			98.3		%		50-140	25-FEB-20
2-Methylnaphthalene			93.6		%		50-140	25-FEB-20
Acenaphthene			98.7		%		50-140	25-FEB-20
Acenaphthylene			97.4		%		50-140	25-FEB-20
Anthracene			97.0		%		50-140	25-FEB-20
Benzo(a)anthracene			97.8		%		50-140	25-FEB-20
Benzo(a)pyrene			95.4		%		50-140	25-FEB-20
Benzo(b)fluoranthene			98.9		%		50-140	25-FEB-20
Benzo(g,h,i)perylene			103.0		%		50-140	25-FEB-20
Benzo(k)fluoranthene			97.9		%		50-140	25-FEB-20
Chrysene			109.8		%		50-140	25-FEB-20
Dibenzo(ah)anthracene			101.1		%		50-140	25-FEB-20
Fluoranthene			99.1		%		50-140	25-FEB-20
Fluorene			96.0		%		50-140	25-FEB-20
Indeno(1,2,3-cd)pyrene			97.6		%		50-140	25-FEB-20
Naphthalene			97.7		%		50-140	25-FEB-20
Phenanthrene			100.3		%		50-140	25-FEB-20
Pyrene			99.9		%		50-140	25-FEB-20
WG3279857-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	25-FEB-20
2-Methylnaphthalene			<0.030		ug/g		0.03	25-FEB-20
Acenaphthene			<0.050		ug/g		0.05	25-FEB-20
Acenaphthylene			<0.050		ug/g		0.05	25-FEB-20
Anthracene			<0.050		ug/g		0.05	25-FEB-20
Benzo(a)anthracene			<0.050		ug/g		0.05	25-FEB-20
Benzo(a)pyrene			<0.050		ug/g		0.05	25-FEB-20
Benzo(b)fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5004428								
WG3279857-1 MB								
Benzo(k)fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Chrysene			<0.050		ug/g		0.05	25-FEB-20
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	25-FEB-20
Fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Fluorene			<0.050		ug/g		0.05	25-FEB-20
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	25-FEB-20
Naphthalene			<0.013		ug/g		0.013	25-FEB-20
Phenanthrene			<0.046		ug/g		0.046	25-FEB-20
Pyrene			<0.050		ug/g		0.05	25-FEB-20
Surrogate: 2-Fluorobiphenyl			95.5		%		50-140	25-FEB-20
Surrogate: p-Terphenyl d14			94.9		%		50-140	25-FEB-20
WG3279857-4 MS		**WG3279857-5**						
1-Methylnaphthalene			96.5		%		50-140	25-FEB-20
2-Methylnaphthalene			92.0		%		50-140	25-FEB-20
Acenaphthene			94.8		%		50-140	25-FEB-20
Acenaphthylene			94.2		%		50-140	25-FEB-20
Anthracene			95.5		%		50-140	25-FEB-20
Benzo(a)anthracene			95.1		%		50-140	25-FEB-20
Benzo(a)pyrene			93.1		%		50-140	25-FEB-20
Benzo(b)fluoranthene			96.7		%		50-140	25-FEB-20
Benzo(g,h,i)perylene			98.5		%		50-140	25-FEB-20
Benzo(k)fluoranthene			93.5		%		50-140	25-FEB-20
Chrysene			105.8		%		50-140	25-FEB-20
Dibenzo(ah)anthracene			97.4		%		50-140	25-FEB-20
Fluoranthene			98.4		%		50-140	25-FEB-20
Fluorene			93.8		%		50-140	25-FEB-20
Indeno(1,2,3-cd)pyrene			101.6		%		50-140	25-FEB-20
Naphthalene			93.9		%		50-140	25-FEB-20
Phenanthrene			96.2		%		50-140	25-FEB-20
Pyrene			98.3		%		50-140	25-FEB-20
Batch R5005211								
WG3280511-3 DUP		**WG3280511-5**						
1-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-FEB-20
2-Methylnaphthalene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5005211								
WG3280511-3 DUP		**WG3280511-5**						
Acenaphthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Acenaphthylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(a)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(a)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(b)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(g,h,i)perylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Benzo(k)fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Chrysene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Dibenzo(ah)anthracene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Fluoranthene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Fluorene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Indeno(1,2,3-cd)pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
Naphthalene		<0.013	<0.013	RPD-NA	ug/g	N/A	40	25-FEB-20
Phenanthrene		<0.046	<0.046	RPD-NA	ug/g	N/A	40	25-FEB-20
Pyrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	25-FEB-20
WG3280511-2 LCS								
1-Methylnaphthalene			98.3		%		50-140	25-FEB-20
2-Methylnaphthalene			93.0		%		50-140	25-FEB-20
Acenaphthene			98.8		%		50-140	25-FEB-20
Acenaphthylene			97.4		%		50-140	25-FEB-20
Anthracene			95.7		%		50-140	25-FEB-20
Benzo(a)anthracene			96.5		%		50-140	25-FEB-20
Benzo(a)pyrene			94.4		%		50-140	25-FEB-20
Benzo(b)fluoranthene			96.0		%		50-140	25-FEB-20
Benzo(g,h,i)perylene			82.0		%		50-140	25-FEB-20
Benzo(k)fluoranthene			104.3		%		50-140	25-FEB-20
Chrysene			110.8		%		50-140	25-FEB-20
Dibenzo(ah)anthracene			78.2		%		50-140	25-FEB-20
Fluoranthene			96.2		%		50-140	25-FEB-20
Fluorene			95.6		%		50-140	25-FEB-20
Indeno(1,2,3-cd)pyrene			76.9		%		50-140	25-FEB-20
Naphthalene			97.0		%		50-140	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5005211								
WG3280511-2 LCS								
Phenanthrene			99.9		%		50-140	25-FEB-20
Pyrene			97.2		%		50-140	25-FEB-20
WG3280511-1 MB								
1-Methylnaphthalene			<0.030		ug/g		0.03	25-FEB-20
2-Methylnaphthalene			<0.030		ug/g		0.03	25-FEB-20
Acenaphthene			<0.050		ug/g		0.05	25-FEB-20
Acenaphthylene			<0.050		ug/g		0.05	25-FEB-20
Anthracene			<0.050		ug/g		0.05	25-FEB-20
Benzo(a)anthracene			<0.050		ug/g		0.05	25-FEB-20
Benzo(a)pyrene			<0.050		ug/g		0.05	25-FEB-20
Benzo(b)fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Benzo(g,h,i)perylene			<0.050		ug/g		0.05	25-FEB-20
Benzo(k)fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Chrysene			<0.050		ug/g		0.05	25-FEB-20
Dibenzo(ah)anthracene			<0.050		ug/g		0.05	25-FEB-20
Fluoranthene			<0.050		ug/g		0.05	25-FEB-20
Fluorene			<0.050		ug/g		0.05	25-FEB-20
Indeno(1,2,3-cd)pyrene			<0.050		ug/g		0.05	25-FEB-20
Naphthalene			<0.013		ug/g		0.013	25-FEB-20
Phenanthrene			<0.046		ug/g		0.046	25-FEB-20
Pyrene			<0.050		ug/g		0.05	25-FEB-20
Surrogate: 2-Fluorobiphenyl			117.1		%		50-140	25-FEB-20
Surrogate: p-Terphenyl d14			121.8		%		50-140	25-FEB-20
WG3280511-4 MS		**WG3280511-5**						
1-Methylnaphthalene			98.7		%		50-140	25-FEB-20
2-Methylnaphthalene			93.4		%		50-140	25-FEB-20
Acenaphthene			99.5		%		50-140	25-FEB-20
Acenaphthylene			97.9		%		50-140	25-FEB-20
Anthracene			96.5		%		50-140	25-FEB-20
Benzo(a)anthracene			98.5		%		50-140	25-FEB-20
Benzo(a)pyrene			96.7		%		50-140	25-FEB-20
Benzo(b)fluoranthene			101.5		%		50-140	25-FEB-20
Benzo(g,h,i)perylene			85.1		%		50-140	25-FEB-20
Benzo(k)fluoranthene			101.5		%		50-140	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Soil**							
Batch R5005211								
WG3280511-4 MS		**WG3280511-5**						
Chrysene			110.2		%		50-140	25-FEB-20
Dibenzo(ah)anthracene			81.7		%		50-140	25-FEB-20
Fluoranthene			96.7		%		50-140	25-FEB-20
Fluorene			97.2		%		50-140	25-FEB-20
Indeno(1,2,3-cd)pyrene			83.6		%		50-140	25-FEB-20
Naphthalene			96.3		%		50-140	25-FEB-20
Phenanthrene			99.95		%		50-140	25-FEB-20
Pyrene			97.2		%		50-140	25-FEB-20
SAR-R511-WT	**Soil**							
Batch R5004988								
WG3281014-4 DUP		**WG3281014-3**						
Calcium (Ca)		18.8	17.8		mg/L	5.5	30	25-FEB-20
Sodium (Na)		29.2	28.5		mg/L	2.4	30	25-FEB-20
Magnesium (Mg)		9.89	9.40		mg/L	5.1	30	25-FEB-20
WG3281014-2 IRM		**WT SAR3**						
Calcium (Ca)			97.9		%		70-130	25-FEB-20
Sodium (Na)			104.0		%		70-130	25-FEB-20
Magnesium (Mg)			104.6		%		70-130	25-FEB-20
WG3281014-5 LCS								
Calcium (Ca)			102.0		%		80-120	25-FEB-20
Sodium (Na)			101.6		%		80-120	25-FEB-20
Magnesium (Mg)			101.0		%		80-120	25-FEB-20
WG3281014-1 MB								
Calcium (Ca)			<0.50		mg/L		0.5	25-FEB-20
Sodium (Na)			<0.50		mg/L		0.5	25-FEB-20
Magnesium (Mg)			<0.50		mg/L		0.5	25-FEB-20
Batch R5006107								
WG3281021-4 DUP		**WG3281021-3**						
Calcium (Ca)		43.5	39.8		mg/L	8.9	30	25-FEB-20
Sodium (Na)		67.2	67.9		mg/L	1.0	30	25-FEB-20
Magnesium (Mg)		14.6	13.7		mg/L	6.4	30	25-FEB-20
WG3281021-2 IRM		**WT SAR3**						
Calcium (Ca)			102.1		%		70-130	25-FEB-20
Sodium (Na)			108.0		%		70-130	25-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SAR-R511-WT	**Soil**							
Batch R5006107								
WG3281021-2 IRM		**WT SAR3**						
Magnesium (Mg)			110.1		%		70-130	25-FEB-20
WG3281021-5 LCS								
Calcium (Ca)			101.7		%		80-120	25-FEB-20
Sodium (Na)			100.6		%		80-120	25-FEB-20
Magnesium (Mg)			100.4		%		80-120	25-FEB-20
WG3281021-1 MB								
Calcium (Ca)			<0.50		mg/L		0.5	25-FEB-20
Sodium (Na)			<0.50		mg/L		0.5	25-FEB-20
Magnesium (Mg)			<0.50		mg/L		0.5	25-FEB-20
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-4 DUP		**WG3279894-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-FEB-20
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	24-FEB-20
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-4 DUP		**WG3279894-3**						
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-FEB-20
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	24-FEB-20
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-FEB-20
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-FEB-20
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	24-FEB-20
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-FEB-20
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	24-FEB-20
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	24-FEB-20
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	24-FEB-20
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	24-FEB-20
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	24-FEB-20
WG3279894-2 LCS								
1,1,1,2-Tetrachloroethane			101.2		%		60-130	24-FEB-20
1,1,2,2-Tetrachloroethane			103.1		%		60-130	24-FEB-20
1,1,1-Trichloroethane			103.9		%		60-130	24-FEB-20
1,1,2-Trichloroethane			99.9		%		60-130	24-FEB-20
1,1-Dichloroethane			104.2		%		60-130	24-FEB-20
1,1-Dichloroethylene			95.1		%		60-130	24-FEB-20
1,2-Dibromoethane			101.7		%		70-130	24-FEB-20
1,2-Dichlorobenzene			105.9		%		70-130	24-FEB-20
1,2-Dichloroethane			103.4		%		60-130	24-FEB-20
1,2-Dichloropropane			103.1		%		70-130	24-FEB-20
1,3-Dichlorobenzene			106.0		%		70-130	24-FEB-20
1,4-Dichlorobenzene			107.3		%		70-130	24-FEB-20
Acetone			100.6		%		60-140	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-2 LCS								
Benzene			106.8		%		70-130	24-FEB-20
Bromodichloromethane			105.0		%		50-140	24-FEB-20
Bromoform			104.2		%		70-130	24-FEB-20
Bromomethane			84.2		%		50-140	24-FEB-20
Carbon tetrachloride			105.8		%		70-130	24-FEB-20
Chlorobenzene			104.9		%		70-130	24-FEB-20
Chloroform			106.0		%		70-130	24-FEB-20
cis-1,2-Dichloroethylene			86.9		%		70-130	24-FEB-20
cis-1,3-Dichloropropene			104.8		%		70-130	24-FEB-20
Dibromochloromethane			97.9		%		60-130	24-FEB-20
Dichlorodifluoromethane			64.5		%		50-140	24-FEB-20
Ethylbenzene			102.0		%		70-130	24-FEB-20
n-Hexane			92.8		%		70-130	24-FEB-20
Methylene Chloride			105.2		%		70-130	24-FEB-20
MTBE			104.0		%		70-130	24-FEB-20
m+p-Xylenes			103.5		%		70-130	24-FEB-20
Methyl Ethyl Ketone			106.4		%		60-140	24-FEB-20
Methyl Isobutyl Ketone			97.1		%		60-140	24-FEB-20
o-Xylene			110.1		%		70-130	24-FEB-20
Styrene			95.8		%		70-130	24-FEB-20
Tetrachloroethylene			106.1		%		60-130	24-FEB-20
Toluene			104.5		%		70-130	24-FEB-20
trans-1,2-Dichloroethylene			100.2		%		60-130	24-FEB-20
trans-1,3-Dichloropropene			107.0		%		70-130	24-FEB-20
Trichloroethylene			106.6		%		60-130	24-FEB-20
Trichlorofluoromethane			95.4		%		50-140	24-FEB-20
Vinyl chloride			101.3		%		60-140	24-FEB-20
WG3279894-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	24-FEB-20
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	24-FEB-20
1,1,1-Trichloroethane			<0.050		ug/g		0.05	24-FEB-20
1,1,2-Trichloroethane			<0.050		ug/g		0.05	24-FEB-20
1,1-Dichloroethane			<0.050		ug/g		0.05	24-FEB-20
1,1-Dichloroethylene			<0.050		ug/g		0.05	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-1 MB								
1,2-Dibromoethane			<0.050		ug/g		0.05	24-FEB-20
1,2-Dichlorobenzene			<0.050		ug/g		0.05	24-FEB-20
1,2-Dichloroethane			<0.050		ug/g		0.05	24-FEB-20
1,2-Dichloropropane			<0.050		ug/g		0.05	24-FEB-20
1,3-Dichlorobenzene			<0.050		ug/g		0.05	24-FEB-20
1,4-Dichlorobenzene			<0.050		ug/g		0.05	24-FEB-20
Acetone			<0.50		ug/g		0.5	24-FEB-20
Benzene			<0.0068		ug/g		0.0068	24-FEB-20
Bromodichloromethane			<0.050		ug/g		0.05	24-FEB-20
Bromoform			<0.050		ug/g		0.05	24-FEB-20
Bromomethane			<0.050		ug/g		0.05	24-FEB-20
Carbon tetrachloride			<0.050		ug/g		0.05	24-FEB-20
Chlorobenzene			<0.050		ug/g		0.05	24-FEB-20
Chloroform			<0.050		ug/g		0.05	24-FEB-20
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-FEB-20
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	24-FEB-20
Dibromochloromethane			<0.050		ug/g		0.05	24-FEB-20
Dichlorodifluoromethane			<0.050		ug/g		0.05	24-FEB-20
Ethylbenzene			<0.018		ug/g		0.018	24-FEB-20
n-Hexane			<0.050		ug/g		0.05	24-FEB-20
Methylene Chloride			<0.050		ug/g		0.05	24-FEB-20
MTBE			<0.050		ug/g		0.05	24-FEB-20
m+p-Xylenes			<0.030		ug/g		0.03	24-FEB-20
Methyl Ethyl Ketone			<0.50		ug/g		0.5	24-FEB-20
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	24-FEB-20
o-Xylene			<0.020		ug/g		0.02	24-FEB-20
Styrene			<0.050		ug/g		0.05	24-FEB-20
Tetrachloroethylene			<0.050		ug/g		0.05	24-FEB-20
Toluene			<0.080		ug/g		0.08	24-FEB-20
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	24-FEB-20
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	24-FEB-20
Trichloroethylene			<0.010		ug/g		0.01	24-FEB-20
Trichlorofluoromethane			<0.050		ug/g		0.05	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-1 MB								
Vinyl chloride			<0.020		ug/g		0.02	24-FEB-20
Surrogate: 1,4-Difluorobenzene			113.2		%		50-140	24-FEB-20
Surrogate: 4-Bromofluorobenzene			100.6		%		50-140	24-FEB-20
WG3279894-5 MS		**WG3279894-3**						
1,1,1,2-Tetrachloroethane			99.0		%		50-140	24-FEB-20
1,1,2,2-Tetrachloroethane			102.6		%		50-140	24-FEB-20
1,1,1-Trichloroethane			101.1		%		50-140	24-FEB-20
1,1,2-Trichloroethane			99.1		%		50-140	24-FEB-20
1,1-Dichloroethane			89.0		%		50-140	24-FEB-20
1,1-Dichloroethylene			92.4		%		50-140	24-FEB-20
1,2-Dibromoethane			101.1		%		50-140	24-FEB-20
1,2-Dichlorobenzene			102.8		%		50-140	24-FEB-20
1,2-Dichloroethane			102.4		%		50-140	24-FEB-20
1,2-Dichloropropane			101.0		%		50-140	24-FEB-20
1,3-Dichlorobenzene			102.5		%		50-140	24-FEB-20
1,4-Dichlorobenzene			104.1		%		50-140	24-FEB-20
Acetone			103.3		%		50-140	24-FEB-20
Benzene			104.8		%		50-140	24-FEB-20
Bromodichloromethane			103.6		%		50-140	24-FEB-20
Bromoform			103.5		%		50-140	24-FEB-20
Bromomethane			81.2		%		50-140	24-FEB-20
Carbon tetrachloride			103.0		%		50-140	24-FEB-20
Chlorobenzene			102.6		%		50-140	24-FEB-20
Chloroform			104.1		%		50-140	24-FEB-20
cis-1,2-Dichloroethylene			99.4		%		50-140	24-FEB-20
cis-1,3-Dichloropropene			100.4		%		50-140	24-FEB-20
Dibromochloromethane			96.7		%		50-140	24-FEB-20
Dichlorodifluoromethane			62.1		%		50-140	24-FEB-20
Ethylbenzene			99.1		%		50-140	24-FEB-20
n-Hexane			90.2		%		50-140	24-FEB-20
Methylene Chloride			103.6		%		50-140	24-FEB-20
MTBE			102.0		%		50-140	24-FEB-20
m+p-Xylenes			100.5		%		50-140	24-FEB-20
Methyl Ethyl Ketone			98.4		%		50-140	24-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5002212								
WG3279894-5 MS		**WG3279894-3**						
Methyl Isobutyl Ketone			95.4		%		50-140	24-FEB-20
o-Xylene			107.0		%		50-140	24-FEB-20
Styrene			92.8		%		50-140	24-FEB-20
Tetrachloroethylene			103.1		%		50-140	24-FEB-20
Toluene			102.1		%		50-140	24-FEB-20
trans-1,2-Dichloroethylene			97.4		%		50-140	24-FEB-20
trans-1,3-Dichloropropene			102.3		%		50-140	24-FEB-20
Trichloroethylene			103.9		%		50-140	24-FEB-20
Trichlorofluoromethane			92.6		%		50-140	24-FEB-20
Vinyl chloride			97.8		%		50-140	24-FEB-20
Batch R5006956								
WG3281118-4 DUP		**WG3281118-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-FEB-20
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	26-FEB-20
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5006956								
WG3281118-4 DUP		**WG3281118-3**						
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-FEB-20
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	26-FEB-20
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-FEB-20
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-FEB-20
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	26-FEB-20
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-FEB-20
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	26-FEB-20
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	26-FEB-20
Trichloroethylene		<0.010	<0.010	RPD-NA	ug/g	N/A	40	26-FEB-20
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	26-FEB-20
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	26-FEB-20
WG3281118-2 LCS								
1,1,1,2-Tetrachloroethane			102.2		%		60-130	26-FEB-20
1,1,2,2-Tetrachloroethane			97.3		%		60-130	26-FEB-20
1,1,1-Trichloroethane			107.7		%		60-130	26-FEB-20
1,1,2-Trichloroethane			97.5		%		60-130	26-FEB-20
1,1-Dichloroethane			102.8		%		60-130	26-FEB-20
1,1-Dichloroethylene			97.4		%		60-130	26-FEB-20
1,2-Dibromoethane			97.9		%		70-130	26-FEB-20
1,2-Dichlorobenzene			108.8		%		70-130	26-FEB-20
1,2-Dichloroethane			100.7		%		60-130	26-FEB-20
1,2-Dichloropropane			102.7		%		70-130	26-FEB-20
1,3-Dichlorobenzene			112.0		%		70-130	26-FEB-20
1,4-Dichlorobenzene			112.9		%		70-130	26-FEB-20
Acetone			91.4		%		60-140	26-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5006956								
WG3281118-2 LCS								
Benzene			108.6		%		70-130	26-FEB-20
Bromodichloromethane			104.5		%		50-140	26-FEB-20
Bromoform			100.0		%		70-130	26-FEB-20
Bromomethane			83.8		%		50-140	26-FEB-20
Carbon tetrachloride			109.9		%		70-130	26-FEB-20
Chlorobenzene			107.9		%		70-130	26-FEB-20
Chloroform			107.3		%		70-130	26-FEB-20
cis-1,2-Dichloroethylene			87.7		%		70-130	26-FEB-20
cis-1,3-Dichloropropene			105.1		%		70-130	26-FEB-20
Dibromochloromethane			96.1		%		60-130	26-FEB-20
Dichlorodifluoromethane			60.7		%		50-140	26-FEB-20
Ethylbenzene			106.6		%		70-130	26-FEB-20
n-Hexane			95.5		%		70-130	26-FEB-20
Methylene Chloride			104.7		%		70-130	26-FEB-20
MTBE			106.3		%		70-130	26-FEB-20
m+p-Xylenes			108.5		%		70-130	26-FEB-20
Methyl Ethyl Ketone			98.0		%		60-140	26-FEB-20
Methyl Isobutyl Ketone			88.3		%		60-140	26-FEB-20
o-Xylene			114.3		%		70-130	26-FEB-20
Styrene			98.4		%		70-130	26-FEB-20
Tetrachloroethylene			111.3		%		60-130	26-FEB-20
Toluene			108.2		%		70-130	26-FEB-20
trans-1,2-Dichloroethylene			102.7		%		60-130	26-FEB-20
trans-1,3-Dichloropropene			106.6		%		70-130	26-FEB-20
Trichloroethylene			109.9		%		60-130	26-FEB-20
Trichlorofluoromethane			98.0		%		50-140	26-FEB-20
Vinyl chloride			100.6		%		60-140	26-FEB-20
WG3281118-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	26-FEB-20
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	26-FEB-20
1,1,1-Trichloroethane			<0.050		ug/g		0.05	26-FEB-20
1,1,2-Trichloroethane			<0.050		ug/g		0.05	26-FEB-20
1,1-Dichloroethane			<0.050		ug/g		0.05	26-FEB-20
1,1-Dichloroethylene			<0.050		ug/g		0.05	26-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5006956								
WG3281118-1 MB								
1,2-Dibromoethane			<0.050		ug/g		0.05	26-FEB-20
1,2-Dichlorobenzene			<0.050		ug/g		0.05	26-FEB-20
1,2-Dichloroethane			<0.050		ug/g		0.05	26-FEB-20
1,2-Dichloropropane			<0.050		ug/g		0.05	26-FEB-20
1,3-Dichlorobenzene			<0.050		ug/g		0.05	26-FEB-20
1,4-Dichlorobenzene			<0.050		ug/g		0.05	26-FEB-20
Acetone			<0.50		ug/g		0.5	26-FEB-20
Benzene			<0.0068		ug/g		0.0068	26-FEB-20
Bromodichloromethane			<0.050		ug/g		0.05	26-FEB-20
Bromoform			<0.050		ug/g		0.05	26-FEB-20
Bromomethane			<0.050		ug/g		0.05	26-FEB-20
Carbon tetrachloride			<0.050		ug/g		0.05	26-FEB-20
Chlorobenzene			<0.050		ug/g		0.05	26-FEB-20
Chloroform			<0.050		ug/g		0.05	26-FEB-20
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	26-FEB-20
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	26-FEB-20
Dibromochloromethane			<0.050		ug/g		0.05	26-FEB-20
Dichlorodifluoromethane			<0.050		ug/g		0.05	26-FEB-20
Ethylbenzene			<0.018		ug/g		0.018	26-FEB-20
n-Hexane			<0.050		ug/g		0.05	26-FEB-20
Methylene Chloride			<0.050		ug/g		0.05	26-FEB-20
MTBE			<0.050		ug/g		0.05	26-FEB-20
m+p-Xylenes			<0.030		ug/g		0.03	26-FEB-20
Methyl Ethyl Ketone			<0.50		ug/g		0.5	26-FEB-20
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	26-FEB-20
o-Xylene			<0.020		ug/g		0.02	26-FEB-20
Styrene			<0.050		ug/g		0.05	26-FEB-20
Tetrachloroethylene			<0.050		ug/g		0.05	26-FEB-20
Toluene			<0.080		ug/g		0.08	26-FEB-20
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	26-FEB-20
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	26-FEB-20
Trichloroethylene			<0.010		ug/g		0.01	26-FEB-20
Trichlorofluoromethane			<0.050		ug/g		0.05	26-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5006956								
WG3281118-1 MB								
Vinyl chloride			<0.020		ug/g		0.02	26-FEB-20
Surrogate: 1,4-Difluorobenzene			108.6		%		50-140	26-FEB-20
Surrogate: 4-Bromofluorobenzene			94.9		%		50-140	26-FEB-20
WG3281118-5 MS		**WG3281118-3**						
1,1,1,2-Tetrachloroethane			103.5		%		50-140	26-FEB-20
1,1,2,2-Tetrachloroethane			104.0		%		50-140	26-FEB-20
1,1,1-Trichloroethane			107.8		%		50-140	26-FEB-20
1,1,2-Trichloroethane			100.6		%		50-140	26-FEB-20
1,1-Dichloroethane			105.3		%		50-140	26-FEB-20
1,1-Dichloroethylene			98.2		%		50-140	26-FEB-20
1,2-Dibromoethane			101.3		%		50-140	26-FEB-20
1,2-Dichlorobenzene			108.5		%		50-140	26-FEB-20
1,2-Dichloroethane			104.1		%		50-140	26-FEB-20
1,2-Dichloropropane			104.8		%		50-140	26-FEB-20
1,3-Dichlorobenzene			108.3		%		50-140	26-FEB-20
1,4-Dichlorobenzene			109.4		%		50-140	26-FEB-20
Acetone			100.3		%		50-140	26-FEB-20
Benzene			109.8		%		50-140	26-FEB-20
Bromodichloromethane			106.8		%		50-140	26-FEB-20
Bromoform			104.4		%		50-140	26-FEB-20
Bromomethane			83.3		%		50-140	26-FEB-20
Carbon tetrachloride			109.6		%		50-140	26-FEB-20
Chlorobenzene			108.0		%		50-140	26-FEB-20
Chloroform			108.9		%		50-140	26-FEB-20
cis-1,2-Dichloroethylene			88.3		%		50-140	26-FEB-20
cis-1,3-Dichloropropene			102.2		%		50-140	26-FEB-20
Dibromochloromethane			98.6		%		50-140	26-FEB-20
Dichlorodifluoromethane			64.6		%		50-140	26-FEB-20
Ethylbenzene			105.3		%		50-140	26-FEB-20
n-Hexane			97.1		%		50-140	26-FEB-20
Methylene Chloride			106.6		%		50-140	26-FEB-20
MTBE			107.0		%		50-140	26-FEB-20
m+p-Xylenes			107.1		%		50-140	26-FEB-20
Methyl Ethyl Ketone			94.7		%		50-140	26-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5006956								
WG3281118-5 MS		**WG3281118-3**						
Methyl Isobutyl Ketone			94.2		%		50-140	26-FEB-20
o-Xylene			113.5		%		50-140	26-FEB-20
Styrene			97.8		%		50-140	26-FEB-20
Tetrachloroethylene			109.0		%		50-140	26-FEB-20
Toluene			107.9		%		50-140	26-FEB-20
trans-1,2-Dichloroethylene			102.4		%		50-140	26-FEB-20
trans-1,3-Dichloropropene			102.5		%		50-140	26-FEB-20
Trichloroethylene			109.2		%		50-140	26-FEB-20
Trichlorofluoromethane			98.8		%		50-140	26-FEB-20
Vinyl chloride			101.9		%		50-140	26-FEB-20
Batch R5009106								
WG3281921-4 DUP		**WG3281921-3**						
1,1,1,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,1,2,2-Tetrachloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,1,1-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,1,2-Trichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,1-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,1-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,2-Dibromoethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,2-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,2-Dichloroethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,2-Dichloropropane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,3-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
1,4-Dichlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Acetone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	27-FEB-20
Benzene		<0.0068	<0.0068	RPD-NA	ug/g	N/A	40	27-FEB-20
Bromodichloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Bromoform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Bromomethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Carbon tetrachloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Chlorobenzene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Chloroform		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
cis-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5009106								
WG3281921-4 DUP		**WG3281921-3**						
cis-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	27-FEB-20
Dibromochloromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Dichlorodifluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Ethylbenzene		<0.018	<0.018	RPD-NA	ug/g	N/A	40	27-FEB-20
n-Hexane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Methylene Chloride		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
MTBE		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
m+p-Xylenes		<0.030	<0.030	RPD-NA	ug/g	N/A	40	27-FEB-20
Methyl Ethyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	27-FEB-20
Methyl Isobutyl Ketone		<0.50	<0.50	RPD-NA	ug/g	N/A	40	27-FEB-20
o-Xylene		<0.020	<0.020	RPD-NA	ug/g	N/A	40	27-FEB-20
Styrene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Tetrachloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Toluene		<0.080	<0.080	RPD-NA	ug/g	N/A	40	27-FEB-20
trans-1,2-Dichloroethylene		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
trans-1,3-Dichloropropene		<0.030	<0.030	RPD-NA	ug/g	N/A	40	27-FEB-20
Trichloroethylene		0.308	0.311		ug/g	1.2	40	27-FEB-20
Trichlorofluoromethane		<0.050	<0.050	RPD-NA	ug/g	N/A	40	27-FEB-20
Vinyl chloride		<0.020	<0.020	RPD-NA	ug/g	N/A	40	27-FEB-20
WG3281921-2 LCS								
1,1,1,2-Tetrachloroethane			94.8		%		60-130	27-FEB-20
1,1,2,2-Tetrachloroethane			89.8		%		60-130	27-FEB-20
1,1,1-Trichloroethane			97.3		%		60-130	27-FEB-20
1,1,2-Trichloroethane			91.7		%		60-130	27-FEB-20
1,1-Dichloroethane			81.4		%		60-130	27-FEB-20
1,1-Dichloroethylene			89.7		%		60-130	27-FEB-20
1,2-Dibromoethane			89.7		%		70-130	27-FEB-20
1,2-Dichlorobenzene			100.9		%		70-130	27-FEB-20
1,2-Dichloroethane			95.3		%		60-130	27-FEB-20
1,2-Dichloropropane			96.1		%		70-130	27-FEB-20
1,3-Dichlorobenzene			99.4		%		70-130	27-FEB-20
1,4-Dichlorobenzene			101.2		%		70-130	27-FEB-20
Acetone			97.9		%		60-140	27-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5009106								
WG3281921-2 LCS								
Benzene			100.2		%		70-130	27-FEB-20
Bromodichloromethane			96.6		%		50-140	27-FEB-20
Bromoform			93.3		%		70-130	27-FEB-20
Bromomethane			83.2		%		50-140	27-FEB-20
Carbon tetrachloride			99.5		%		70-130	27-FEB-20
Chlorobenzene			98.3		%		70-130	27-FEB-20
Chloroform			99.5		%		70-130	27-FEB-20
cis-1,2-Dichloroethylene			97.1		%		70-130	27-FEB-20
cis-1,3-Dichloropropene			97.3		%		70-130	27-FEB-20
Dibromochloromethane			89.1		%		60-130	27-FEB-20
Dichlorodifluoromethane			69.2		%		50-140	27-FEB-20
Ethylbenzene			94.3		%		70-130	27-FEB-20
n-Hexane			87.1		%		70-130	27-FEB-20
Methylene Chloride			100.2		%		70-130	27-FEB-20
MTBE			98.9		%		70-130	27-FEB-20
m+p-Xylenes			96.5		%		70-130	27-FEB-20
Methyl Ethyl Ketone			97.2		%		60-140	27-FEB-20
Methyl Isobutyl Ketone			90.0		%		60-140	27-FEB-20
o-Xylene			102.3		%		70-130	27-FEB-20
Styrene			91.7		%		70-130	27-FEB-20
Tetrachloroethylene			106.0		%		60-130	27-FEB-20
Toluene			104.8		%		70-130	27-FEB-20
trans-1,2-Dichloroethylene			93.9		%		60-130	27-FEB-20
trans-1,3-Dichloropropene			90.9		%		70-130	27-FEB-20
Trichloroethylene			99.7		%		60-130	27-FEB-20
Trichlorofluoromethane			92.3		%		50-140	27-FEB-20
Vinyl chloride			101.8		%		60-140	27-FEB-20
WG3281921-1 MB								
1,1,1,2-Tetrachloroethane			<0.050		ug/g		0.05	27-FEB-20
1,1,2,2-Tetrachloroethane			<0.050		ug/g		0.05	27-FEB-20
1,1,1-Trichloroethane			<0.050		ug/g		0.05	27-FEB-20
1,1,2-Trichloroethane			<0.050		ug/g		0.05	27-FEB-20
1,1-Dichloroethane			<0.050		ug/g		0.05	27-FEB-20
1,1-Dichloroethylene			<0.050		ug/g		0.05	27-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5009106								
WG3281921-1 MB								
1,2-Dibromoethane			<0.050		ug/g		0.05	27-FEB-20
1,2-Dichlorobenzene			<0.050		ug/g		0.05	27-FEB-20
1,2-Dichloroethane			<0.050		ug/g		0.05	27-FEB-20
1,2-Dichloropropane			<0.050		ug/g		0.05	27-FEB-20
1,3-Dichlorobenzene			<0.050		ug/g		0.05	27-FEB-20
1,4-Dichlorobenzene			<0.050		ug/g		0.05	27-FEB-20
Acetone			<0.50		ug/g		0.5	27-FEB-20
Benzene			<0.0068		ug/g		0.0068	27-FEB-20
Bromodichloromethane			<0.050		ug/g		0.05	27-FEB-20
Bromoform			<0.050		ug/g		0.05	27-FEB-20
Bromomethane			<0.050		ug/g		0.05	27-FEB-20
Carbon tetrachloride			<0.050		ug/g		0.05	27-FEB-20
Chlorobenzene			<0.050		ug/g		0.05	27-FEB-20
Chloroform			<0.050		ug/g		0.05	27-FEB-20
cis-1,2-Dichloroethylene			<0.050		ug/g		0.05	27-FEB-20
cis-1,3-Dichloropropene			<0.030		ug/g		0.03	27-FEB-20
Dibromochloromethane			<0.050		ug/g		0.05	27-FEB-20
Dichlorodifluoromethane			<0.050		ug/g		0.05	27-FEB-20
Ethylbenzene			<0.018		ug/g		0.018	27-FEB-20
n-Hexane			<0.050		ug/g		0.05	27-FEB-20
Methylene Chloride			<0.050		ug/g		0.05	27-FEB-20
MTBE			<0.050		ug/g		0.05	27-FEB-20
m+p-Xylenes			<0.030		ug/g		0.03	27-FEB-20
Methyl Ethyl Ketone			<0.50		ug/g		0.5	27-FEB-20
Methyl Isobutyl Ketone			<0.50		ug/g		0.5	27-FEB-20
o-Xylene			<0.020		ug/g		0.02	27-FEB-20
Styrene			<0.050		ug/g		0.05	27-FEB-20
Tetrachloroethylene			<0.050		ug/g		0.05	27-FEB-20
Toluene			<0.080		ug/g		0.08	27-FEB-20
trans-1,2-Dichloroethylene			<0.050		ug/g		0.05	27-FEB-20
trans-1,3-Dichloropropene			<0.030		ug/g		0.03	27-FEB-20
Trichloroethylene			<0.010		ug/g		0.01	27-FEB-20
Trichlorofluoromethane			<0.050		ug/g		0.05	27-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5009106								
WG3281921-1 MB								
Vinyl chloride			<0.020		ug/g		0.02	27-FEB-20
Surrogate: 1,4-Difluorobenzene			103.6		%		50-140	27-FEB-20
Surrogate: 4-Bromofluorobenzene			88.7		%		50-140	27-FEB-20
WG3281921-5 MS		**WG3281921-3**						
1,1,1,2-Tetrachloroethane			101.9		%		50-140	27-FEB-20
1,1,2,2-Tetrachloroethane			97.9		%		50-140	27-FEB-20
1,1,1-Trichloroethane			103.5		%		50-140	27-FEB-20
1,1,2-Trichloroethane			100.7		%		50-140	27-FEB-20
1,1-Dichloroethane			70.7		%		50-140	27-FEB-20
1,1-Dichloroethylene			96.2		%		50-140	27-FEB-20
1,2-Dibromoethane			97.9		%		50-140	27-FEB-20
1,2-Dichlorobenzene			105.9		%		50-140	27-FEB-20
1,2-Dichloroethane			103.3		%		50-140	27-FEB-20
1,2-Dichloropropane			103.1		%		50-140	27-FEB-20
1,3-Dichlorobenzene			111.8		%		50-140	27-FEB-20
1,4-Dichlorobenzene			111.0		%		50-140	27-FEB-20
Acetone			110.1		%		50-140	27-FEB-20
Benzene			107.1		%		50-140	27-FEB-20
Bromodichloromethane			104.5		%		50-140	27-FEB-20
Bromoform			96.9		%		50-140	27-FEB-20
Bromomethane			89.5		%		50-140	27-FEB-20
Carbon tetrachloride			105.2		%		50-140	27-FEB-20
Chlorobenzene			104.8		%		50-140	27-FEB-20
Chloroform			105.9		%		50-140	27-FEB-20
cis-1,2-Dichloroethylene			102.6		%		50-140	27-FEB-20
cis-1,3-Dichloropropene			101.7		%		50-140	27-FEB-20
Dibromochloromethane			96.5		%		50-140	27-FEB-20
Dichlorodifluoromethane			82.2		%		50-140	27-FEB-20
Ethylbenzene			99.3		%		50-140	27-FEB-20
n-Hexane			94.4		%		50-140	27-FEB-20
Methylene Chloride			108.4		%		50-140	27-FEB-20
MTBE			104.1		%		50-140	27-FEB-20
m+p-Xylenes			100.5		%		50-140	27-FEB-20
Methyl Ethyl Ketone			103.6		%		50-140	27-FEB-20

Quality Control Report

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Soil**							
Batch R5009106								
WG3281921-5 MS		**WG3281921-3**						
Methyl Isobutyl Ketone			95.3		%		50-140	27-FEB-20
o-Xylene			109.4		%		50-140	27-FEB-20
Styrene			94.2		%		50-140	27-FEB-20
Tetrachloroethylene			111.3		%		50-140	27-FEB-20
Toluene			110.6		%		50-140	27-FEB-20
trans-1,2-Dichloroethylene			99.8		%		50-140	27-FEB-20
trans-1,3-Dichloropropene			96.1		%		50-140	27-FEB-20
Trichloroethylene			96.3		%		50-140	27-FEB-20
Trichlorofluoromethane			99.9		%		50-140	27-FEB-20
Vinyl chloride			110.6		%		50-140	27-FEB-20

Quality Control Report

Workorder: L2419793 Report Date: 19-APR-21

Client: Jacobs Consultancy Canada Inc.
CH2M HILL CANADA LIMITED 72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: MICHAEL SHIRY

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
SURQC	Surrogate recovery marginally exceeded DQO in QC sample (MB, LCS, RM, or MS). Surrogates are less important for QC samples than for test samples. Refer to regular (non-surrogate) analyte results in affected QC sample for assessment of potential impacts to those analytes.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

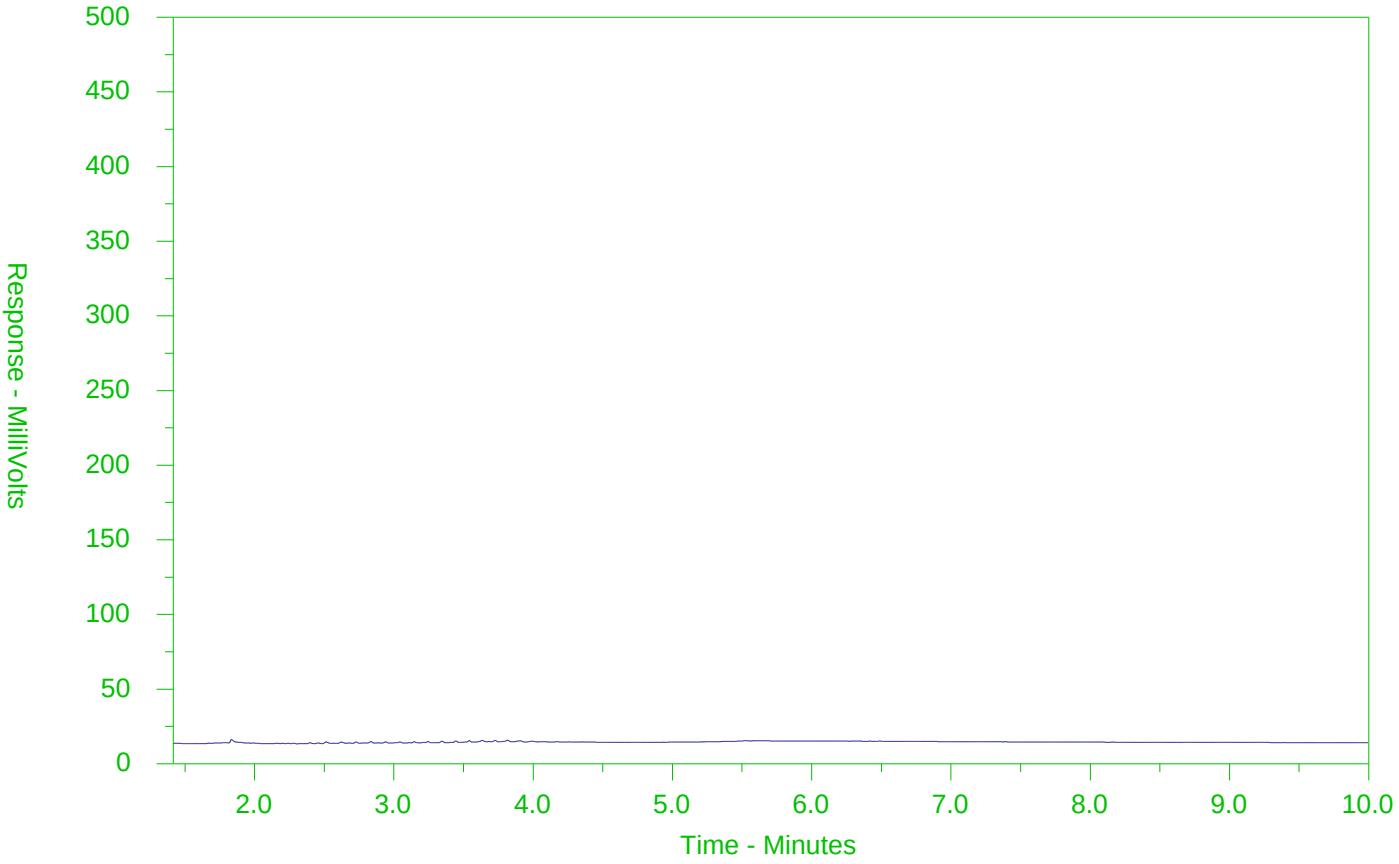
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-1
Client Sample ID: TP20-324-1-1.5'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

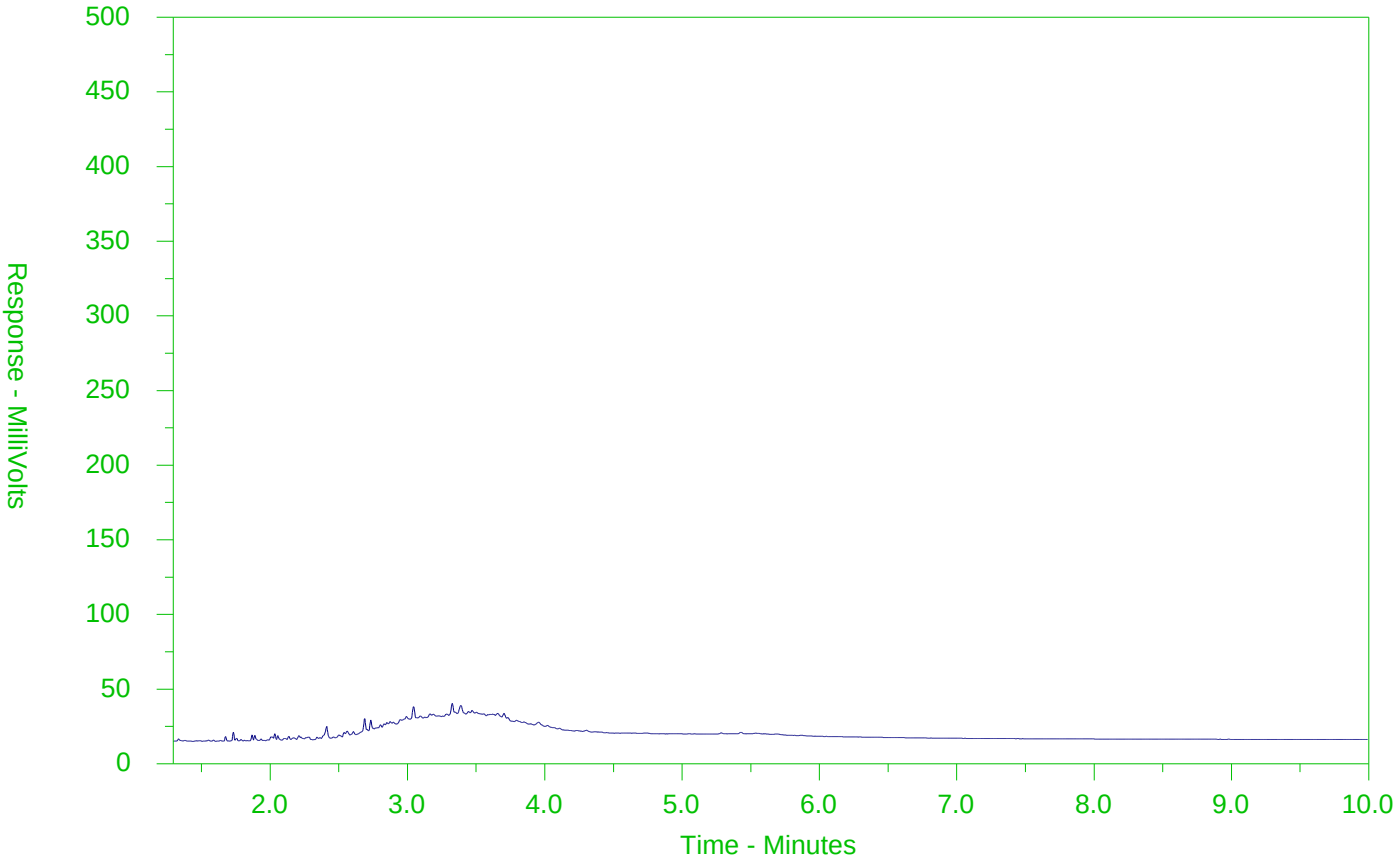
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-5
Client Sample ID: TP20-322-2-2.5'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

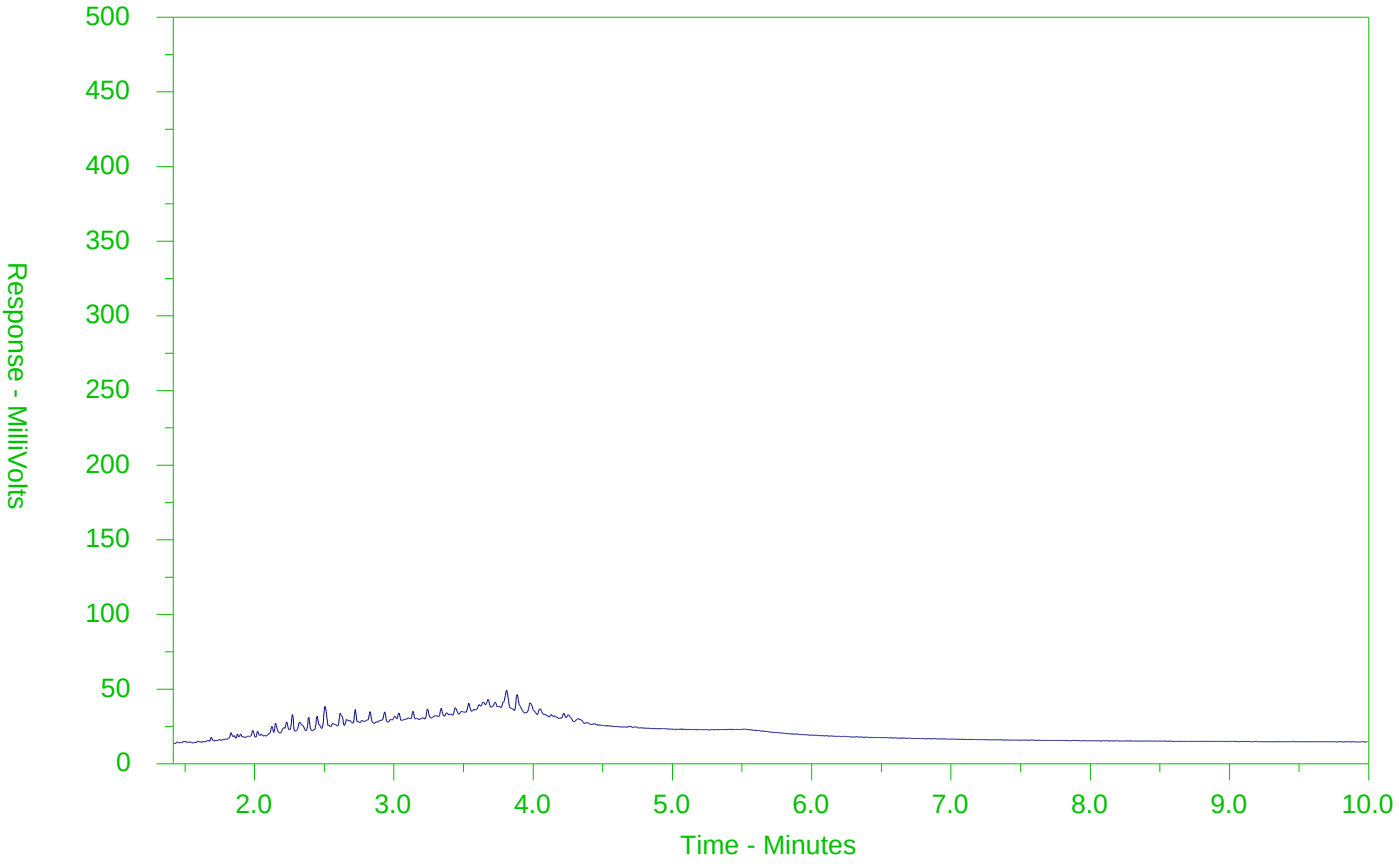
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-7
Client Sample ID: TP20-321-2.75-3.25'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

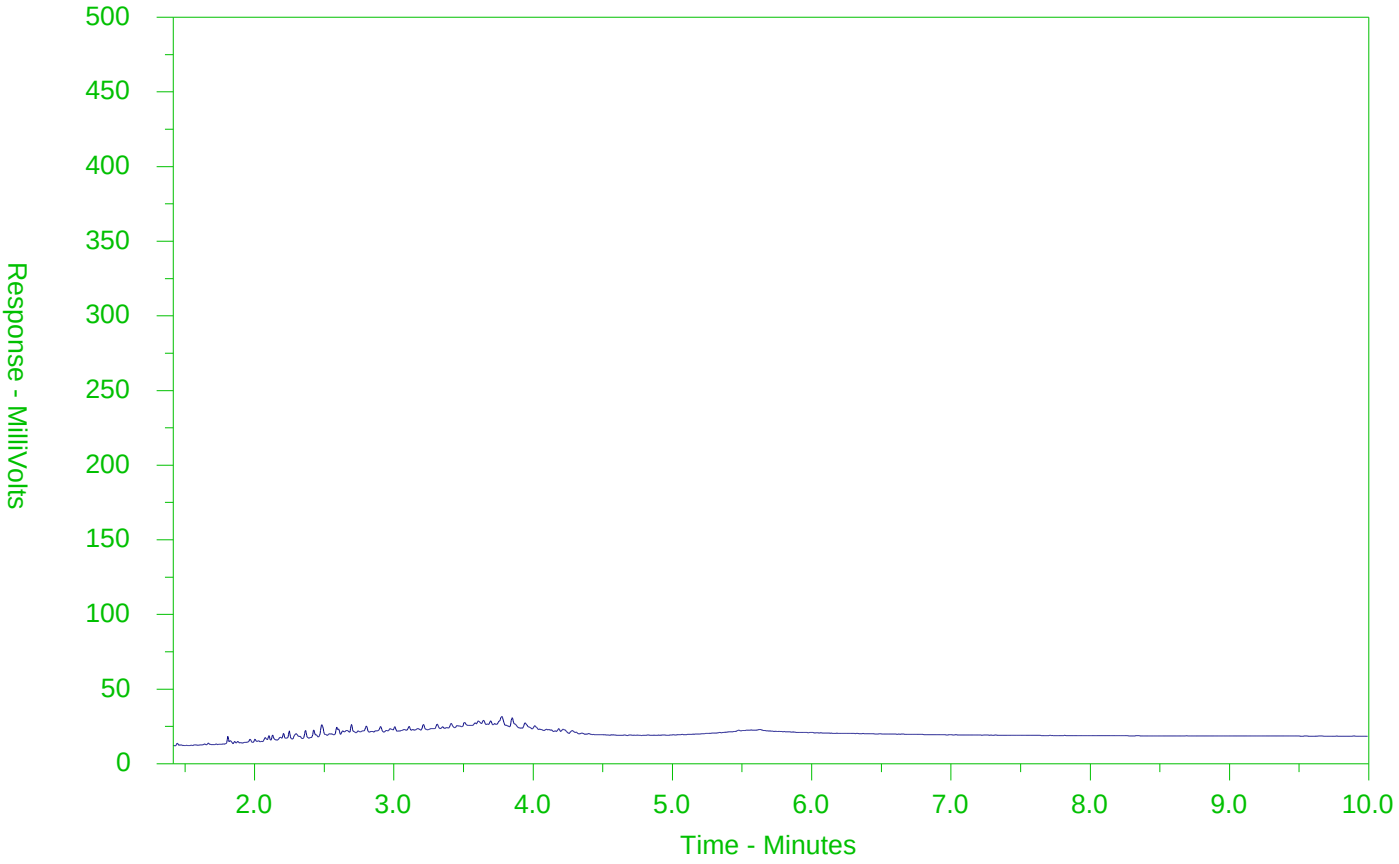
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-8
Client Sample ID: TP20-321-4.5-5'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

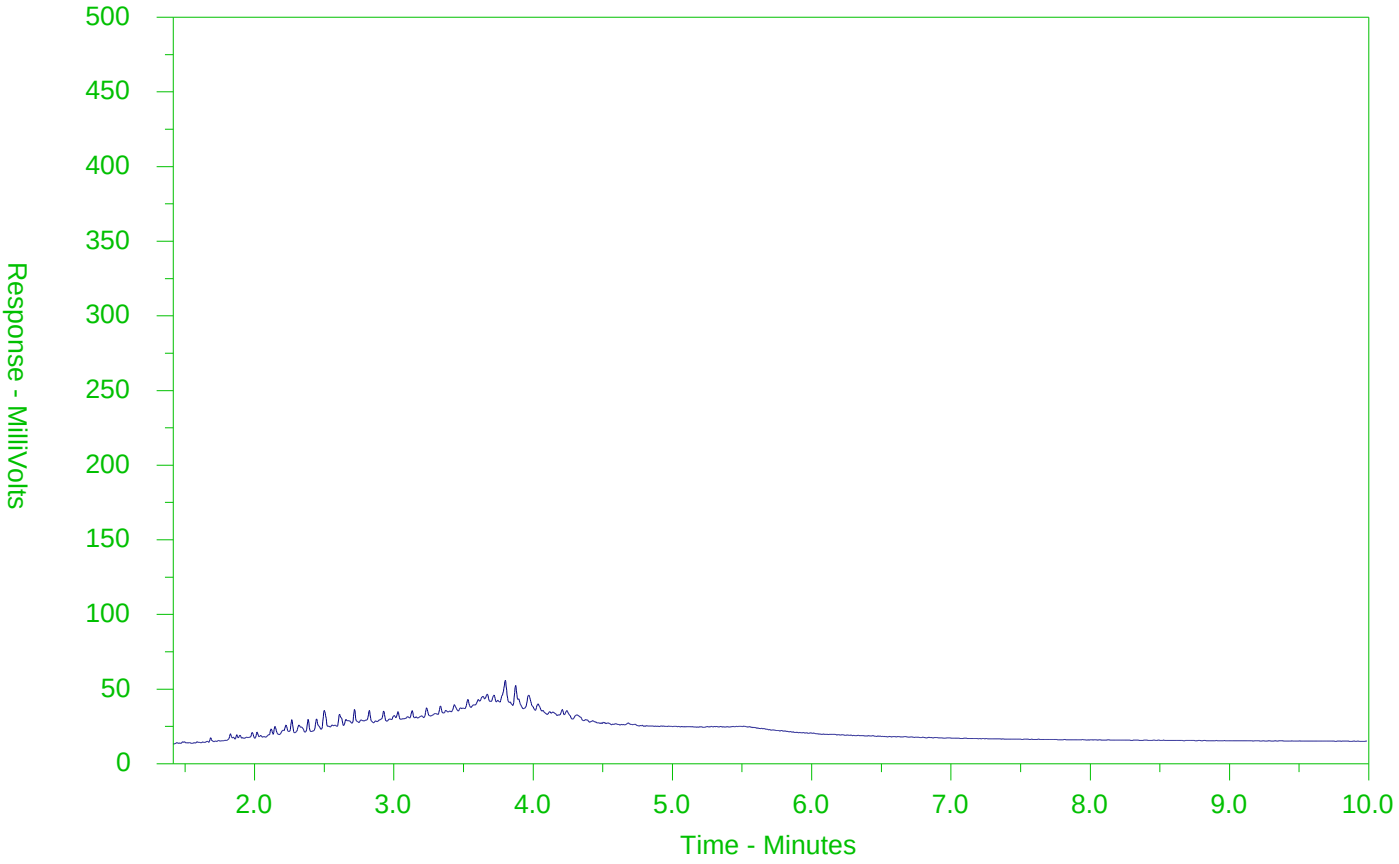
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-9
Client Sample ID: TP20-320-2.5-3'



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

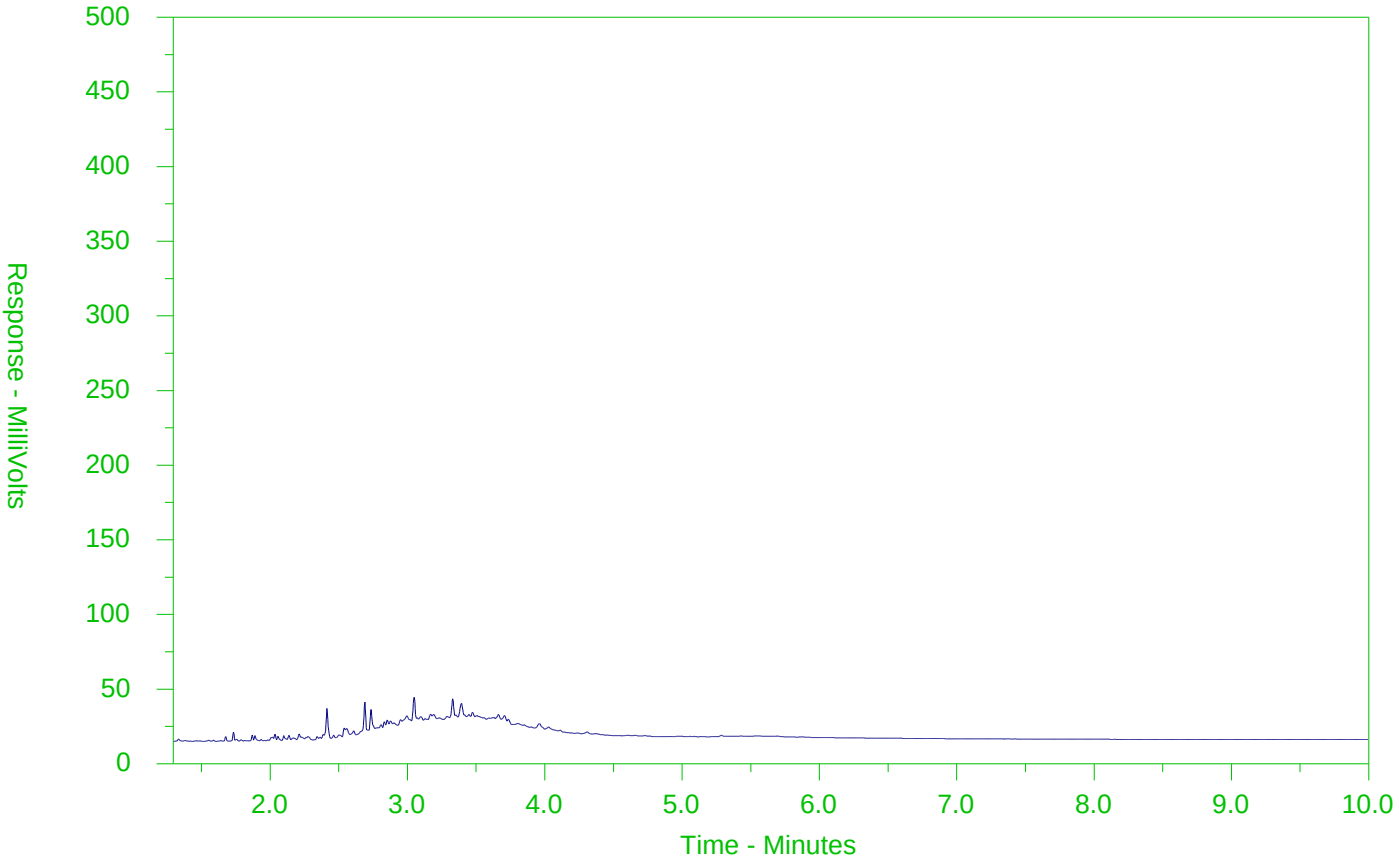
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-11
Client Sample ID: DUP1



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

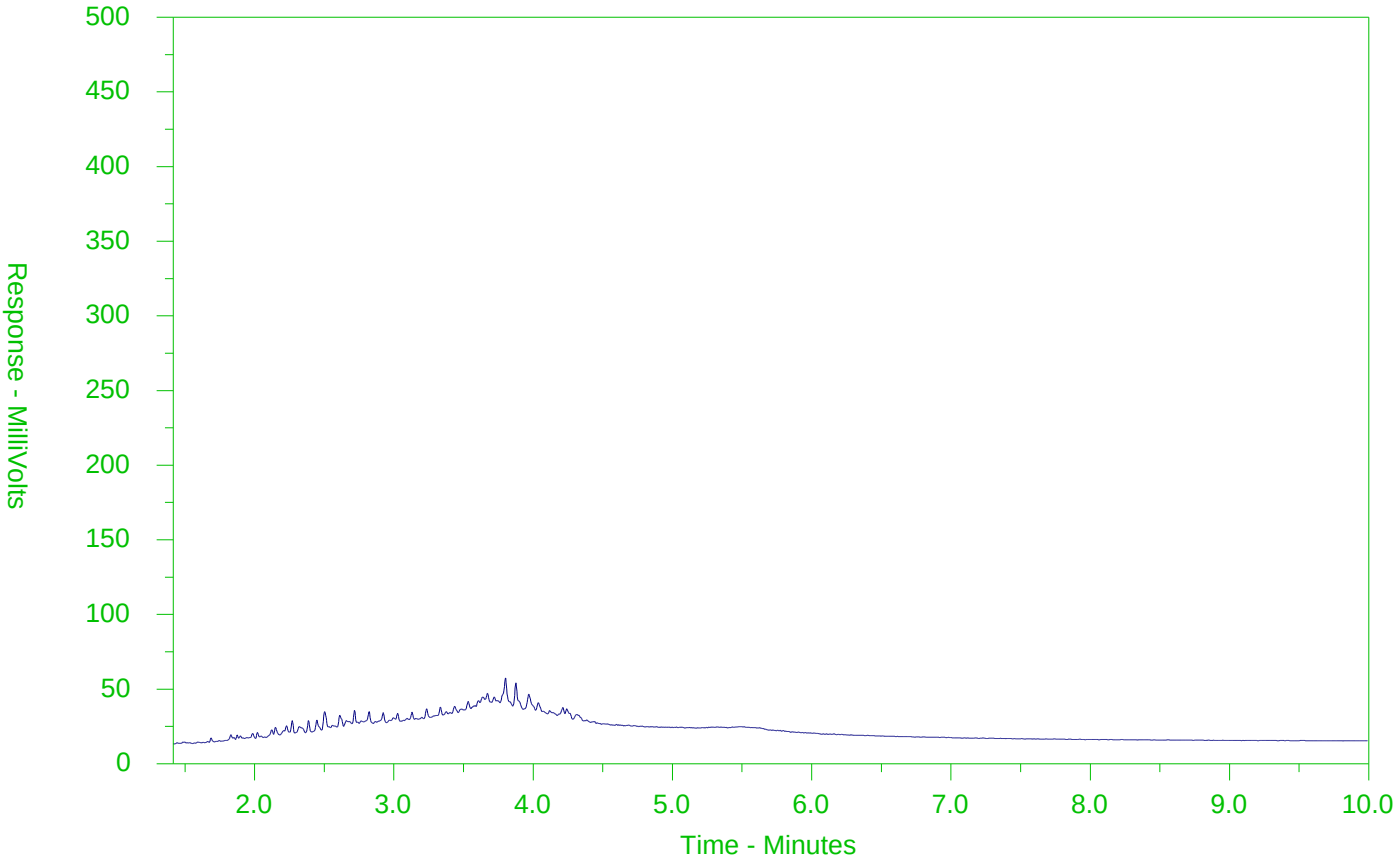
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-12
Client Sample ID: DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

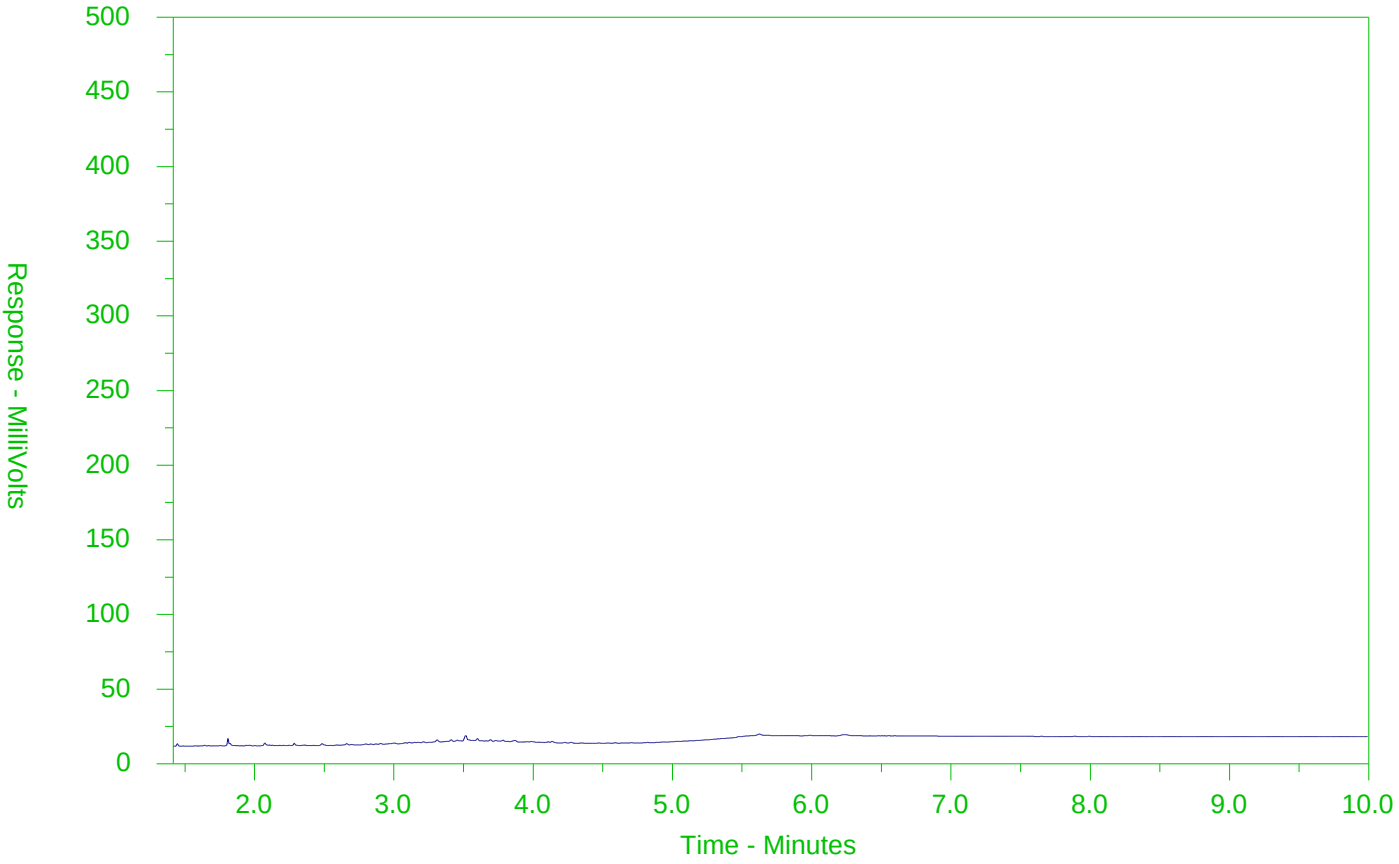
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-18
Client Sample ID: BH20-212-0.5-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

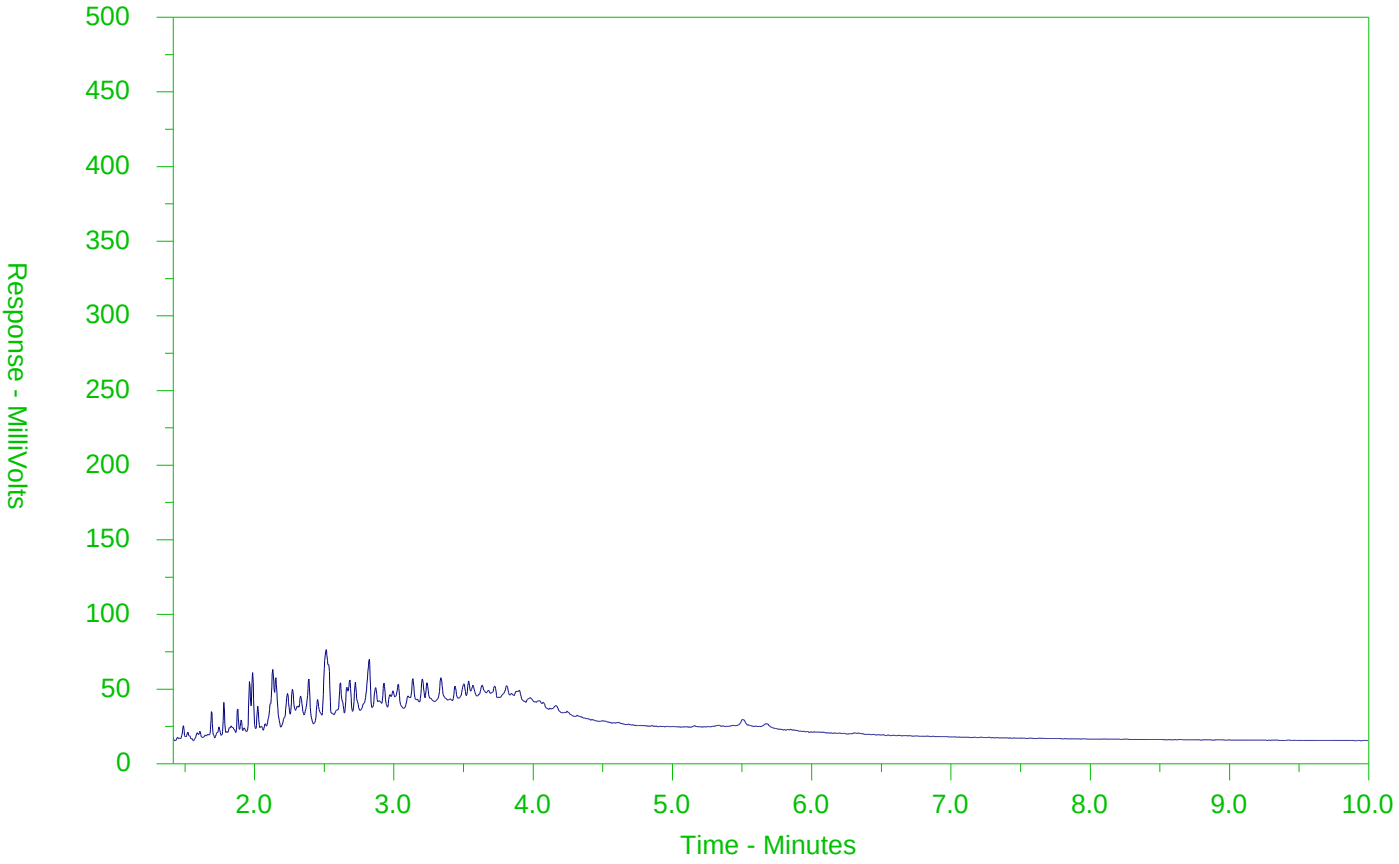
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-20
Client Sample ID: BH20-214-0.5-2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

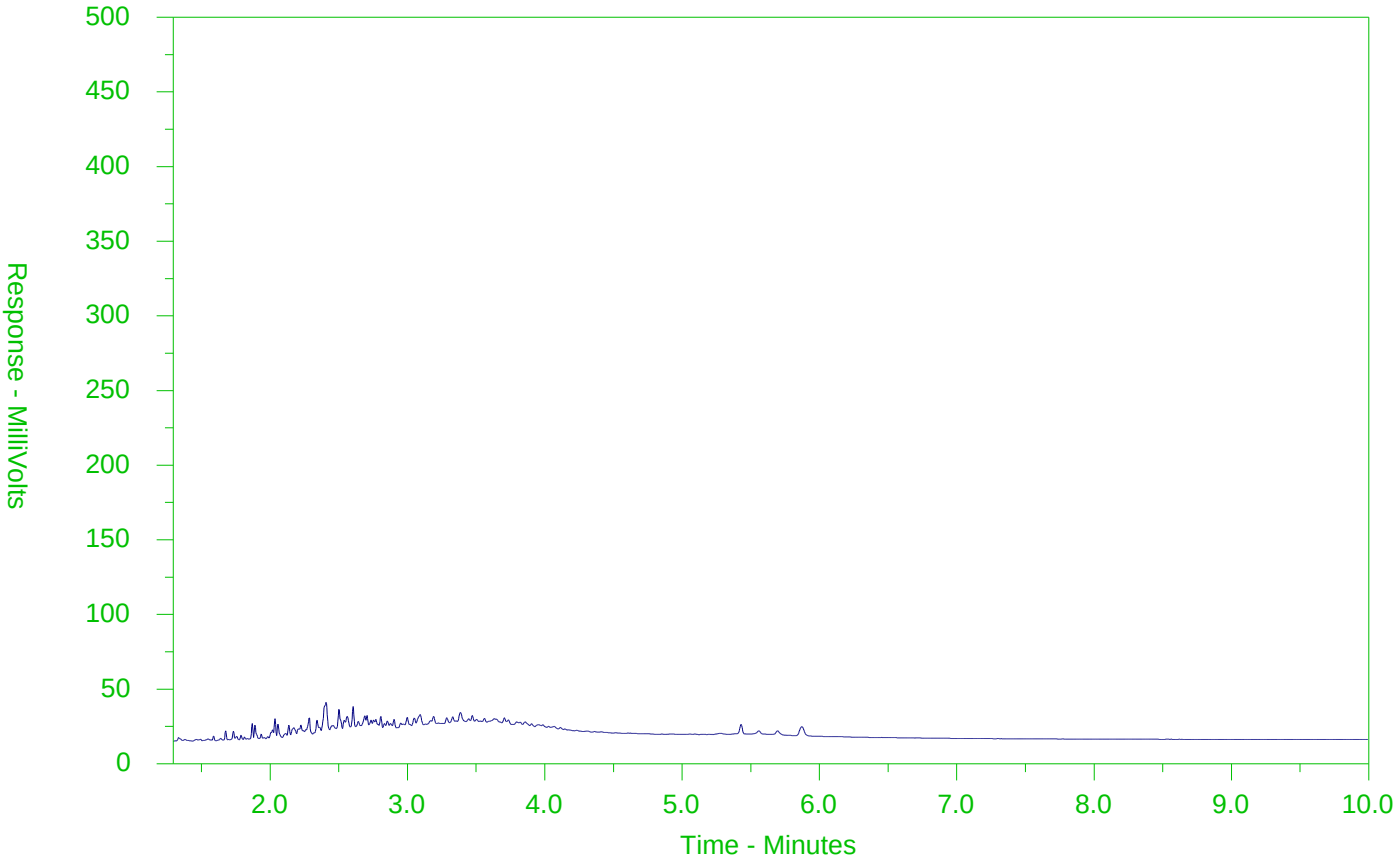
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2419793-21
Client Sample ID: BH20-214-2.5-3



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2419793-COFC

COC Number: 17 - 795231

Page 1 of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R]: Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report: YES NO	4 day [P4-20%] / 3 day [P3-25%] / 2 day [P2-50%] (Priority (Business Days))
Phone	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	1 Business day [E - 100%] / Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply) (Emergency)
Company address below will appear on the final report		Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St S, Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2: ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3: tania.mccarthy@jacobs.com	
Invoice To	Same as Report To: YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	Jacobs	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information	Oil and Gas Required Fields (client use)
ALS Account # / Quote #: Q78833	AFE/Cost Center: / PO#:
Job #: 69475TCH	Major/Minor Code: / Routing Code:
PO / AFE:	Requisitioner:
LSD: 21B	Location:
ALS Lab Work Order # (lab use only): L2419793 MG	ALS Contact: E. Hansen / Sampler: V. Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	O. Reg 153 Metals + Hg	PAHs	PHCs	VOCs										SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
								P												
1	TP20-324-1-1.5'	2020/02/20	9:00	Soil	5	X	X	X	X											
2	TP20-324-6.5-7'		9:30		5	X	X	X	X										Yes	
3	TP20-323-2-2.5'		10:07		2	X	X													
4	TP20-323-5.5-6'		10:40		2	X	X												Yes	
5	TP20-322-2-2.5'		11:10		5	X	X	X	X											
6	TP20-322-4.5-5'		12:30		5	X	X	X	X										Yes	
7	TP20-321-2.75-3.25'		12:00		5	X	X	X	X											
8	TP20-321-4.5-5'		12:15		5	X	X	X	X											
9	TP20-320-2.5-3'		13:00		5	X	X	X	X											
10	TP20-320-5-5.5'		13:20		5	X	X	X	X										Yes	
11	DUP1		—		5	X	X	X	X											
12	DUP2	2020/02/20	—	Soil	5	X	X	X	X											

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [X] NO	No ptt for any samples
Are samples for human consumption/ use? [ ] YES [X] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations: Yes [ ] No [ ]
Ice Packs [✓] Ice Cubes [ ] Custody seal intact: Yes [ ] No [ ]
Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				9.3	8.7		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 2020/02/21	Time: 17:20	Received by:	Date:	Time:	Received by: MG	Date: Feb 24/20	Time: 17:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SIF

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

L2419793-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 17 - 795255

Page 2 of

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R]: Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report: YES NO	PRIORITY (Surcharges Apply): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
Phone:	519-579-3560	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%]; Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St. S, Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2: ed.tawes@jacobs.com	
Postal Code:	N2E 4Y4	Email 3: tania.mccarthy@jacobs.com	
Invoice To	Same as Report To: YES NO	Invoice Distribution	
	Copy of Invoice with Report: YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax	
Contact		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q78583	AFE/Cost Center:	PO#:
Job #:	694757CH	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2419793 ua

ALS Contact: E. Hansen

Sampler: V. Peters

Analysis Request — indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS: O. Reg 153 Metals + Hg	PAHs	PHCs	VOCs	SVOCs	Metals Only	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
13	BH20-213-0.5-2.5	02-21-20	14:30	Soil	X		X		X			
14	BH20-213-5-7	02-21-20	15:00		X		X		X		Yes	
15	BH18-2071-0.5-2.5	02-21-20	09:55			X		X				
16	BH18-2071-5-7	02-21-20	10:20			H	H	H		X		
17	BH18-2071-7.5-9.5	02-21-20	10:40			H	H	H		X		
18	BH20-212-0.5-2	02-21-20	~~10:40~~ 11:15		X	X	X	X				
19	BH20-212-5.6-7	02-21-20	~~12:45~~ 12:30		X	X	X	X				
20	BH20-214-0.5-2	02-21-20	13:30		X	X	X	X			Yes	
21	BH20-214-2.5-3	02-21-20	13:45	Soil	X	X	X	X				
22	TB-001			QC				X				

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	No pH for ANY sample limited quantity in all
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				9.3	8.7		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Vicky Peters	Date: 2020/02/21	Time: 17:20	Received by:	Date:	Time:	Received by:	Date: Feb 21/20	Time: 17:20

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: Michael Shiry
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 25-FEB-20
Report Date: 03-MAR-20 08:28 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2420861

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH
C of C Numbers: 17-795244, 17-795253, 17-795254
Legal Site Desc:

Emily Hansen
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-1 MW18-115S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	27-FEB-20	2700
Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2
Bromoform	<5.0		5.0	ug/L	27-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2
Chloroform	<1.0		1.0	ug/L	27-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640
MTBE	<2.0		2.0	ug/L	27-FEB-20	15
Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	27-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72
Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	27-FEB-20	
Surrogate: 1,4-Difluorobenzene	102.1		70-130	%	27-FEB-20	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	27-FEB-20	420

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-1 MW18-115S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Hydrocarbons						
F1-BTEX	<25		25	ug/L	27-FEB-20	420
F2 (C10-C16)	<100		100	ug/L	26-FEB-20	150
F2-Naphth	<100		100	ug/L	27-FEB-20	
F3 (C16-C34)	<250		250	ug/L	26-FEB-20	500
F3-PAH	<250		250	ug/L	27-FEB-20	
F4 (C34-C50)	<250		250	ug/L	26-FEB-20	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	27-FEB-20	
Chrom. to baseline at nC50	YES			No Unit	26-FEB-20	
Surrogate: 2-Bromobenzotrifluoride	87.1		60-140	%	26-FEB-20	
Surrogate: 3,4-Dichlorotoluene	72.8		60-140	%	27-FEB-20	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	27-FEB-20	4.1
Acenaphthylene	<0.020		0.020	ug/L	27-FEB-20	1
Anthracene	<0.020		0.020	ug/L	27-FEB-20	0.1
Benzo(a)anthracene	<0.020		0.020	ug/L	27-FEB-20	0.2
Benzo(a)pyrene	<0.010		0.010	ug/L	27-FEB-20	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	27-FEB-20	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.1
Chrysene	<0.020		0.020	ug/L	27-FEB-20	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	27-FEB-20	0.2
Fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.4
Fluorene	<0.020		0.020	ug/L	27-FEB-20	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	27-FEB-20	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	27-FEB-20	2
1-Methylnaphthalene	<0.020		0.020	ug/L	27-FEB-20	2
2-Methylnaphthalene	<0.020		0.020	ug/L	27-FEB-20	2
Naphthalene	<0.050		0.050	ug/L	27-FEB-20	7
Phenanthrene	<0.020		0.020	ug/L	27-FEB-20	0.1
Pyrene	<0.020		0.020	ug/L	27-FEB-20	0.2
Surrogate: d10-Acenaphthene	117.3		60-140	%	27-FEB-20	
Surrogate: d12-Chrysene	105.8		60-140	%	27-FEB-20	
Surrogate: d8-Naphthalene	113.0		60-140	%	27-FEB-20	
Surrogate: d10-Phenanthrene	105.0		60-140	%	27-FEB-20	
L2420861-2 MW18-115D						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-2 MW18-115D						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	0.83		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	95.5		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	101.2		70-130	%	26-FEB-20	
L2420861-4 MW18-124S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2420861-4 MW18-124S									
Sampled By: V.PETERS/A.CASEY on 24-FEB-2									
Matrix: WATER						#1			
Volatile Organic Compounds									
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640			
MTBE	<2.0		2.0	ug/L	26-FEB-20	15			
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150			
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5			
o-Xylene	<0.30		0.30	ug/L	26-FEB-20				
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20				
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72			
Surrogate: 4-Bromofluorobenzene	96.1		70-130	%	26-FEB-20				
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%	26-FEB-20				
L2420861-5 MW17-106S									
Sampled By: V.PETERS/A.CASEY on 24-FEB-2									
Matrix: WATER						#1			
Volatile Organic Compounds									
Acetone	<30		30	ug/L	26-FEB-20	2700			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-5 MW17-106S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	96.2		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	26-FEB-20	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	28-FEB-20	4.1
Acenaphthylene	<0.020		0.020	ug/L	28-FEB-20	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2420861-5 MW17-106S Sampled By: V.PETERS/A.CASEY on 24-FEB-2 Matrix: WATER									
Polycyclic Aromatic Hydrocarbons									
Anthracene	<0.020		0.020	ug/L	28-FEB-20	0.1			
Benzo(a)anthracene	<0.020		0.020	ug/L	28-FEB-20	0.2			
Benzo(a)pyrene	<0.010		0.010	ug/L	28-FEB-20	0.01			
Benzo(b)fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.1			
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	28-FEB-20	0.2			
Benzo(k)fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.1			
Chrysene	<0.020		0.020	ug/L	28-FEB-20	0.1			
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	28-FEB-20	0.2			
Fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.4			
Fluorene	<0.020		0.020	ug/L	28-FEB-20	120			
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	28-FEB-20	0.2			
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	02-MAR-20	2			
1-Methylnaphthalene	<0.020		0.020	ug/L	28-FEB-20	2			
2-Methylnaphthalene	<0.020		0.020	ug/L	28-FEB-20	2			
Naphthalene	<0.050		0.050	ug/L	28-FEB-20	7			
Phenanthrene	<0.020		0.020	ug/L	28-FEB-20	0.1			
Pyrene	<0.020		0.020	ug/L	28-FEB-20	0.2			
Surrogate: 2-Fluorobiphenyl	108.3		50-140	%	28-FEB-20				
Surrogate: d14-Terphenyl	121.9		60-140	%	28-FEB-20				
Semi-Volatile Organics									
Biphenyl	<0.40		0.40	ug/L	02-MAR-20	0.5			
4-Chloroaniline	<0.40		0.40	ug/L	02-MAR-20	10			
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	02-MAR-20	5			
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	02-MAR-20	120			
2-Chlorophenol	<0.30		0.30	ug/L	02-MAR-20	8.9			
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	02-MAR-20	0.5			
2,4-Dichlorophenol	<0.30		0.30	ug/L	02-MAR-20	20			
Diethylphthalate	<0.20		0.20	ug/L	02-MAR-20	30			
Dimethylphthalate	<0.20		0.20	ug/L	02-MAR-20	30			
2,4-Dimethylphenol	<0.50		0.50	ug/L	02-MAR-20	10			
2,4-Dinitrophenol	<1.0		1.0	ug/L	02-MAR-20	10			
2,4-Dinitrotoluene	<0.40		0.40	ug/L	02-MAR-20				
2,6-Dinitrotoluene	<0.40		0.40	ug/L	02-MAR-20				
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L	02-MAR-20	5			
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	02-MAR-20	10			
Pentachlorophenol	<0.50		0.50	ug/L	02-MAR-20	0.5			
Phenol	<0.50		0.50	ug/L	02-MAR-20	5			
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	02-MAR-20	0.5			
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	02-MAR-20	0.2			
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	02-MAR-20	0.2			
Surrogate: 2-Fluorobiphenyl	113.1		50-140	%	02-MAR-20				
Surrogate: Nitrobenzene d5	133.5		50-140	%	02-MAR-20				
Surrogate: p-Terphenyl d14	125.5		60-140	%	02-MAR-20				
Surrogate: 2,4,6-Tribromophenol	132.0		50-140	%	02-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2420861-6	MW17-106D									
Sampled By:	V.PETERS/A.CASEY on 24-FEB-2									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Acetone	<30		30	ug/L	26-FEB-20	2700			
	Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
	Bromoform	<5.0		5.0	ug/L	26-FEB-20	5			
	Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
	Chloroform	<1.0		1.0	ug/L	26-FEB-20	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5			
	1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5			
	Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400			
	Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640			
	MTBE	<2.0		2.0	ug/L	26-FEB-20	15			
	Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150			
	Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5			
	o-Xylene	<0.30		0.30	ug/L	26-FEB-20				
	m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20				
	Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72			
	Surrogate: 4-Bromofluorobenzene	94.9		70-130	%	26-FEB-20				
	Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	26-FEB-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2420861-7	MW17-100S									
Sampled By:	V.PETERS/A.CASEY on 24-FEB-2									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Acetone	<30		30	ug/L	26-FEB-20	2700			
	Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
	Bromoform	<5.0		5.0	ug/L	26-FEB-20	5			
	Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
	Chloroform	<1.0		1.0	ug/L	26-FEB-20	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5			
	1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5			
	Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400			
	Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640			
	MTBE	<2.0		2.0	ug/L	26-FEB-20	15			
	Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150			
	Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5			
	o-Xylene	<0.30		0.30	ug/L	26-FEB-20				
	m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20				
	Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72			
	Surrogate: 4-Bromofluorobenzene	100.7		70-130	%	26-FEB-20				
	Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	26-FEB-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-8 MW18-113D						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	1.02		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.8		70-130	%	26-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-9 MW18-113S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	100.2		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	26-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-10 MW18-114S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	0.87		0.50	ug/L	26-FEB-20	*0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	26-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-11 MW18-117S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%	26-FEB-20	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	26-FEB-20	420

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-11 MW18-117S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Hydrocarbons						
F1-BTEX	<25		25	ug/L	27-FEB-20	420
F2 (C10-C16)	<100		100	ug/L	26-FEB-20	150
F3 (C16-C34)	<250		250	ug/L	26-FEB-20	500
F4 (C34-C50)	<250		250	ug/L	26-FEB-20	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	27-FEB-20	
Chrom. to baseline at nC50	YES			No Unit	26-FEB-20	
Surrogate: 2-Bromobenzotrifluoride	83.0		60-140	%	26-FEB-20	
Surrogate: 3,4-Dichlorotoluene	97.2		60-140	%	26-FEB-20	
L2420861-12 MW18-114D						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	1.71		0.50	ug/L	26-FEB-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-12 MW18-114D						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	100.2		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	26-FEB-20	
L2420861-13 MW18-118S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-13 MW18-118S						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	26-FEB-20	
L2420861-14 DUP1						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-14 DUP1						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	99.4		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.4		70-130	%	26-FEB-20	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	28-FEB-20	4.1
Acenaphthylene	<0.020		0.020	ug/L	28-FEB-20	1
Anthracene	<0.020		0.020	ug/L	28-FEB-20	0.1
Benzo(a)anthracene	<0.020		0.020	ug/L	28-FEB-20	0.2
Benzo(a)pyrene	<0.010		0.010	ug/L	28-FEB-20	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	28-FEB-20	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.1
Chrysene	<0.020		0.020	ug/L	28-FEB-20	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	28-FEB-20	0.2
Fluoranthene	<0.020		0.020	ug/L	28-FEB-20	0.4
Fluorene	<0.020		0.020	ug/L	28-FEB-20	120
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	28-FEB-20	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	02-MAR-20	2
1-Methylnaphthalene	<0.020		0.020	ug/L	28-FEB-20	2
2-Methylnaphthalene	<0.020		0.020	ug/L	28-FEB-20	2
Naphthalene	<0.050		0.050	ug/L	28-FEB-20	7
Phenanthrene	<0.020		0.020	ug/L	28-FEB-20	0.1
Pyrene	<0.020		0.020	ug/L	28-FEB-20	0.2
Surrogate: 2-Fluorobiphenyl	94.8		50-140	%	28-FEB-20	
Surrogate: d14-Terphenyl	116.3		60-140	%	28-FEB-20	
Semi-Volatile Organics						
Biphenyl	<0.40		0.40	ug/L	02-MAR-20	0.5
4-Chloroaniline	<0.40		0.40	ug/L	02-MAR-20	10
Bis(2-chloroethyl)ether	<0.40		0.40	ug/L	02-MAR-20	5
Bis(2-chloroisopropyl)ether	<0.40		0.40	ug/L	02-MAR-20	120
2-Chlorophenol	<0.30		0.30	ug/L	02-MAR-20	8.9
3,3'-Dichlorobenzidine	<0.40		0.40	ug/L	02-MAR-20	0.5

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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-14 DUP1						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Semi-Volatile Organics						
2,4-Dichlorophenol	<0.30		0.30	ug/L	02-MAR-20	20
Diethylphthalate	<0.20		0.20	ug/L	02-MAR-20	30
Dimethylphthalate	<0.20		0.20	ug/L	02-MAR-20	30
2,4-Dimethylphenol	<0.50		0.50	ug/L	02-MAR-20	10
2,4-Dinitrophenol	<1.0		1.0	ug/L	02-MAR-20	10
2,4-Dinitrotoluene	<0.40		0.40	ug/L	02-MAR-20	
2,6-Dinitrotoluene	<0.40		0.40	ug/L	02-MAR-20	
2,4+2,6-Dinitrotoluene	<0.57		0.57	ug/L	02-MAR-20	5
Bis(2-ethylhexyl)phthalate	<2.0		2.0	ug/L	02-MAR-20	10
Pentachlorophenol	<0.50		0.50	ug/L	02-MAR-20	0.5
Phenol	<0.50		0.50	ug/L	02-MAR-20	5
1,2,4-Trichlorobenzene	<0.40		0.40	ug/L	02-MAR-20	0.5
2,4,5-Trichlorophenol	<0.20		0.20	ug/L	02-MAR-20	0.2
2,4,6-Trichlorophenol	<0.20		0.20	ug/L	02-MAR-20	0.2
Surrogate: 2-Fluorobiphenyl	96.5		50-140	%	02-MAR-20	
Surrogate: Nitrobenzene d5	113.2		50-140	%	02-MAR-20	
Surrogate: p-Terphenyl d14	124.8		60-140	%	02-MAR-20	
Surrogate: 2,4,6-Tribromophenol	117.4		50-140	%	02-MAR-20	
L2420861-15 DUP2						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	

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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-15 DUP2						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						
Volatile Organic Compounds						
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.7		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	26-FEB-20	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	26-FEB-20	420
F1-BTEX	<25		25	ug/L	27-FEB-20	420
F2 (C10-C16)	<100		100	ug/L	27-FEB-20	150
F2-Naphth	<100		100	ug/L	27-FEB-20	
F3 (C16-C34)	<250		250	ug/L	27-FEB-20	500
F3-PAH	<250		250	ug/L	27-FEB-20	
F4 (C34-C50)	<250		250	ug/L	27-FEB-20	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	27-FEB-20	
Chrom. to baseline at nC50	YES			No Unit	27-FEB-20	
Surrogate: 2-Bromobenzotrifluoride	105.3		60-140	%	27-FEB-20	
Surrogate: 3,4-Dichlorotoluene	96.0		60-140	%	26-FEB-20	
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	<0.020		0.020	ug/L	27-FEB-20	4.1
Acenaphthylene	<0.020		0.020	ug/L	27-FEB-20	1
Anthracene	<0.020		0.020	ug/L	27-FEB-20	0.1
Benzo(a)anthracene	<0.020		0.020	ug/L	27-FEB-20	0.2
Benzo(a)pyrene	<0.010		0.010	ug/L	27-FEB-20	0.01
Benzo(b)fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.1
Benzo(g,h,i)perylene	<0.020		0.020	ug/L	27-FEB-20	0.2
Benzo(k)fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.1
Chrysene	<0.020		0.020	ug/L	27-FEB-20	0.1
Dibenzo(ah)anthracene	<0.020		0.020	ug/L	27-FEB-20	0.2
Fluoranthene	<0.020		0.020	ug/L	27-FEB-20	0.4
Fluorene	<0.020		0.020	ug/L	27-FEB-20	120

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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-15 DUP2						
Sampled By: V.PETERS/A.CASEY on 24-FEB-2						
Matrix: WATER						#1
Polycyclic Aromatic Hydrocarbons						
Indeno(1,2,3-cd)pyrene	<0.020		0.020	ug/L	27-FEB-20	0.2
1+2-Methylnaphthalenes	<0.028		0.028	ug/L	27-FEB-20	2
1-Methylnaphthalene	<0.020		0.020	ug/L	27-FEB-20	2
2-Methylnaphthalene	<0.020		0.020	ug/L	27-FEB-20	2
Naphthalene	<0.050		0.050	ug/L	27-FEB-20	7
Phenanthrene	<0.020		0.020	ug/L	27-FEB-20	0.1
Pyrene	<0.020		0.020	ug/L	27-FEB-20	0.2
Surrogate: d10-Acenaphthene	118.6		60-140	%	27-FEB-20	
Surrogate: d12-Chrysene	101.0		60-140	%	27-FEB-20	
Surrogate: d8-Naphthalene	113.8		60-140	%	27-FEB-20	
Surrogate: d10-Phenanthrene	105.1		60-140	%	27-FEB-20	
L2420861-16 MW18-112S						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5

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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-16 MW18-112S						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%	26-FEB-20	
L2420861-17 MW18-112G						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	1.57		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400

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T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-17 MW18-112G Sampled By: V.PETERS/A.CASEY on 25-FEB-2 Matrix: WATER						#1
Volatile Organic Compounds						
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.5		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.0		70-130	%	26-FEB-20	
L2420861-18 MW18-112D Sampled By: V.PETERS/A.CASEY on 25-FEB-2 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	27-FEB-20	2700
Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2
Bromoform	<5.0		5.0	ug/L	27-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2
Chloroform	<1.0		1.0	ug/L	27-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-18 MW18-112D						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640
MTBE	<2.0		2.0	ug/L	27-FEB-20	15
Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	27-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72
Surrogate: 4-Bromofluorobenzene	96.5		70-130	%	27-FEB-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	27-FEB-20	
L2420861-19 OW16						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-19 OW16						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.2		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.2		70-130	%	26-FEB-20	
L2420861-20 OW15						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-20 OW15						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	97.8		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	26-FEB-20	
L2420861-21 MW18-119S						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	5.83		0.50	ug/L	26-FEB-20	*0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-21	MW18-119S						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
	MTBE	<2.0		2.0	ug/L	26-FEB-20	15
	Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
	1,1,1-Trichloroethane	12.4		0.50	ug/L	26-FEB-20	*0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
	Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
	o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
	m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
	Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
	Surrogate: 4-Bromofluorobenzene	99.2		70-130	%	26-FEB-20	
	Surrogate: 1,4-Difluorobenzene	100.0		70-130	%	26-FEB-20	
L2420861-22	MW18-119D						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	26-FEB-20	2700
	Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
	Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
	Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
	Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-22 MW18-119D						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	0.66		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	0.71		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%	26-FEB-20	
L2420861-23 OW11-I						
Sampled By: V.PETERS/A.CASEY on 25-FEB-2						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Chloroform	<1.0		1.0	ug/L	26-FEB-20	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-23 OW11-I Sampled By: V.PETERS/A.CASEY on 25-FEB-2 Matrix: WATER						#1
Volatile Organic Compounds						
1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
MTBE	<2.0		2.0	ug/L	26-FEB-20	15
Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5
o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
Surrogate: 4-Bromofluorobenzene	97.7		70-130	%	26-FEB-20	
Surrogate: 1,4-Difluorobenzene	100.0		70-130	%	26-FEB-20	
L2420861-24 OW11-II Sampled By: V.PETERS/A.CASEY on 25-FEB-2 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	26-FEB-20	2700
Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2
Bromoform	<5.0		5.0	ug/L	26-FEB-20	5
Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-24	OW11-II						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2
	Chloroform	<1.0		1.0	ug/L	26-FEB-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590
	1,1-Dichloroethane	22.6		0.50	ug/L	26-FEB-20	*0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,1-Dichloroethylene	0.75		0.50	ug/L	26-FEB-20	*0.5
	cis-1,2-Dichloroethylene	<1.4	DLQ	1.4	ug/L	26-FEB-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640
	MTBE	<2.0		2.0	ug/L	26-FEB-20	15
	Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8
	1,1,1-Trichloroethane	27.1		0.50	ug/L	26-FEB-20	*0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150
	Vinyl chloride	0.86		0.50	ug/L	26-FEB-20	*0.5
	o-Xylene	<0.30		0.30	ug/L	26-FEB-20	
	m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20	
	Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72
	Surrogate: 4-Bromofluorobenzene	99.4		70-130	%	26-FEB-20	
	Surrogate: 1,4-Difluorobenzene	100.2		70-130	%	26-FEB-20	
L2420861-25	MW18-122G						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	26-FEB-20	2700
	Benzene	<0.50		0.50	ug/L	26-FEB-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	26-FEB-20	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2420861-25	MW18-122G									
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Bromoform	<5.0		5.0	ug/L	26-FEB-20	5			
	Bromomethane	<0.50		0.50	ug/L	26-FEB-20	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	26-FEB-20	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dibromochloromethane	<2.0		2.0	ug/L	26-FEB-20	2			
	Chloroform	<1.0		1.0	ug/L	26-FEB-20	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	26-FEB-20	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	26-FEB-20	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,2-Dichloroethylene	0.53		0.50	ug/L	26-FEB-20	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	26-FEB-20	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	26-FEB-20	5			
	1,2-Dichloropropane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	26-FEB-20				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	n-Hexane	<0.50		0.50	ug/L	26-FEB-20	5			
	Methyl Ethyl Ketone	<20		20	ug/L	26-FEB-20	400			
	Methyl Isobutyl Ketone	<20		20	ug/L	26-FEB-20	640			
	MTBE	<2.0		2.0	ug/L	26-FEB-20	15			
	Styrene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Toluene	<0.50		0.50	ug/L	26-FEB-20	0.8			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	26-FEB-20	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	26-FEB-20	150			
	Vinyl chloride	<0.50		0.50	ug/L	26-FEB-20	0.5			
	o-Xylene	<0.30		0.30	ug/L	26-FEB-20				
	m+p-Xylenes	<0.40		0.40	ug/L	26-FEB-20				
	Xylenes (Total)	<0.50		0.50	ug/L	26-FEB-20	72			
	Surrogate: 4-Bromofluorobenzene	99.4		70-130	%	26-FEB-20				
	Surrogate: 1,4-Difluorobenzene	99.3		70-130	%	26-FEB-20				
L2420861-26	MW18-122D									
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2									
Matrix:	WATER						#1			
Volatile Organic Compounds										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-26	MW18-122D						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	27-FEB-20	2700
	Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Bromoform	<5.0		5.0	ug/L	27-FEB-20	5
	Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Chloroform	<1.0		1.0	ug/L	27-FEB-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590
	1,1-Dichloroethane	5.89		0.50	ug/L	27-FEB-20	*0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,2-Dichloroethylene	1.82		0.50	ug/L	27-FEB-20	*1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640
	MTBE	<2.0		2.0	ug/L	27-FEB-20	15
	Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150
	Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5
	o-Xylene	<0.30		0.30	ug/L	27-FEB-20	
	m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20	
	Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72
	Surrogate: 4-Bromofluorobenzene	98.4		70-130	%	27-FEB-20	
	Surrogate: 1,4-Difluorobenzene	99.5		70-130	%	27-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2420861-27	OW12						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	27-FEB-20	2700
	Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Bromoform	<5.0		5.0	ug/L	27-FEB-20	5
	Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Chloroform	<1.0		1.0	ug/L	27-FEB-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590
	1,1-Dichloroethane	0.91		0.50	ug/L	27-FEB-20	*0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640
	MTBE	<2.0		2.0	ug/L	27-FEB-20	15
	Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8
	1,1,1-Trichloroethane	5.80		0.50	ug/L	27-FEB-20	*0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150
	Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5
	o-Xylene	<0.30		0.30	ug/L	27-FEB-20	
	m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20	
	Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72
	Surrogate: 4-Bromofluorobenzene	95.4		70-130	%	27-FEB-20	
	Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	27-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2420861-28	MW18-120D									
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2									
Matrix:	WATER						#1			
Volatile Organic Compounds										
	Acetone	<30		30	ug/L	27-FEB-20	2700			
	Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
	Bromoform	<5.0		5.0	ug/L	27-FEB-20	5			
	Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89			
	Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2			
	Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
	Chloroform	<1.0		1.0	ug/L	27-FEB-20	2			
	1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2			
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590			
	1,1-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
	Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5			
	1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5			
	Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400			
	Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640			
	MTBE	<2.0		2.0	ug/L	27-FEB-20	15			
	Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1			
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8			
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
	Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150			
	Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5			
	o-Xylene	<0.30		0.30	ug/L	27-FEB-20				
	m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20				
	Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72			
	Surrogate: 4-Bromofluorobenzene	97.0		70-130	%	27-FEB-20				
	Surrogate: 1,4-Difluorobenzene	100.8		70-130	%	27-FEB-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2420861-29 DUP3									
Sampled By: V.PETERS/A.CASEY on 25-FEB-2									
Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	27-FEB-20	2700			
Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
Bromoform	<5.0		5.0	ug/L	27-FEB-20	5			
Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
Chloroform	<1.0		1.0	ug/L	27-FEB-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640			
MTBE	<2.0		2.0	ug/L	27-FEB-20	15			
Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150			
Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5			
o-Xylene	<0.30		0.30	ug/L	27-FEB-20				
m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20				
Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72			
Surrogate: 4-Bromofluorobenzene	97.5		70-130	%	27-FEB-20				
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	27-FEB-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2420861-30 TB001									
Sampled By: V.PETERS/A.CASEY on 25-FEB-2									
Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	27-FEB-20	2700			
Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
Bromoform	<5.0		5.0	ug/L	27-FEB-20	5			
Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2			
Chloroform	<1.0		1.0	ug/L	27-FEB-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5			
n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640			
MTBE	<2.0		2.0	ug/L	27-FEB-20	15			
Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150			
Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5			
o-Xylene	<0.30		0.30	ug/L	27-FEB-20				
m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20				
Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72			
Surrogate: 4-Bromofluorobenzene	96.6		70-130	%	27-FEB-20				
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	27-FEB-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2420861-31	MW17-111S						
Sampled By:	V.PETERS/A.CASEY on 25-FEB-2						
Matrix:	WATER						
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	27-FEB-20	2700
	Benzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Bromoform	<5.0		5.0	ug/L	27-FEB-20	5
	Bromomethane	<0.50		0.50	ug/L	27-FEB-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	27-FEB-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	27-FEB-20	2
	Chloroform	<1.0		1.0	ug/L	27-FEB-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	27-FEB-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	27-FEB-20	590
	1,1-Dichloroethane	2.04		0.50	ug/L	27-FEB-20	*0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	27-FEB-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	27-FEB-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	27-FEB-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	27-FEB-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	27-FEB-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	27-FEB-20	0.5
	n-Hexane	<0.50		0.50	ug/L	27-FEB-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	27-FEB-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	27-FEB-20	640
	MTBE	<2.0		2.0	ug/L	27-FEB-20	15
	Styrene	<0.50		0.50	ug/L	27-FEB-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Toluene	<0.50		0.50	ug/L	27-FEB-20	0.8
	1,1,1-Trichloroethane	5.29		0.50	ug/L	27-FEB-20	*0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	27-FEB-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	27-FEB-20	150
	Vinyl chloride	<0.50		0.50	ug/L	27-FEB-20	0.5
	o-Xylene	<0.30		0.30	ug/L	27-FEB-20	
	m+p-Xylenes	<0.40		0.40	ug/L	27-FEB-20	
	Xylenes (Total)	<0.50		0.50	ug/L	27-FEB-20	72
	Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	27-FEB-20	
	Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	27-FEB-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
625-511-WT	Water	ABN,CP,PAH-O.Reg 153/04	SW846 8270 (511)

Ground water sample extraction is carried out at a pH <2 (acid extractables) and pH>11 (base neutral extractables). Extracts are dried, concentrated and exchanged into a solvent compatible with the cleanup. Analysis is by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

DINITROTOL-CALC-WT	Water	ABN-Calculated Parameters	SW846 8270
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

METHYLNAPS-CALC-WT	Water	PAH-Calculated Parameters	SW846 8270
PAH-511-WT	Water	PAH-O. Reg 153/04 (July 2011)	SW846 3510/8270

Aqueous samples, fortified with surrogates, are extracted using liquid/liquid extraction technique. The sample extracts are concentrated and then analyzed using GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

Reference Information

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-795244 17-795253 17-795254

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R5011272								
WG3282669-2 LCS								
1,2,4-Trichlorobenzene			59.5		%		50-140	02-MAR-20
2-Chlorophenol			89.2		%		50-140	02-MAR-20
2,4-Dichlorophenol			95.3		%		50-140	02-MAR-20
2,4-Dimethylphenol			43.8		%		30-130	02-MAR-20
2,4-Dinitrophenol			112.2		%		50-140	02-MAR-20
2,4-Dinitrotoluene			120.8		%		50-140	02-MAR-20
2,4,5-Trichlorophenol			104.7		%		50-140	02-MAR-20
2,4,6-Trichlorophenol			100.7		%		50-140	02-MAR-20
2,6-Dinitrotoluene			105.8		%		50-140	02-MAR-20
3,3'-Dichlorobenzidine			34.9		%		30-130	02-MAR-20
4-Chloroaniline			18.6	RRQC	%		30-130	02-MAR-20
Biphenyl			88.7		%		50-140	02-MAR-20
Bis(2-chloroethyl)ether			94.0		%		50-140	02-MAR-20
Bis(2-chloroisopropyl)ether			88.4		%		50-140	02-MAR-20
Bis(2-ethylhexyl)phthalate			116.8		%		50-140	02-MAR-20
Diethylphthalate			96.6		%		50-140	02-MAR-20
Dimethylphthalate			96.3		%		50-140	02-MAR-20
Pentachlorophenol			115.2		%		50-140	02-MAR-20
Phenol			92.6		%		30-130	02-MAR-20
COMMENTS: RRQC: Recoveries are outside ALS control limits. Associated non-detect sample results have not been affected.								
WG3282669-1 MB								
1,2,4-Trichlorobenzene			<0.40		ug/L		0.4	02-MAR-20
2-Chlorophenol			<0.30		ug/L		0.3	02-MAR-20
2,4-Dichlorophenol			<0.30		ug/L		0.3	02-MAR-20
2,4-Dimethylphenol			<0.50		ug/L		0.5	02-MAR-20
2,4-Dinitrophenol			<1.0		ug/L		1	02-MAR-20
2,4-Dinitrotoluene			<0.40		ug/L		0.4	02-MAR-20
2,4,5-Trichlorophenol			<0.20		ug/L		0.2	02-MAR-20
2,4,6-Trichlorophenol			<0.20		ug/L		0.2	02-MAR-20
2,6-Dinitrotoluene			<0.40		ug/L		0.4	02-MAR-20
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	02-MAR-20
4-Chloroaniline			<0.40		ug/L		0.4	02-MAR-20
Biphenyl			<0.40		ug/L		0.4	02-MAR-20
Bis(2-chloroethyl)ether			<0.40		ug/L		0.4	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-511-WT	**Water**							
Batch R5011272								
WG3282669-1 MB								
Bis(2-chloroisopropyl)ether			<0.40		ug/L		0.4	02-MAR-20
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	02-MAR-20
Diethylphthalate			<0.20		ug/L		0.2	02-MAR-20
Dimethylphthalate			<0.20		ug/L		0.2	02-MAR-20
Pentachlorophenol			<0.50		ug/L		0.5	02-MAR-20
Phenol			<0.50		ug/L		0.5	02-MAR-20
Surrogate: 2-Fluorobiphenyl			108.0		%		50-140	02-MAR-20
Surrogate: 2,4,6-Tribromophenol			88.0		%		50-140	02-MAR-20
Surrogate: Nitrobenzene d5			111.5		%		50-140	02-MAR-20
Surrogate: p-Terphenyl d14			136.5		%		60-140	02-MAR-20
F1-HS-511-WT	**Water**							
Batch R5007132								
WG3281771-4 DUP		**WG3281771-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	26-FEB-20
WG3281771-1 LCS								
F1 (C6-C10)			92.6		%		80-120	26-FEB-20
WG3281771-2 MB								
F1 (C6-C10)			<25		ug/L		25	26-FEB-20
Surrogate: 3,4-Dichlorotoluene			96.4		%		60-140	26-FEB-20
WG3281771-5 MS		**WG3281771-3**						
F1 (C6-C10)			87.4		%		60-140	26-FEB-20
Batch R5009329								
WG3278555-4 DUP		**WG3278555-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	27-FEB-20
WG3278555-1 LCS								
F1 (C6-C10)			84.4		%		80-120	27-FEB-20
WG3278555-2 MB								
F1 (C6-C10)			<25		ug/L		25	27-FEB-20
Surrogate: 3,4-Dichlorotoluene			94.7		%		60-140	27-FEB-20
WG3278555-5 MS		**WG3278555-3**						
F1 (C6-C10)			87.3		%		60-140	27-FEB-20
F2-F4-511-WT	**Water**							

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-511-WT	**Water**							
Batch R5009517								
WG3281885-2 LCS								
F2 (C10-C16)			108.3		%		70-130	26-FEB-20
F3 (C16-C34)			109.1		%		70-130	26-FEB-20
F4 (C34-C50)			110.6		%		70-130	26-FEB-20
WG3281885-1 MB								
F2 (C10-C16)			<100		ug/L		100	26-FEB-20
F3 (C16-C34)			<250		ug/L		250	26-FEB-20
F4 (C34-C50)			<250		ug/L		250	26-FEB-20
Surrogate: 2-Bromobenzotrifluoride			83.5		%		60-140	26-FEB-20
Batch R5010828								
WG3282571-2 LCS								
F2 (C10-C16)			114.2		%		70-130	27-FEB-20
F3 (C16-C34)			115.6		%		70-130	27-FEB-20
F4 (C34-C50)			122.8		%		70-130	27-FEB-20
WG3282571-1 MB								
F2 (C10-C16)			<100		ug/L		100	27-FEB-20
F3 (C16-C34)			<250		ug/L		250	27-FEB-20
F4 (C34-C50)			<250		ug/L		250	27-FEB-20
Surrogate: 2-Bromobenzotrifluoride			99.8		%		60-140	27-FEB-20
PAH-511-WT	**Water**							
Batch R5010626								
WG3281885-2 LCS								
1-Methylnaphthalene			100.8		%		50-140	27-FEB-20
2-Methylnaphthalene			96.6		%		50-140	27-FEB-20
Acenaphthene			107.2		%		50-140	27-FEB-20
Acenaphthylene			94.5		%		50-140	27-FEB-20
Anthracene			89.4		%		50-140	27-FEB-20
Benzo(a)anthracene			105.3		%		50-140	27-FEB-20
Benzo(a)pyrene			104.9		%		50-140	27-FEB-20
Benzo(b)fluoranthene			118.6		%		50-140	27-FEB-20
Benzo(g,h,i)perylene			100.5		%		50-140	27-FEB-20
Benzo(k)fluoranthene			106.1		%		50-140	27-FEB-20
Chrysene			98.2		%		50-140	27-FEB-20
Dibenzo(ah)anthracene			94.2		%		50-140	27-FEB-20
Fluoranthene			96.1		%		50-140	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R5010626								
WG3281885-2 LCS								
Fluorene			95.4		%		50-140	27-FEB-20
Indeno(1,2,3-cd)pyrene			106.5		%		50-140	27-FEB-20
Naphthalene			101.1		%		50-140	27-FEB-20
Phenanthrene			96.2		%		50-140	27-FEB-20
Pyrene			95.8		%		50-140	27-FEB-20
WG3281885-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	27-FEB-20
2-Methylnaphthalene			<0.020		ug/L		0.02	27-FEB-20
Acenaphthene			<0.020		ug/L		0.02	27-FEB-20
Acenaphthylene			<0.020		ug/L		0.02	27-FEB-20
Anthracene			<0.020		ug/L		0.02	27-FEB-20
Benzo(a)anthracene			<0.020		ug/L		0.02	27-FEB-20
Benzo(a)pyrene			<0.010		ug/L		0.01	27-FEB-20
Benzo(b)fluoranthene			<0.020		ug/L		0.02	27-FEB-20
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	27-FEB-20
Benzo(k)fluoranthene			<0.020		ug/L		0.02	27-FEB-20
Chrysene			<0.020		ug/L		0.02	27-FEB-20
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	27-FEB-20
Fluoranthene			<0.020		ug/L		0.02	27-FEB-20
Fluorene			<0.020		ug/L		0.02	27-FEB-20
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	27-FEB-20
Naphthalene			<0.050		ug/L		0.05	27-FEB-20
Phenanthrene			<0.020		ug/L		0.02	27-FEB-20
Pyrene			<0.020		ug/L		0.02	27-FEB-20
Surrogate: d8-Naphthalene			107.7		%		60-140	27-FEB-20
Surrogate: d10-Phenanthrene			102.6		%		60-140	27-FEB-20
Surrogate: d12-Chrysene			103.5		%		60-140	27-FEB-20
Surrogate: d10-Acenaphthene			111.6		%		60-140	27-FEB-20
Batch R5010970								
WG3282669-2 LCS								
1-Methylnaphthalene			82.4		%		50-140	28-FEB-20
2-Methylnaphthalene			72.9		%		50-140	28-FEB-20
Acenaphthene			81.5		%		50-140	28-FEB-20
Acenaphthylene			76.1		%		50-140	28-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R5010970								
WG3282669-2 LCS								
Anthracene			78.8		%		50-140	28-FEB-20
Benzo(a)anthracene			85.9		%		50-140	28-FEB-20
Benzo(a)pyrene			78.2		%		50-140	28-FEB-20
Benzo(b)fluoranthene			80.4		%		50-140	28-FEB-20
Benzo(g,h,i)perylene			79.9		%		50-140	28-FEB-20
Benzo(k)fluoranthene			85.1		%		50-140	28-FEB-20
Chrysene			93.9		%		50-140	28-FEB-20
Dibenzo(ah)anthracene			80.9		%		50-140	28-FEB-20
Fluoranthene			85.2		%		50-140	28-FEB-20
Fluorene			85.1		%		50-140	28-FEB-20
Indeno(1,2,3-cd)pyrene			81.2		%		50-140	28-FEB-20
Naphthalene			71.1		%		50-140	28-FEB-20
Phenanthrene			84.1		%		50-140	28-FEB-20
Pyrene			84.1		%		50-140	28-FEB-20
WG3282669-1 MB								
1-Methylnaphthalene			<0.020		ug/L		0.02	28-FEB-20
2-Methylnaphthalene			<0.020		ug/L		0.02	28-FEB-20
Acenaphthene			<0.020		ug/L		0.02	28-FEB-20
Acenaphthylene			<0.020		ug/L		0.02	28-FEB-20
Anthracene			<0.020		ug/L		0.02	28-FEB-20
Benzo(a)anthracene			<0.020		ug/L		0.02	28-FEB-20
Benzo(a)pyrene			<0.010		ug/L		0.01	28-FEB-20
Benzo(b)fluoranthene			<0.020		ug/L		0.02	28-FEB-20
Benzo(g,h,i)perylene			<0.020		ug/L		0.02	28-FEB-20
Benzo(k)fluoranthene			<0.020		ug/L		0.02	28-FEB-20
Chrysene			<0.020		ug/L		0.02	28-FEB-20
Dibenzo(ah)anthracene			<0.020		ug/L		0.02	28-FEB-20
Fluoranthene			<0.020		ug/L		0.02	28-FEB-20
Fluorene			<0.020		ug/L		0.02	28-FEB-20
Indeno(1,2,3-cd)pyrene			<0.020		ug/L		0.02	28-FEB-20
Naphthalene			<0.050		ug/L		0.05	28-FEB-20
Phenanthrene			<0.020		ug/L		0.02	28-FEB-20
Pyrene			<0.020		ug/L		0.02	28-FEB-20
Surrogate: 2-Fluorobiphenyl			105.2		%		50-140	28-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-511-WT	**Water**							
Batch R5010970								
WG3282669-1 MB								
Surrogate: d14-Terphenyl			113.9		%		60-140	28-FEB-20
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-4 DUP		**WG3281771-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	26-FEB-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	26-FEB-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	26-FEB-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	26-FEB-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-4 DUP		**WG3281771-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	26-FEB-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
WG3281771-1 LCS								
1,1,1,2-Tetrachloroethane			92.6		%		70-130	26-FEB-20
1,1,2,2-Tetrachloroethane			93.0		%		70-130	26-FEB-20
1,1,1-Trichloroethane			93.6		%		70-130	26-FEB-20
1,1,2-Trichloroethane			87.2		%		70-130	26-FEB-20
1,1-Dichloroethane			91.9		%		70-130	26-FEB-20
1,1-Dichloroethylene			89.8		%		70-130	26-FEB-20
1,2-Dibromoethane			89.7		%		70-130	26-FEB-20
1,2-Dichlorobenzene			95.3		%		70-130	26-FEB-20
1,2-Dichloroethane			91.9		%		70-130	26-FEB-20
1,2-Dichloropropane			92.4		%		70-130	26-FEB-20
1,3-Dichlorobenzene			97.4		%		70-130	26-FEB-20
1,4-Dichlorobenzene			97.9		%		70-130	26-FEB-20
Acetone			100.7		%		60-140	26-FEB-20
Benzene			89.9		%		70-130	26-FEB-20
Bromodichloromethane			94.9		%		70-130	26-FEB-20
Bromoform			89.1		%		70-130	26-FEB-20
Bromomethane			85.7		%		60-140	26-FEB-20
Carbon tetrachloride			95.3		%		70-130	26-FEB-20
Chlorobenzene			90.1		%		70-130	26-FEB-20
Chloroform			94.8		%		70-130	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-1 LCS								
cis-1,2-Dichloroethylene			91.9		%		70-130	26-FEB-20
cis-1,3-Dichloropropene			88.4		%		70-130	26-FEB-20
Dibromochloromethane			85.6		%		70-130	26-FEB-20
Dichlorodifluoromethane			112.1		%		50-140	26-FEB-20
Ethylbenzene			91.8		%		70-130	26-FEB-20
n-Hexane			88.6		%		70-130	26-FEB-20
m+p-Xylenes			93.6		%		70-130	26-FEB-20
Methyl Ethyl Ketone			85.2		%		60-140	26-FEB-20
Methyl Isobutyl Ketone			93.0		%		60-140	26-FEB-20
Methylene Chloride			95.7		%		70-130	26-FEB-20
MTBE			93.9		%		70-130	26-FEB-20
o-Xylene			98.4		%		70-130	26-FEB-20
Styrene			90.0		%		70-130	26-FEB-20
Tetrachloroethylene			93.7		%		70-130	26-FEB-20
Toluene			93.9		%		70-130	26-FEB-20
trans-1,2-Dichloroethylene			91.6		%		70-130	26-FEB-20
trans-1,3-Dichloropropene			93.0		%		70-130	26-FEB-20
Trichloroethylene			92.2		%		70-130	26-FEB-20
Trichlorofluoromethane			95.2		%		60-140	26-FEB-20
Vinyl chloride			116.9		%		60-140	26-FEB-20
WG3281771-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1-Dichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
1,2-Dibromoethane			<0.20		ug/L		0.2	26-FEB-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
1,2-Dichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,2-Dichloropropane			<0.50		ug/L		0.5	26-FEB-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
Acetone			<30		ug/L		30	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-2 MB								
Benzene			<0.50		ug/L		0.5	26-FEB-20
Bromodichloromethane			<2.0		ug/L		2	26-FEB-20
Bromoform			<5.0		ug/L		5	26-FEB-20
Bromomethane			<0.50		ug/L		0.5	26-FEB-20
Carbon tetrachloride			<0.20		ug/L		0.2	26-FEB-20
Chlorobenzene			<0.50		ug/L		0.5	26-FEB-20
Chloroform			<1.0		ug/L		1	26-FEB-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	26-FEB-20
Dibromochloromethane			<2.0		ug/L		2	26-FEB-20
Dichlorodifluoromethane			<2.0		ug/L		2	26-FEB-20
Ethylbenzene			<0.50		ug/L		0.5	26-FEB-20
n-Hexane			<0.50		ug/L		0.5	26-FEB-20
m+p-Xylenes			<0.40		ug/L		0.4	26-FEB-20
Methyl Ethyl Ketone			<20		ug/L		20	26-FEB-20
Methyl Isobutyl Ketone			<20		ug/L		20	26-FEB-20
Methylene Chloride			<5.0		ug/L		5	26-FEB-20
MTBE			<2.0		ug/L		2	26-FEB-20
o-Xylene			<0.30		ug/L		0.3	26-FEB-20
Styrene			<0.50		ug/L		0.5	26-FEB-20
Tetrachloroethylene			<0.50		ug/L		0.5	26-FEB-20
Toluene			<0.50		ug/L		0.5	26-FEB-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	26-FEB-20
Trichloroethylene			<0.50		ug/L		0.5	26-FEB-20
Trichlorofluoromethane			<5.0		ug/L		5	26-FEB-20
Vinyl chloride			<0.50		ug/L		0.5	26-FEB-20
Surrogate: 1,4-Difluorobenzene			100.1		%		70-130	26-FEB-20
Surrogate: 4-Bromofluorobenzene			98.4		%		70-130	26-FEB-20
WG3281771-5 MS		**WG3281771-3**						
1,1,1,2-Tetrachloroethane			93.1		%		50-140	26-FEB-20
1,1,2,2-Tetrachloroethane			96.3		%		50-140	26-FEB-20
1,1,1-Trichloroethane			90.7		%		50-140	26-FEB-20
1,1,2-Trichloroethane			91.3		%		50-140	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-5 MS		**WG3281771-3**						
1,1-Dichloroethane			91.6		%		50-140	26-FEB-20
1,1-Dichloroethylene			84.8		%		50-140	26-FEB-20
1,2-Dibromoethane			94.6		%		50-140	26-FEB-20
1,2-Dichlorobenzene			95.1		%		50-140	26-FEB-20
1,2-Dichloroethane			97.3		%		50-140	26-FEB-20
1,2-Dichloropropane			95.5		%		50-140	26-FEB-20
1,3-Dichlorobenzene			96.7		%		50-140	26-FEB-20
1,4-Dichlorobenzene			97.6		%		50-140	26-FEB-20
Acetone			106.2		%		50-140	26-FEB-20
Benzene			90.0		%		50-140	26-FEB-20
Bromodichloromethane			98.5		%		50-140	26-FEB-20
Bromoform			91.9		%		50-140	26-FEB-20
Bromomethane			82.7		%		50-140	26-FEB-20
Carbon tetrachloride			91.7		%		50-140	26-FEB-20
Chlorobenzene			90.2		%		50-140	26-FEB-20
Chloroform			96.1		%		50-140	26-FEB-20
cis-1,2-Dichloroethylene			93.0		%		50-140	26-FEB-20
cis-1,3-Dichloropropene			92.8		%		50-140	26-FEB-20
Dibromochloromethane			87.8		%		50-140	26-FEB-20
Dichlorodifluoromethane			93.5		%		50-140	26-FEB-20
Ethylbenzene			89.4		%		50-140	26-FEB-20
n-Hexane			80.8		%		50-140	26-FEB-20
m+p-Xylenes			91.4		%		50-140	26-FEB-20
Methyl Ethyl Ketone			97.9		%		50-140	26-FEB-20
Methyl Isobutyl Ketone			103.0		%		50-140	26-FEB-20
Methylene Chloride			97.2		%		50-140	26-FEB-20
MTBE			93.8		%		50-140	26-FEB-20
o-Xylene			97.3		%		50-140	26-FEB-20
Styrene			90.3		%		50-140	26-FEB-20
Tetrachloroethylene			89.4		%		50-140	26-FEB-20
Toluene			92.2		%		50-140	26-FEB-20
trans-1,2-Dichloroethylene			89.4		%		50-140	26-FEB-20
trans-1,3-Dichloropropene			97.3		%		50-140	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007132								
WG3281771-5 MS		**WG3281771-3**						
Trichloroethylene			90.8		%		50-140	26-FEB-20
Trichlorofluoromethane			87.2		%		50-140	26-FEB-20
Vinyl chloride			106.2		%		50-140	26-FEB-20
Batch R5007306								
WG3281769-4 DUP		**WG3281769-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	26-FEB-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	26-FEB-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	26-FEB-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	26-FEB-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007306								
WG3281769-4 DUP		**WG3281769-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	26-FEB-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	26-FEB-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	26-FEB-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	26-FEB-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	26-FEB-20
WG3281769-1 LCS								
1,1,1,2-Tetrachloroethane			93.1		%		70-130	26-FEB-20
1,1,2,2-Tetrachloroethane			89.2		%		70-130	26-FEB-20
1,1,1-Trichloroethane			96.5		%		70-130	26-FEB-20
1,1,2-Trichloroethane			99.9		%		70-130	26-FEB-20
1,1-Dichloroethane			96.4		%		70-130	26-FEB-20
1,1-Dichloroethylene			89.6		%		70-130	26-FEB-20
1,2-Dibromoethane			98.5		%		70-130	26-FEB-20
1,2-Dichlorobenzene			95.5		%		70-130	26-FEB-20
1,2-Dichloroethane			86.0		%		70-130	26-FEB-20
1,2-Dichloropropane			89.3		%		70-130	26-FEB-20
1,3-Dichlorobenzene			94.8		%		70-130	26-FEB-20
1,4-Dichlorobenzene			93.6		%		70-130	26-FEB-20
Acetone			90.3		%		60-140	26-FEB-20
Benzene			93.6		%		70-130	26-FEB-20
Bromodichloromethane			90.8		%		70-130	26-FEB-20
Bromoform			89.9		%		70-130	26-FEB-20
Bromomethane			90.2		%		60-140	26-FEB-20
Carbon tetrachloride			92.9		%		70-130	26-FEB-20
Chlorobenzene			94.2		%		70-130	26-FEB-20
Chloroform			92.8		%		70-130	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007306								
WG3281769-1 LCS								
cis-1,2-Dichloroethylene			92.3		%		70-130	26-FEB-20
cis-1,3-Dichloropropene			82.4		%		70-130	26-FEB-20
Dibromochloromethane			97.4		%		70-130	26-FEB-20
Dichlorodifluoromethane			117.9		%		50-140	26-FEB-20
Ethylbenzene			90.8		%		70-130	26-FEB-20
n-Hexane			88.7		%		70-130	26-FEB-20
m+p-Xylenes			90.6		%		70-130	26-FEB-20
Methyl Ethyl Ketone			99.7		%		60-140	26-FEB-20
Methyl Isobutyl Ketone			82.6		%		60-140	26-FEB-20
Methylene Chloride			100.6		%		70-130	26-FEB-20
MTBE			95.8		%		70-130	26-FEB-20
o-Xylene			99.0		%		70-130	26-FEB-20
Styrene			88.9		%		70-130	26-FEB-20
Tetrachloroethylene			94.7		%		70-130	26-FEB-20
Toluene			95.2		%		70-130	26-FEB-20
trans-1,2-Dichloroethylene			88.6		%		70-130	26-FEB-20
trans-1,3-Dichloropropene			90.8		%		70-130	26-FEB-20
Trichloroethylene			99.6		%		70-130	26-FEB-20
Trichlorofluoromethane			100.4		%		60-140	26-FEB-20
Vinyl chloride			119.0		%		60-140	26-FEB-20
WG3281769-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1-Dichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
1,2-Dibromoethane			<0.20		ug/L		0.2	26-FEB-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
1,2-Dichloroethane			<0.50		ug/L		0.5	26-FEB-20
1,2-Dichloropropane			<0.50		ug/L		0.5	26-FEB-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	26-FEB-20
Acetone			<30		ug/L		30	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007306								
WG3281769-2 MB								
Benzene			<0.50		ug/L		0.5	26-FEB-20
Bromodichloromethane			<2.0		ug/L		2	26-FEB-20
Bromoform			<5.0		ug/L		5	26-FEB-20
Bromomethane			<0.50		ug/L		0.5	26-FEB-20
Carbon tetrachloride			<0.20		ug/L		0.2	26-FEB-20
Chlorobenzene			<0.50		ug/L		0.5	26-FEB-20
Chloroform			<1.0		ug/L		1	26-FEB-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	26-FEB-20
Dibromochloromethane			<2.0		ug/L		2	26-FEB-20
Dichlorodifluoromethane			<2.0		ug/L		2	26-FEB-20
Ethylbenzene			<0.50		ug/L		0.5	26-FEB-20
n-Hexane			<0.50		ug/L		0.5	26-FEB-20
m+p-Xylenes			<0.40		ug/L		0.4	26-FEB-20
Methyl Ethyl Ketone			<20		ug/L		20	26-FEB-20
Methyl Isobutyl Ketone			<20		ug/L		20	26-FEB-20
Methylene Chloride			<5.0		ug/L		5	26-FEB-20
MTBE			<2.0		ug/L		2	26-FEB-20
o-Xylene			<0.30		ug/L		0.3	26-FEB-20
Styrene			<0.50		ug/L		0.5	26-FEB-20
Tetrachloroethylene			<0.50		ug/L		0.5	26-FEB-20
Toluene			<0.50		ug/L		0.5	26-FEB-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	26-FEB-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	26-FEB-20
Trichloroethylene			<0.50		ug/L		0.5	26-FEB-20
Trichlorofluoromethane			<5.0		ug/L		5	26-FEB-20
Vinyl chloride			<0.50		ug/L		0.5	26-FEB-20
Surrogate: 1,4-Difluorobenzene			100.9		%		70-130	26-FEB-20
Surrogate: 4-Bromofluorobenzene			96.3		%		70-130	26-FEB-20
WG3281769-5 MS		**WG3281769-3**						
1,1,1,2-Tetrachloroethane			93.9		%		50-140	26-FEB-20
1,1,2,2-Tetrachloroethane			80.4		%		50-140	26-FEB-20
1,1,1-Trichloroethane			100.2		%		50-140	26-FEB-20
1,1,2-Trichloroethane			92.9		%		50-140	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007306								
WG3281769-5 MS		**WG3281769-3**						
1,1-Dichloroethane			91.1		%		50-140	26-FEB-20
1,1-Dichloroethylene			89.8		%		50-140	26-FEB-20
1,2-Dibromoethane			88.6		%		50-140	26-FEB-20
1,2-Dichlorobenzene			94.3		%		50-140	26-FEB-20
1,2-Dichloroethane			77.9		%		50-140	26-FEB-20
1,2-Dichloropropane			85.9		%		50-140	26-FEB-20
1,3-Dichlorobenzene			95.4		%		50-140	26-FEB-20
1,4-Dichlorobenzene			92.4		%		50-140	26-FEB-20
Acetone			81.5		%		50-140	26-FEB-20
Benzene			92.8		%		50-140	26-FEB-20
Bromodichloromethane			88.1		%		50-140	26-FEB-20
Bromoform			83.2		%		50-140	26-FEB-20
Bromomethane			81.5		%		50-140	26-FEB-20
Carbon tetrachloride			97.8		%		50-140	26-FEB-20
Chlorobenzene			93.8		%		50-140	26-FEB-20
Chloroform			92.4		%		50-140	26-FEB-20
cis-1,2-Dichloroethylene			90.4		%		50-140	26-FEB-20
cis-1,3-Dichloropropene			69.7		%		50-140	26-FEB-20
Dibromochloromethane			92.4		%		50-140	26-FEB-20
Dichlorodifluoromethane			108.2		%		50-140	26-FEB-20
Ethylbenzene			94.4		%		50-140	26-FEB-20
n-Hexane			89.7		%		50-140	26-FEB-20
m+p-Xylenes			93.3		%		50-140	26-FEB-20
Methyl Ethyl Ketone			71.0		%		50-140	26-FEB-20
Methyl Isobutyl Ketone			66.6		%		50-140	26-FEB-20
Methylene Chloride			94.2		%		50-140	26-FEB-20
MTBE			95.7		%		50-140	26-FEB-20
o-Xylene			101.4		%		50-140	26-FEB-20
Styrene			86.7		%		50-140	26-FEB-20
Tetrachloroethylene			100.0		%		50-140	26-FEB-20
Toluene			98.1		%		50-140	26-FEB-20
trans-1,2-Dichloroethylene			85.5		%		50-140	26-FEB-20
trans-1,3-Dichloropropene			74.3		%		50-140	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5007306								
WG3281769-5 MS		**WG3281769-3**						
Trichloroethylene			101.7		%		50-140	26-FEB-20
Trichlorofluoromethane			101.6		%		50-140	26-FEB-20
Vinyl chloride			112.2		%		50-140	26-FEB-20
Batch R5009266								
WG3281922-4 DUP		**WG3281922-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1-Dichloroethane		5.89	5.53		ug/L	6.3	30	27-FEB-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	27-FEB-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	27-FEB-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	27-FEB-20
cis-1,2-Dichloroethylene		1.82	1.69		ug/L	7.4	30	27-FEB-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	27-FEB-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009266								
WG3281922-4 DUP		**WG3281922-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	27-FEB-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
WG3281922-1 LCS								
1,1,1,2-Tetrachloroethane			93.7		%		70-130	26-FEB-20
1,1,2,2-Tetrachloroethane			98.8		%		70-130	26-FEB-20
1,1,1-Trichloroethane			92.8		%		70-130	26-FEB-20
1,1,2-Trichloroethane			91.7		%		70-130	26-FEB-20
1,1-Dichloroethane			92.0		%		70-130	26-FEB-20
1,1-Dichloroethylene			88.3		%		70-130	26-FEB-20
1,2-Dibromoethane			95.0		%		70-130	26-FEB-20
1,2-Dichlorobenzene			95.4		%		70-130	26-FEB-20
1,2-Dichloroethane			97.3		%		70-130	26-FEB-20
1,2-Dichloropropane			95.2		%		70-130	26-FEB-20
1,3-Dichlorobenzene			95.4		%		70-130	26-FEB-20
1,4-Dichlorobenzene			96.1		%		70-130	26-FEB-20
Acetone			113.7		%		60-140	26-FEB-20
Benzene			90.5		%		70-130	26-FEB-20
Bromodichloromethane			98.4		%		70-130	26-FEB-20
Bromoform			93.2		%		70-130	26-FEB-20
Bromomethane			84.8		%		60-140	26-FEB-20
Carbon tetrachloride			94.5		%		70-130	26-FEB-20
Chlorobenzene			90.0		%		70-130	26-FEB-20
Chloroform			96.5		%		70-130	26-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009266								
WG3281922-1 LCS								
cis-1,2-Dichloroethylene			93.0		%		70-130	26-FEB-20
cis-1,3-Dichloropropene			88.4		%		70-130	26-FEB-20
Dibromochloromethane			88.6		%		70-130	26-FEB-20
Dichlorodifluoromethane			103.9		%		50-140	26-FEB-20
Ethylbenzene			89.8		%		70-130	26-FEB-20
n-Hexane			86.1		%		70-130	26-FEB-20
m+p-Xylenes			91.3		%		70-130	26-FEB-20
Methyl Ethyl Ketone			96.5		%		60-140	26-FEB-20
Methyl Isobutyl Ketone			103.0		%		60-140	26-FEB-20
Methylene Chloride			98.2		%		70-130	26-FEB-20
MTBE			94.7		%		70-130	26-FEB-20
o-Xylene			97.1		%		70-130	26-FEB-20
Styrene			89.5		%		70-130	26-FEB-20
Tetrachloroethylene			90.9		%		70-130	26-FEB-20
Toluene			92.5		%		70-130	26-FEB-20
trans-1,2-Dichloroethylene			90.1		%		70-130	26-FEB-20
trans-1,3-Dichloropropene			91.6		%		70-130	26-FEB-20
Trichloroethylene			91.6		%		70-130	26-FEB-20
Trichlorofluoromethane			93.4		%		60-140	26-FEB-20
Vinyl chloride			113.5		%		60-140	26-FEB-20
WG3281922-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1-Dichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
1,2-Dibromoethane			<0.20		ug/L		0.2	27-FEB-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
1,2-Dichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,2-Dichloropropane			<0.50		ug/L		0.5	27-FEB-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
Acetone			<30		ug/L		30	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009266								
WG3281922-2 MB								
Benzene			<0.50		ug/L		0.5	27-FEB-20
Bromodichloromethane			<2.0		ug/L		2	27-FEB-20
Bromoform			<5.0		ug/L		5	27-FEB-20
Bromomethane			<0.50		ug/L		0.5	27-FEB-20
Carbon tetrachloride			<0.20		ug/L		0.2	27-FEB-20
Chlorobenzene			<0.50		ug/L		0.5	27-FEB-20
Chloroform			<1.0		ug/L		1	27-FEB-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	27-FEB-20
Dibromochloromethane			<2.0		ug/L		2	27-FEB-20
Dichlorodifluoromethane			<2.0		ug/L		2	27-FEB-20
Ethylbenzene			<0.50		ug/L		0.5	27-FEB-20
n-Hexane			<0.50		ug/L		0.5	27-FEB-20
m+p-Xylenes			<0.40		ug/L		0.4	27-FEB-20
Methyl Ethyl Ketone			<20		ug/L		20	27-FEB-20
Methyl Isobutyl Ketone			<20		ug/L		20	27-FEB-20
Methylene Chloride			<5.0		ug/L		5	27-FEB-20
MTBE			<2.0		ug/L		2	27-FEB-20
o-Xylene			<0.30		ug/L		0.3	27-FEB-20
Styrene			<0.50		ug/L		0.5	27-FEB-20
Tetrachloroethylene			<0.50		ug/L		0.5	27-FEB-20
Toluene			<0.50		ug/L		0.5	27-FEB-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	27-FEB-20
Trichloroethylene			<0.50		ug/L		0.5	27-FEB-20
Trichlorofluoromethane			<5.0		ug/L		5	27-FEB-20
Vinyl chloride			<0.50		ug/L		0.5	27-FEB-20
Surrogate: 1,4-Difluorobenzene			100.3		%		70-130	27-FEB-20
Surrogate: 4-Bromofluorobenzene			99.5		%		70-130	27-FEB-20
WG3281922-5 MS		**WG3281922-3**						
1,1,1,2-Tetrachloroethane			94.7		%		50-140	27-FEB-20
1,1,2,2-Tetrachloroethane			91.5		%		50-140	27-FEB-20
1,1,1-Trichloroethane			96.1		%		50-140	27-FEB-20
1,1,2-Trichloroethane			87.4		%		50-140	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009266								
WG3281922-5 MS		**WG3281922-3**						
1,1-Dichloroethane			91.8		%		50-140	27-FEB-20
1,1-Dichloroethylene			90.1		%		50-140	27-FEB-20
1,2-Dibromoethane			88.6		%		50-140	27-FEB-20
1,2-Dichlorobenzene			95.2		%		50-140	27-FEB-20
1,2-Dichloroethane			91.3		%		50-140	27-FEB-20
1,2-Dichloropropane			93.1		%		50-140	27-FEB-20
1,3-Dichlorobenzene			96.8		%		50-140	27-FEB-20
1,4-Dichlorobenzene			96.5		%		50-140	27-FEB-20
Acetone			97.9		%		50-140	27-FEB-20
Benzene			89.9		%		50-140	27-FEB-20
Bromodichloromethane			95.9		%		50-140	27-FEB-20
Bromoform			87.2		%		50-140	27-FEB-20
Bromomethane			80.9		%		50-140	27-FEB-20
Carbon tetrachloride			98.2		%		50-140	27-FEB-20
Chlorobenzene			90.4		%		50-140	27-FEB-20
Chloroform			96.4		%		50-140	27-FEB-20
cis-1,2-Dichloroethylene			91.9		%		50-140	27-FEB-20
cis-1,3-Dichloropropene			80.8		%		50-140	27-FEB-20
Dibromochloromethane			85.9		%		50-140	27-FEB-20
Dichlorodifluoromethane			100.6		%		50-140	27-FEB-20
Ethylbenzene			92.9		%		50-140	27-FEB-20
n-Hexane			88.1		%		50-140	27-FEB-20
m+p-Xylenes			93.9		%		50-140	27-FEB-20
Methyl Ethyl Ketone			78.5		%		50-140	27-FEB-20
Methyl Isobutyl Ketone			88.7		%		50-140	27-FEB-20
Methylene Chloride			95.1		%		50-140	27-FEB-20
MTBE			94.3		%		50-140	27-FEB-20
o-Xylene			99.7		%		50-140	27-FEB-20
Styrene			88.6		%		50-140	27-FEB-20
Tetrachloroethylene			93.9		%		50-140	27-FEB-20
Toluene			94.9		%		50-140	27-FEB-20
trans-1,2-Dichloroethylene			89.7		%		50-140	27-FEB-20
trans-1,3-Dichloropropene			84.3		%		50-140	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009266								
WG3281922-5 MS		**WG3281922-3**						
Trichloroethylene			92.8		%		50-140	27-FEB-20
Trichlorofluoromethane			95.0		%		50-140	27-FEB-20
Vinyl chloride			111.1		%		50-140	27-FEB-20
Batch R5009329								
WG3278555-4 DUP		**WG3278555-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	27-FEB-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	27-FEB-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	27-FEB-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	27-FEB-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009329								
WG3278555-4 DUP		**WG3278555-3**						
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	27-FEB-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	27-FEB-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	27-FEB-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	27-FEB-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	27-FEB-20
WG3278555-1 LCS								
1,1,1,2-Tetrachloroethane			92.0		%		70-130	27-FEB-20
1,1,2,2-Tetrachloroethane			84.0		%		70-130	27-FEB-20
1,1,1-Trichloroethane			97.6		%		70-130	27-FEB-20
1,1,2-Trichloroethane			96.2		%		70-130	27-FEB-20
1,1-Dichloroethane			87.0		%		70-130	27-FEB-20
1,1-Dichloroethylene			89.2		%		70-130	27-FEB-20
1,2-Dibromoethane			93.8		%		70-130	27-FEB-20
1,2-Dichlorobenzene			95.4		%		70-130	27-FEB-20
1,2-Dichloroethane			81.7		%		70-130	27-FEB-20
1,2-Dichloropropane			87.2		%		70-130	27-FEB-20
1,3-Dichlorobenzene			95.8		%		70-130	27-FEB-20
1,4-Dichlorobenzene			94.9		%		70-130	27-FEB-20
Acetone			86.3		%		60-140	27-FEB-20
Benzene			92.9		%		70-130	27-FEB-20
Bromodichloromethane			88.5		%		70-130	27-FEB-20
Bromoform			85.7		%		70-130	27-FEB-20
Bromomethane			89.6		%		60-140	27-FEB-20
Carbon tetrachloride			94.4		%		70-130	27-FEB-20
Chlorobenzene			93.4		%		70-130	27-FEB-20
Chloroform			91.9		%		70-130	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009329								
WG3278555-1 LCS								
cis-1,2-Dichloroethylene			92.0		%		70-130	27-FEB-20
cis-1,3-Dichloropropene			79.5		%		70-130	27-FEB-20
Dibromochloromethane			93.3		%		70-130	27-FEB-20
Dichlorodifluoromethane			114.8		%		50-140	27-FEB-20
Ethylbenzene			90.7		%		70-130	27-FEB-20
n-Hexane			89.3		%		70-130	27-FEB-20
m+p-Xylenes			90.6		%		70-130	27-FEB-20
Methyl Ethyl Ketone			96.8		%		60-140	27-FEB-20
Methyl Isobutyl Ketone			74.7		%		60-140	27-FEB-20
Methylene Chloride			98.1		%		70-130	27-FEB-20
MTBE			96.0		%		70-130	27-FEB-20
o-Xylene			98.0		%		70-130	27-FEB-20
Styrene			86.3		%		70-130	27-FEB-20
Tetrachloroethylene			97.3		%		70-130	27-FEB-20
Toluene			95.4		%		70-130	27-FEB-20
trans-1,2-Dichloroethylene			86.9		%		70-130	27-FEB-20
trans-1,3-Dichloropropene			86.4		%		70-130	27-FEB-20
Trichloroethylene			101.7		%		70-130	27-FEB-20
Trichlorofluoromethane			101.4		%		60-140	27-FEB-20
Vinyl chloride			117.4		%		60-140	27-FEB-20
WG3278555-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1-Dichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
1,2-Dibromoethane			<0.20		ug/L		0.2	27-FEB-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
1,2-Dichloroethane			<0.50		ug/L		0.5	27-FEB-20
1,2-Dichloropropane			<0.50		ug/L		0.5	27-FEB-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	27-FEB-20
Acetone			<30		ug/L		30	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009329								
WG3278555-2 MB								
Benzene			<0.50		ug/L		0.5	27-FEB-20
Bromodichloromethane			<2.0		ug/L		2	27-FEB-20
Bromoform			<5.0		ug/L		5	27-FEB-20
Bromomethane			<0.50		ug/L		0.5	27-FEB-20
Carbon tetrachloride			<0.20		ug/L		0.2	27-FEB-20
Chlorobenzene			<0.50		ug/L		0.5	27-FEB-20
Chloroform			<1.0		ug/L		1	27-FEB-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	27-FEB-20
Dibromochloromethane			<2.0		ug/L		2	27-FEB-20
Dichlorodifluoromethane			<2.0		ug/L		2	27-FEB-20
Ethylbenzene			<0.50		ug/L		0.5	27-FEB-20
n-Hexane			<0.50		ug/L		0.5	27-FEB-20
m+p-Xylenes			<0.40		ug/L		0.4	27-FEB-20
Methyl Ethyl Ketone			<20		ug/L		20	27-FEB-20
Methyl Isobutyl Ketone			<20		ug/L		20	27-FEB-20
Methylene Chloride			<5.0		ug/L		5	27-FEB-20
MTBE			<2.0		ug/L		2	27-FEB-20
o-Xylene			<0.30		ug/L		0.3	27-FEB-20
Styrene			<0.50		ug/L		0.5	27-FEB-20
Tetrachloroethylene			<0.50		ug/L		0.5	27-FEB-20
Toluene			<0.50		ug/L		0.5	27-FEB-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	27-FEB-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	27-FEB-20
Trichloroethylene			<0.50		ug/L		0.5	27-FEB-20
Trichlorofluoromethane			<5.0		ug/L		5	27-FEB-20
Vinyl chloride			<0.50		ug/L		0.5	27-FEB-20
Surrogate: 1,4-Difluorobenzene			101.8		%		70-130	27-FEB-20
Surrogate: 4-Bromofluorobenzene			97.1		%		70-130	27-FEB-20
WG3278555-5 MS		**WG3278555-3**						
1,1,1,2-Tetrachloroethane			92.3		%		50-140	27-FEB-20
1,1,2,2-Tetrachloroethane			93.4		%		50-140	27-FEB-20
1,1,1-Trichloroethane			93.7		%		50-140	27-FEB-20
1,1,2-Trichloroethane			103.1		%		50-140	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009329								
WG3278555-5 MS		**WG3278555-3**						
1,1-Dichloroethane			86.4		%		50-140	27-FEB-20
1,1-Dichloroethylene			83.3		%		50-140	27-FEB-20
1,2-Dibromoethane			102.7		%		50-140	27-FEB-20
1,2-Dichlorobenzene			95.3		%		50-140	27-FEB-20
1,2-Dichloroethane			89.4		%		50-140	27-FEB-20
1,2-Dichloropropane			90.7		%		50-140	27-FEB-20
1,3-Dichlorobenzene			93.7		%		50-140	27-FEB-20
1,4-Dichlorobenzene			93.1		%		50-140	27-FEB-20
Acetone			96.5		%		50-140	27-FEB-20
Benzene			93.4		%		50-140	27-FEB-20
Bromodichloromethane			93.2		%		50-140	27-FEB-20
Bromoform			94.2		%		50-140	27-FEB-20
Bromomethane			85.4		%		50-140	27-FEB-20
Carbon tetrachloride			90.0		%		50-140	27-FEB-20
Chlorobenzene			93.4		%		50-140	27-FEB-20
Chloroform			93.5		%		50-140	27-FEB-20
cis-1,2-Dichloroethylene			94.0		%		50-140	27-FEB-20
cis-1,3-Dichloropropene			85.0		%		50-140	27-FEB-20
Dibromochloromethane			98.6		%		50-140	27-FEB-20
Dichlorodifluoromethane			88.5		%		50-140	27-FEB-20
Ethylbenzene			86.9		%		50-140	27-FEB-20
n-Hexane			81.0		%		50-140	27-FEB-20
m+p-Xylenes			87.1		%		50-140	27-FEB-20
Methyl Ethyl Ketone			103.5		%		50-140	27-FEB-20
Methyl Isobutyl Ketone			89.1		%		50-140	27-FEB-20
Methylene Chloride			101.3		%		50-140	27-FEB-20
MTBE			95.8		%		50-140	27-FEB-20
o-Xylene			95.3		%		50-140	27-FEB-20
Styrene			86.5		%		50-140	27-FEB-20
Tetrachloroethylene			92.6		%		50-140	27-FEB-20
Toluene			92.2		%		50-140	27-FEB-20
trans-1,2-Dichloroethylene			85.5		%		50-140	27-FEB-20
trans-1,3-Dichloropropene			91.4		%		50-140	27-FEB-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5009329								
WG3278555-5 MS		**WG3278555-3**						
Trichloroethylene			100.8		%		50-140	27-FEB-20
Trichlorofluoromethane			91.6		%		50-140	27-FEB-20
Vinyl chloride			104.9		%		50-140	27-FEB-20

Quality Control Report

Workorder: L2420861 Report Date: 03-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

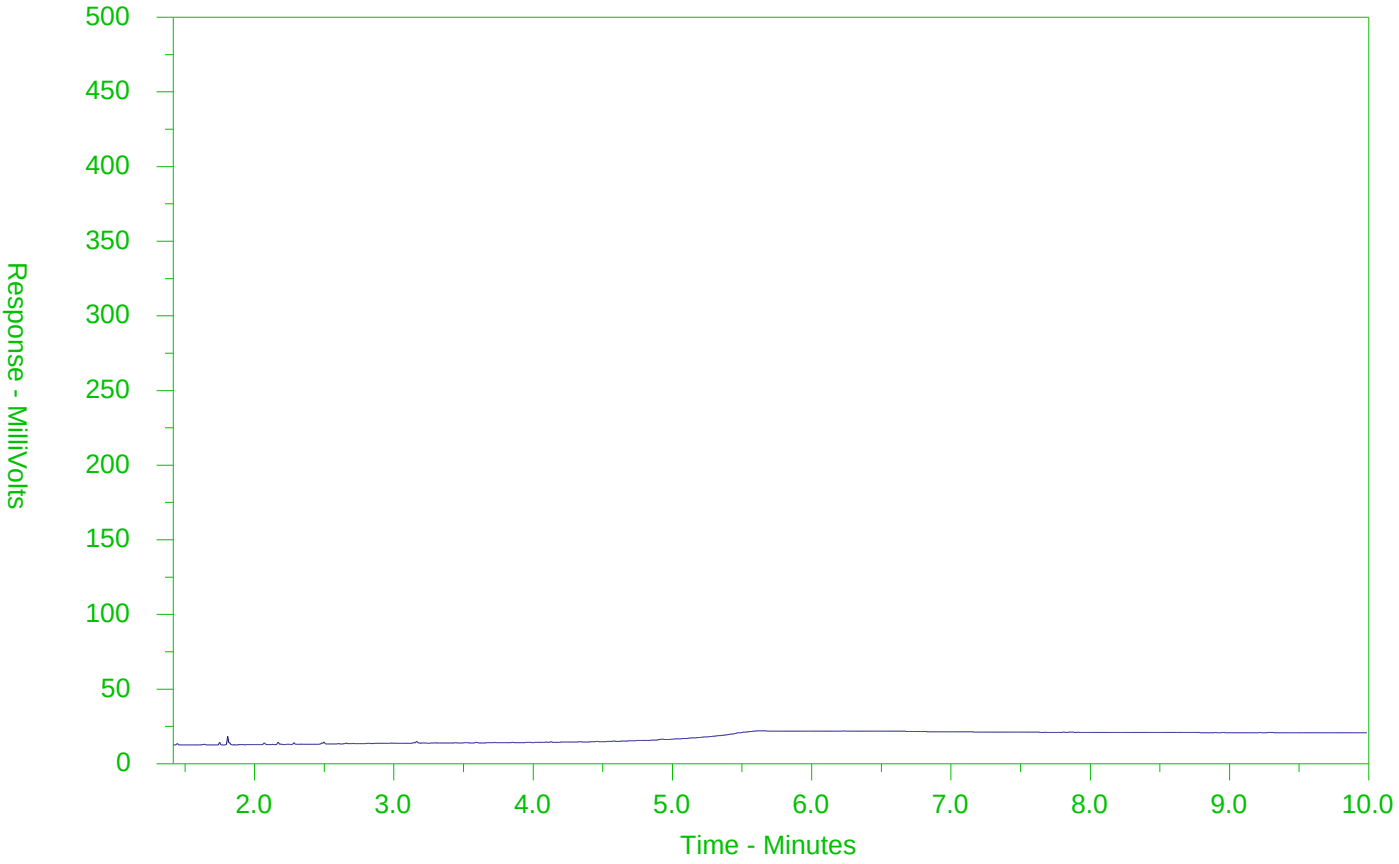
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2420861-1
Client Sample ID: MW18-115S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

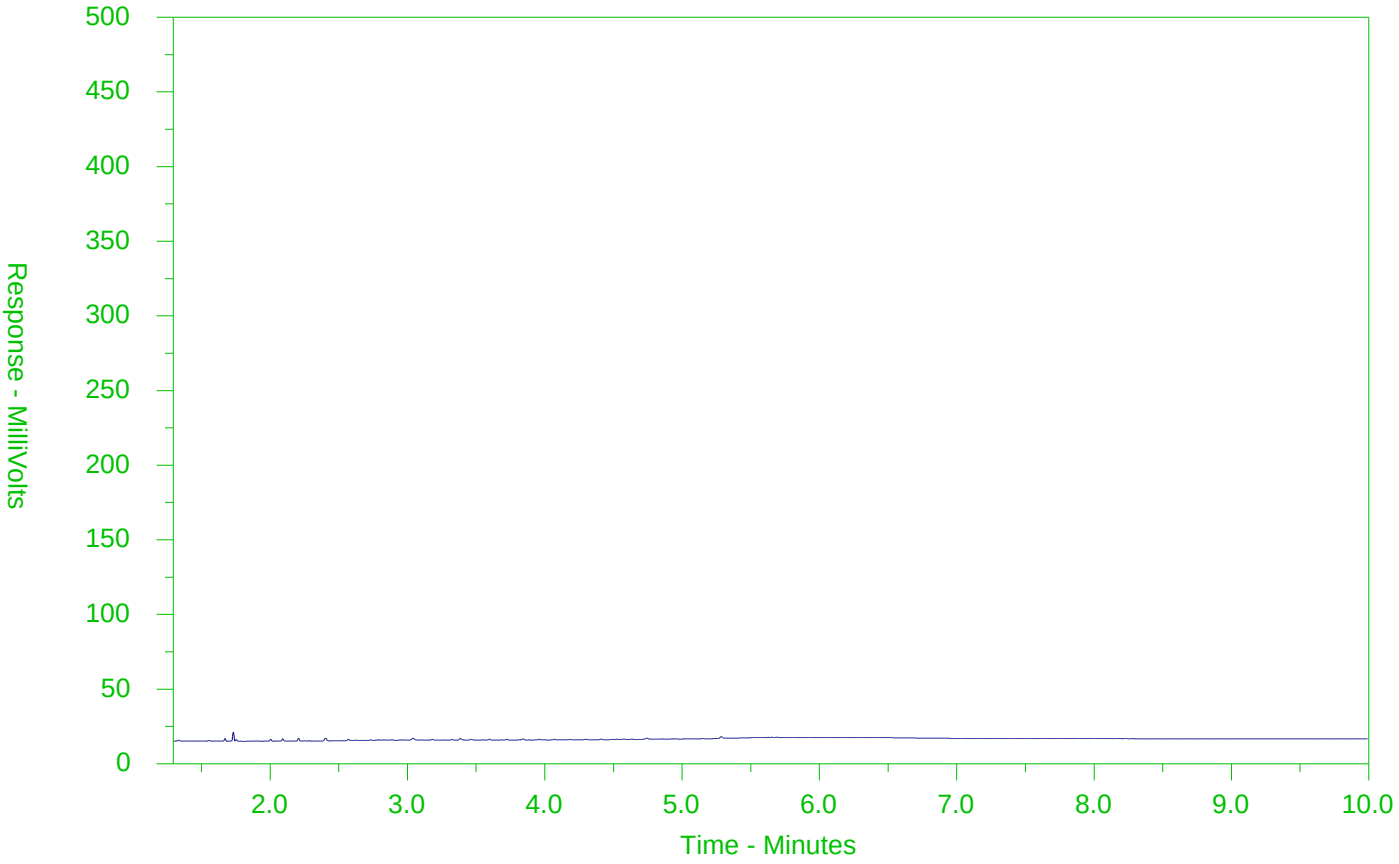
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2420861-11
Client Sample ID: MW18-117S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

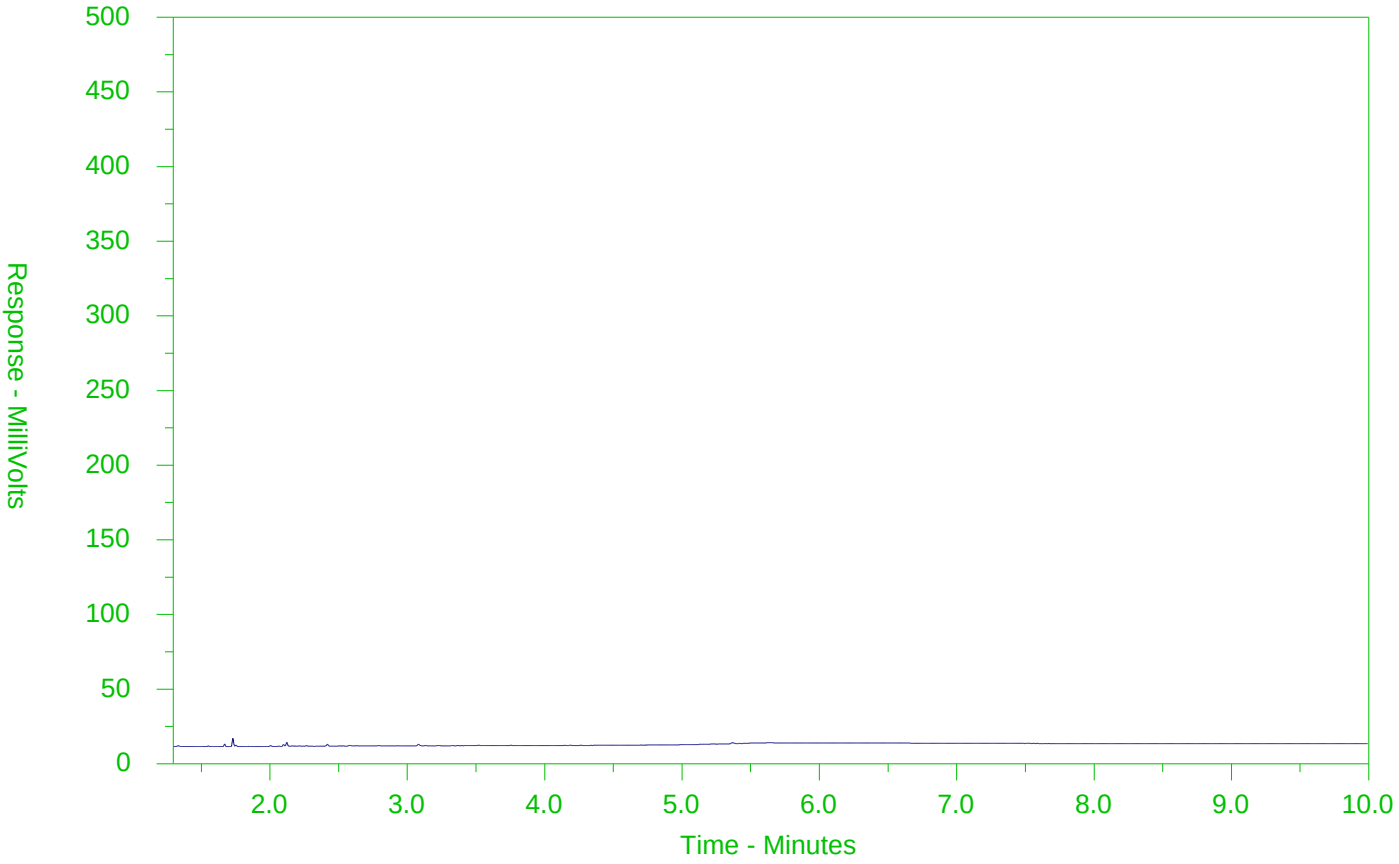
The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2420861-15
Client Sample ID: DUP2



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →	← Motor Oils/Lube Oils/Grease →		
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com
Canada Toll Free: 1 800 668 9878

L2420861-COFC

COC Number: 17 - 795244
Page 1 of 3

Report To	Contact and company name below will appear on the final report
Company:	Jacobs
Contact:	Michael Shiry
Phone:	519-579-3500
	Company address below will appear on the final report
Street:	72 Victoria St. S Suite 300
City/Province:	Kitchener, ON
Postal Code:	N2G 4Y9
Invoice To	Same as Report To: YES / NO
	Copy of Invoice with Report: YES / NO
Company:	Jacobs
Contact:	Accounts Payable

Report Format / Distribution
Select Report Format: PDF, EXCEL, EDD (DIGITAL)
Quality Control (QC) Report with Report: YES / NO
Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: EMAIL / MAIL / FAX
Email 1 or Fax: michael.shiry@jacobs.com
Email 2: ed.taves@jacobs.com
Email 3: tania.mccarthy@jacobs.com

Invoice Distribution
Select Invoice Distribution: EMAIL / MAIL / FAX
Email 1 or Fax:
Email 2:

Project Information
ALS Account # / Quote #: Q78833
Job #: 6947S7CH
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)
AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2420861
ALS Contact: E. Hansen
Sampler: V. Peters, A. Casey

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Regular [R]: Standard TAT if received by 3 pm - business days - no surcharges apply
PRIORITY (Business Days): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
EMERGENCY: 1 Business day [E - 100%]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request
Indicate Filtered (F), Preserved (P), or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	PAHs	PHCs	SVOCs	PAH(B(a)P filter)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						P	P	P				
	MW18-115S	24-02-20	9:55	water	6	X	X	X				
	MW18-115D		11:20			X						
	MW18-155		9:55		2					H	Yes	
	MW18-124S		12:15		2	X						
	MW17-106S		14:00		3	X			X			
	MW17-106D		14:50		2	X						
	MW17-100S		15:40		2	X						
	MW18-113D		15:20		2	X						
	MW18-113S		14:25		2	X						
	MW18-114S		10:25		2	X						
	MW18-117S		12:25		4	X		X				
	MW18-114D	24-02-20	11:25	water	2	X						

Drinking Water (DW) Samples[1] (client use)
Are samples taken from a Regulated DW System? YES / NO
Are samples for human consumption/ use? YES / NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
O. Reg 153/04 Table 1
B(a)P Filter on HOLD

SAMPLE CONDITION AS RECEIVED (lab use only)
Frozen / SIF Observations: Yes / No
Ice Packs / Ice Cubes / Custody seal intact: Yes / No
Cooling Initiated

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				10.9			

SHIPMENT RELEASE (client use)
Released by: V. Peters
Date: 2020/02/25
Time: 10:50

INITIAL SHIPMENT RECEPTION (lab use only)
Received by:
Date:
Time:

FINAL SHIPMENT RECEPTION (lab use only)
Received by: MK
Date: Feb 25/20
Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System please submit using an Authorized DW COC form.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2420861-COFC

COC Number: 17 - 795254

Report To	Contact and company name below will appear on the final report
Company:	Jacobs
Contact:	Michael Shiry
Phone	519-579-3510
	Company address below will appear on the final report
Street:	72 Victoria St. S. Suite 300
City/Province:	Kitchener, ON
Postal Code:	N2G 4Y9
Invoice To	Same as Report To: YES [X] NO [ ]
	Copy of Invoice with Report: YES [X] NO [ ]
Company:	Jacobs
Contact	Accounts Payable

Report Format / Distribution	
Select Report Format:	PDF [X] EXCEL [X] EDD (DIGITAL) [ ]
Quality Control (QC) Report with Report	YES [X] NO [ ]
Compare Results to Criteria on Report - provide details below if box checked	[ ]
Select Distribution	EMAIL [X] MAIL [ ] FAX [ ]
Email 1 or Fax	michael.shiry@jacobs.com
Email 2	ed.taves@jacobs.com
Email 3	tania.mccarthy@jacobs.com
Invoice Distribution	
Select Invoice Distribution:	EMAIL [X] MAIL [ ] FAX [ ]
Email 1 or Fax	
Email 2	

Project Information	
ALS Account # / Quote #:	Q78833
Job #:	6947570 H
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center	PO#
Major/Minor Code	Routing Code
Requisitioner	
Location	

ALS Lab Work Order # (lab use only): L2420861 801

ALS Contact: E. Hanson

Sampler: V. Peters; A. Casey

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R]: [X] Standard TAT if received by 3 pm - business days - no surcharges apply

Priority (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]

Emergency: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] [ ]

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	PAHs	PHCs	SVOCs	PAH (B(a)P filter)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						P	P	P				
	MW18-1185	24-02-20	16:30	Water	2	X						
	DUP1	24-02-20	—	Water	3	X			X			
	DUP2	24-02-20	—	Water	6	X	X	X				
	MW18-112S	25-02-20	9:00		2	X						
	MW18-112G		9:35		2	X						
	MW18-112D		10:25		2	X						
	OW16		11:15		2	X						
	OW15		12:10		2	X						
	MW18-119S		14:05		2	X						
	MW18-119D		15:15		2	X						
	OW11-I		9:15		2	X						
	OW11-II	25-02-20	10:20	Water	2	X						

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? YES [ ] NO [X]

Are samples for human consumption/ use? YES [ ] NO [X]

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

O. Reg 153/04 Table 1

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations: Yes [ ] No [ ]

Ice Packs [X] Ice Cubes [X] Custody seal intact: Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				10.4			

SHIPMENT RELEASE (client use)

Released by: Vicki Peters Date: 2020/02/25 Time: 16:50

INITIAL SHIPMENT RECEPTION (lab use only)

Received by: Date: Time:

FINAL SHIPMENT RECEPTION (lab use only)

Received by: MK Date: Feb 25/20 Time: 16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JUNE 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2420861-COFC

COC Number: 17 - 795253

Page 3 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company	Jacobs	Select Report Format:	PDF X EXCEL X EDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report	X YES | NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐ — EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)] ☐
Phone:	519-579-3500	☐ Compare Results to Criteria on Report - provide details below if box checked		
	Company address below will appear on the final report	Select Distribution:	X EMAIL | MAIL | FAX	
Street:	72 Victoria St S. Suite 300	Email 1 or Fax	michael.shiry@jacobs.com	Date and Time Required for all E&P TATs: dd mmm yy hh:mm
City/Province:	Kitchener, ON	Email 2	ed.faves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code	N2G 4Y9	Email 3	tania.mccarthy@jacobs.com	
Invoice To	Same as Report To X YES | NO	Invoice Distribution		Analysis Request
	Copy of Invoice with Report X YES | NO	Select Invoice Distribution:	X EMAIL ☐ MAIL ☐ FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax		
Contact:		Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q78833	AFE/Cost Center:	PO#:
Job #:	6947578H	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2420801

ALS Contact: E. Hartson

Sampler: V. Peturel / A. Lasey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	BTEX	PHCs	SVOCs	PAH (Bio) P filter										SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						P	P	P													
	MW18-122S	25-02-20	11:15	water	2	X															
	MW18-122D	"	12:05	"	2	X															
	OW12-M	"	14:15	"	2	X															
	MW18-120D	"	15:00	"	2	X															
	DUP3	25-02-20	—	water	2	X															
	TB001	—	—	QC	2	X															
	MW17-111S	25-02-20	15:50	water	2	X															

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? | | YES X NO

Are samples for human consumption/ use? | | YES X NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

O. Reg. 153/04 Table 1

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs X Ice Cubes X Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				10.4			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
V. Peturel	2020/02/25	16:50					Feb 25/20	16:50

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

[1] If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: Michael Shiry
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 28-FEB-20
Report Date: 04-MAR-20 13:28 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2422349

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH
C of C Numbers: 17-795245, 17-795246, 17-795247, 17-795248
Legal Site Desc:

Emily Hansen
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-1 MW18-121S						
Sampled By: VP/ AC on 26-FEB-20 @ 09:20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	0.81		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.7		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	102.0		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-2 MW18-121D						
Sampled By: VP/ AC on 26-FEB-20 @ 10:10						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	1.16		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.09		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.63		0.50	ug/L	03-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-3 MW17-107S						
Sampled By: VP/ AC on 26-FEB-20 @ 11:05						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	13.4		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	0.62		0.50	ug/L	02-MAR-20	*0.5
cis-1,2-Dichloroethylene	1.78		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	8.34		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	1.43		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-4 MW18-107D						
Sampled By: VP/ AC on 26-FEB-20 @ 11:50						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.82		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.2		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	102.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-5 MW18-116S						
Sampled By: VP/ AC on 26-FEB-20 @ 14:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	0.72		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.7		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.6		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-6 MW18-116D						
Sampled By: VP/ AC on 26-FEB-20 @ 14:55						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.79		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	0.98		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	0.57		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.3		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.7		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-7 MW17-102D						
Sampled By: VP/ AC on 26-FEB-20 @ 16:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	1.30		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	1.47		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	5.40		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.5		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-8 MW18-123D						
Sampled By: VP/ AC on 26-FEB-20 @ 16:55						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.77		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.05		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.4		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-9 OW22D						
Sampled By: VP/ AC on 26-FEB-20 @ 13:10						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	0.86		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.1		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2422349-10 OW22S Sampled By: VP/ AC on 26-FEB-20 @ 14:00 Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	02-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640			
MTBE	<2.0		2.0	ug/L	02-MAR-20	15			
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	02-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	02-MAR-20				
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	02-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-11 MW18-123S						
Sampled By: VP/ AC on 26-FEB-20 @ 17:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	03-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	1.19		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.1		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-12 OW26D						
Sampled By: VP/ AC on 26-FEB-20 @ 16:05						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	03-MAR-20	2700
Benzene	<0.50		0.50	ug/L	03-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	03-MAR-20	2
Bromoform	<5.0		5.0	ug/L	03-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	03-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	03-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	03-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	03-MAR-20	2
Chloroform	<1.0		1.0	ug/L	03-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	03-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	03-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	03-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	03-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	03-MAR-20	590
1,1-Dichloroethane	0.61		0.50	ug/L	03-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	03-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	03-MAR-20	0.5
cis-1,2-Dichloroethylene	1.16		0.50	ug/L	03-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	03-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	03-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	03-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	03-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	03-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	03-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	03-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	03-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	03-MAR-20	640
MTBE	<2.0		2.0	ug/L	03-MAR-20	15
Styrene	<0.50		0.50	ug/L	03-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	03-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	03-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	03-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	03-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	03-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	03-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	03-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	03-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	03-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	03-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	03-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.9		70-130	%	03-MAR-20	
Surrogate: 1,4-Difluorobenzene	102.1		70-130	%	03-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-13 OW26S Sampled By: VP/ AC on 26-FEB-20 @ 15:15 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	3.92		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.65		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	1.75		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.3		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-14 DUP4						
Sampled By: VP/ AC on 26-FEB-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	1.33		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.12		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.62		0.50	ug/L	03-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.0		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-15 MW18-136D						
Sampled By: VP/ AC on 27-FEB-20 @ 09:55						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.86		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.64		0.50	ug/L	03-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.4		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.6		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-16 MW18-136G Sampled By: VP/ AC on 27-FEB-20 @ 10:30 Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.69		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.46		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-17 MW18-134S						
Sampled By: VP/ AC on 27-FEB-20 @ 11:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.2		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-18 MW18-134D						
Sampled By: VP/ AC on 27-FEB-20 @ 12:25						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	6.34		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	1.09		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	03-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.89		0.50	ug/L	03-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	03-MAR-20	72
Surrogate: 4-Bromofluorobenzene	95.2		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-19 MW19-137S						
Sampled By: VP/ AC on 27-FEB-20 @ 14:40						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	8.22		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	95.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	02-MAR-20	
Hydrocarbons						
F1 (C6-C10)	<25		25	ug/L	02-MAR-20	420

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-19 MW19-137S Sampled By: VP/ AC on 27-FEB-20 @ 14:40 Matrix: WATER						#1
Hydrocarbons						
F1-BTEX	<25		25	ug/L	03-MAR-20	420
F2 (C10-C16)	<100		100	ug/L	02-MAR-20	150
F3 (C16-C34)	<250		250	ug/L	02-MAR-20	500
F4 (C34-C50)	<250		250	ug/L	02-MAR-20	500
Total Hydrocarbons (C6-C50)	<370		370	ug/L	03-MAR-20	
Chrom. to baseline at nC50	YES			No Unit	02-MAR-20	
Surrogate: 2-Bromobenzotrifluoride	100.2		60-140	%	02-MAR-20	
Surrogate: 3,4-Dichlorotoluene	88.2		60-140	%	02-MAR-20	
L2422349-20 OW14 Sampled By: VP/ AC on 27-FEB-20 @ 15:35 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	11.1		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	0.89		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-20 OW14						
Sampled By: VP/ AC on 27-FEB-20 @ 15:35						
Matrix: WATER						#1
Volatile Organic Compounds						
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	1.25		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	95.4		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	02-MAR-20	
L2422349-21 OW07-34S						
Sampled By: VP/ AC on 27-FEB-20 @ 09:55						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	1.07		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-21 OW07-34S Sampled By: VP/ AC on 27-FEB-20 @ 09:55 Matrix: WATER						#1
Volatile Organic Compounds						
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	1.03		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.3		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	102.0		70-130	%	02-MAR-20	
L2422349-22 OW07-34D Sampled By: VP/ AC on 27-FEB-20 @ 10:45 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.57		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-22 OW07-34D Sampled By: VP/ AC on 27-FEB-20 @ 10:45 Matrix: WATER						#1
Volatile Organic Compounds						
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	101.2		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	
L2422349-23 OW25 Sampled By: VP/ AC on 27-FEB-20 @ 11:35 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.63		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-23 OW25						
Sampled By: VP/ AC on 27-FEB-20 @ 11:35						
Matrix: WATER						#1
Volatile Organic Compounds						
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	1.40		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	101.5		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	
L2422349-24 MW18-126D						
Sampled By: VP/ AC on 27-FEB-20 @ 12:10						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	0.57		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-24 MW18-126D						
Sampled By: VP/ AC on 27-FEB-20 @ 12:10						
Matrix: WATER						#1
Volatile Organic Compounds						
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	1.55		0.50	ug/L	02-MAR-20	*0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	02-MAR-20	
L2422349-26 OW07-33						
Sampled By: VP/ AC on 27-FEB-20 @ 14:45						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.94		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-26 OW07-33						
Sampled By: VP/ AC on 27-FEB-20 @ 14:45						
Matrix: WATER						#1
Volatile Organic Compounds						
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	1.18		0.50	ug/L	02-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	0.55		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.0		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	
L2422349-27 MW18-125S						
Sampled By: VP/ AC on 27-FEB-20 @ 15:40						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.77		0.50	ug/L	02-MAR-20	*0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-27 MW18-125S						
Sampled By: VP/ AC on 27-FEB-20 @ 15:40						
Matrix: WATER						#1
Volatile Organic Compounds						
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	1.57		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.88		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.9		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.2		70-130	%	02-MAR-20	
L2422349-28 MW17-105S						
Sampled By: VP/ AC on 28-FEB-20 @ 08:55						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	31.1		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-28 MW17-105S						
Sampled By: VP/ AC on 28-FEB-20 @ 08:55						
Matrix: WATER						#1
Volatile Organic Compounds						
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	3.49		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	1.42		0.50	ug/L	02-MAR-20	*0.5
n-Hexane	0.57		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	0.85		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	0.94		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	11.0		0.40	ug/L	02-MAR-20	
Xylenes (Total)	11.0		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	02-MAR-20	
L2422349-29 MW17-105D						
Sampled By: VP/ AC on 28-FEB-20 @ 09:40						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	1.80		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-29 MW17-105D						
Sampled By: VP/ AC on 28-FEB-20 @ 09:40						
Matrix: WATER						#1
Volatile Organic Compounds						
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	1.80		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	1.23		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.9		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	
L2422349-30 MW18-105G						
Sampled By: VP/ AC on 28-FEB-20 @ 10:20						
Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-30 MW18-105G Sampled By: VP/ AC on 28-FEB-20 @ 10:20 Matrix: WATER						#1
Volatile Organic Compounds						
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	0.78		0.50	ug/L	02-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.11		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.8		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	02-MAR-20	
L2422349-31 OW13 Sampled By: VP/ AC on 28-FEB-20 @ 09:10 Matrix: WATER						#1
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2422349-31 OW13						
Sampled By: VP/ AC on 28-FEB-20 @ 09:10						
Matrix: WATER						#1
Volatile Organic Compounds						
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.26		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.4		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	02-MAR-20	
L2422349-32 MW18-129D						
Sampled By: VP/ AC on 28-FEB-20 @ 09:45						
Matrix: WATER						#1
Volatile Organic Compounds						

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-32 MW18-129D						
Sampled By: VP/ AC on 28-FEB-20 @ 09:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	3.14		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	3.67		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	5.63		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.3		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.3		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2422349-33 OW09-I Sampled By: VP/ AC on 28-FEB-20 @ 11:25 Matrix: WATER						#1			
Volatile Organic Compounds									
Acetone	<30		30	ug/L	02-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640			
MTBE	<2.0		2.0	ug/L	02-MAR-20	15			
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	02-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	100.4		70-130	%	02-MAR-20				
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	02-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-34 OW09-II						
Sampled By: VP/ AC on 28-FEB-20 @ 10:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	2.20		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	6.51		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	6.07		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	101.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-35 OW13-39S						
Sampled By: VP/ AC on 28-FEB-20 @ 13:10						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	0.55		0.50	ug/L	02-MAR-20	*0.5
cis-1,2-Dichloroethylene	25.5		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	1.62		0.50	ug/L	02-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	66.8		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	3.65		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.6		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.2		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-36 OW13-39D						
Sampled By: VP/ AC on 28-FEB-20 @ 13:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	5.02		0.50	ug/L	02-MAR-20	*0.5
cis-1,2-Dichloroethylene	69.9		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	7.83		0.50	ug/L	02-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	577		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	10.5		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.9		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-37 MW17-101S						
Sampled By: VP/ AC on 28-FEB-20 @ 13:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	101.8		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.8		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-38 MW17-101D						
Sampled By: VP/ AC on 28-FEB-20 @ 13:10						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	0.70		0.50	ug/L	02-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	1.80		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	1.24		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.9		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-39 DUP5						
Sampled By: VP/ AC on 28-FEB-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,2-Dichloroethylene	2.22		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	0.50		0.50	ug/L	02-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.1		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.4		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2422349-40 DUP6						
Sampled By: VP/ AC on 28-FEB-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	02-MAR-20	2700
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1-Dichloroethylene	4.94		0.50	ug/L	02-MAR-20	*0.5
cis-1,2-Dichloroethylene	68.4		0.50	ug/L	02-MAR-20	*1.6
trans-1,2-Dichloroethylene	7.56		0.50	ug/L	02-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640
MTBE	<2.0		2.0	ug/L	02-MAR-20	15
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5
Trichloroethylene	562		0.50	ug/L	02-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150
Vinyl chloride	10.2		0.50	ug/L	02-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	02-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72
Surrogate: 4-Bromofluorobenzene	101.2		70-130	%	02-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	02-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2422349-41 TB-002 Sampled By: VP/ AC on 28-FEB-20 Matrix: WATER						#1			
Volatile Organic Compounds									
Acetone	<30		30	ug/L	02-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	02-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	02-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	02-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	02-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	02-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	02-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	02-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	02-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	02-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	02-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	02-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	02-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	02-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	02-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	02-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	02-MAR-20	640			
MTBE	<2.0		2.0	ug/L	02-MAR-20	15			
Styrene	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	02-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	02-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	02-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	02-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	02-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	02-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	02-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	99.6		70-130	%	02-MAR-20				
Surrogate: 1,4-Difluorobenzene	101.8		70-130	%	02-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-795245 17-795246 17-795247 17-795248

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

Reference Information

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2422349 Report Date: 04-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-511-WT	**Water**							
Batch R5012126								
WG3282678-4 DUP		**WG3282678-3**						
F1 (C6-C10)		<25	<25	RPD-NA	ug/L	N/A	30	02-MAR-20
WG3282678-1 LCS								
F1 (C6-C10)			101.9		%		80-120	02-MAR-20
WG3282678-2 MB								
F1 (C6-C10)			<25		ug/L		25	02-MAR-20
Surrogate: 3,4-Dichlorotoluene			99.8		%		60-140	02-MAR-20
WG3282678-5 MS		**WG3282678-3**						
F1 (C6-C10)			91.1		%		60-140	02-MAR-20
F2-F4-511-WT	**Water**							
Batch R5012153								
WG3284543-2 LCS								
F2 (C10-C16)			104.8		%		70-130	02-MAR-20
F3 (C16-C34)			104.1		%		70-130	02-MAR-20
F4 (C34-C50)			110.9		%		70-130	02-MAR-20
WG3284543-1 MB								
F2 (C10-C16)			<100		ug/L		100	02-MAR-20
F3 (C16-C34)			<250		ug/L		250	02-MAR-20
F4 (C34-C50)			<250		ug/L		250	02-MAR-20
Surrogate: 2-Bromobenzotrifluoride			102.4		%		60-140	02-MAR-20
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-6 DUP		**L2422349-21**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1,1-Trichloroethane		1.03	0.92		ug/L	11	30	02-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1-Dichloroethane		1.07	1.01		ug/L	5.8	30	02-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-6 DUP		**L2422349-21**						
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	02-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	02-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
WG3284547-1 LCS								
1,1,1,2-Tetrachloroethane			95.1		%		70-130	02-MAR-20
1,1,2,2-Tetrachloroethane			96.1		%		70-130	02-MAR-20
1,1,1-Trichloroethane			93.6		%		70-130	02-MAR-20
1,1,2-Trichloroethane			90.3		%		70-130	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-1 LCS								
1,1-Dichloroethane			89.9		%		70-130	02-MAR-20
1,1-Dichloroethylene			87.1		%		70-130	02-MAR-20
1,2-Dibromoethane			93.4		%		70-130	02-MAR-20
1,2-Dichlorobenzene			94.9		%		70-130	02-MAR-20
1,2-Dichloroethane			95.2		%		70-130	02-MAR-20
1,2-Dichloropropane			92.7		%		70-130	02-MAR-20
1,3-Dichlorobenzene			95.8		%		70-130	02-MAR-20
1,4-Dichlorobenzene			96.9		%		70-130	02-MAR-20
Acetone			103.7		%		60-140	02-MAR-20
Benzene			88.8		%		70-130	02-MAR-20
Bromodichloromethane			97.5		%		70-130	02-MAR-20
Bromoform			92.4		%		70-130	02-MAR-20
Bromomethane			86.8		%		60-140	02-MAR-20
Carbon tetrachloride			97.3		%		70-130	02-MAR-20
Chlorobenzene			90.2		%		70-130	02-MAR-20
Chloroform			96.6		%		70-130	02-MAR-20
cis-1,2-Dichloroethylene			94.1		%		70-130	02-MAR-20
cis-1,3-Dichloropropene			92.4		%		70-130	02-MAR-20
Dibromochloromethane			89.1		%		70-130	02-MAR-20
Dichlorodifluoromethane			102.8		%		50-140	02-MAR-20
Ethylbenzene			87.6		%		70-130	02-MAR-20
n-Hexane			83.5		%		70-130	02-MAR-20
m+p-Xylenes			89.9		%		70-130	02-MAR-20
Methyl Ethyl Ketone			90.5		%		60-140	02-MAR-20
Methyl Isobutyl Ketone			94.3		%		60-140	02-MAR-20
Methylene Chloride			97.9		%		70-130	02-MAR-20
MTBE			93.2		%		70-130	02-MAR-20
o-Xylene			95.0		%		70-130	02-MAR-20
Styrene			87.4		%		70-130	02-MAR-20
Tetrachloroethylene			94.5		%		70-130	02-MAR-20
Toluene			90.7		%		70-130	02-MAR-20
trans-1,2-Dichloroethylene			89.4		%		70-130	02-MAR-20
trans-1,3-Dichloropropene			93.0		%		70-130	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-1 LCS								
Trichloroethylene			95.5		%		70-130	02-MAR-20
Trichlorofluoromethane			94.6		%		60-140	02-MAR-20
Vinyl chloride			110.6		%		60-140	02-MAR-20
WG3284547-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	02-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	02-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
Acetone			<30		ug/L		30	02-MAR-20
Benzene			<0.50		ug/L		0.5	02-MAR-20
Bromodichloromethane			<2.0		ug/L		2	02-MAR-20
Bromoform			<5.0		ug/L		5	02-MAR-20
Bromomethane			<0.50		ug/L		0.5	02-MAR-20
Carbon tetrachloride			<0.20		ug/L		0.2	02-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	02-MAR-20
Chloroform			<1.0		ug/L		1	02-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	02-MAR-20
Dibromochloromethane			<2.0		ug/L		2	02-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	02-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	02-MAR-20
n-Hexane			<0.50		ug/L		0.5	02-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	02-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	02-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	02-MAR-20
Methylene Chloride			<5.0		ug/L		5	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-2 MB								
MTBE			<2.0		ug/L		2	02-MAR-20
o-Xylene			<0.30		ug/L		0.3	02-MAR-20
Styrene			<0.50		ug/L		0.5	02-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	02-MAR-20
Toluene			<0.50		ug/L		0.5	02-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	02-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	02-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	02-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	02-MAR-20
Surrogate: 1,4-Difluorobenzene			101.7		%		70-130	02-MAR-20
Surrogate: 4-Bromofluorobenzene			100.0		%		70-130	02-MAR-20
WG3284547-5 MS		**L2422349-21**						
1,1,1,2-Tetrachloroethane			95.6		%		50-140	02-MAR-20
1,1,2,2-Tetrachloroethane			100.6		%		50-140	02-MAR-20
1,1,1-Trichloroethane			91.0		%		50-140	02-MAR-20
1,1,2-Trichloroethane			94.0		%		50-140	02-MAR-20
1,1-Dichloroethane			90.0		%		50-140	02-MAR-20
1,1-Dichloroethylene			83.1		%		50-140	02-MAR-20
1,2-Dibromoethane			99.0		%		50-140	02-MAR-20
1,2-Dichlorobenzene			95.1		%		50-140	02-MAR-20
1,2-Dichloroethane			100.6		%		50-140	02-MAR-20
1,2-Dichloropropane			95.8		%		50-140	02-MAR-20
1,3-Dichlorobenzene			94.5		%		50-140	02-MAR-20
1,4-Dichlorobenzene			95.7		%		50-140	02-MAR-20
Acetone			114.0		%		50-140	02-MAR-20
Benzene			89.3		%		50-140	02-MAR-20
Bromodichloromethane			101.1		%		50-140	02-MAR-20
Bromoform			96.6		%		50-140	02-MAR-20
Bromomethane			86.3		%		50-140	02-MAR-20
Carbon tetrachloride			93.7		%		50-140	02-MAR-20
Chlorobenzene			89.4		%		50-140	02-MAR-20
Chloroform			98.2		%		50-140	02-MAR-20
cis-1,2-Dichloroethylene			95.7		%		50-140	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012033								
WG3284547-5 MS		**L2422349-21**						
cis-1,3-Dichloropropene			91.3		%		50-140	02-MAR-20
Dibromochloromethane			92.3		%		50-140	02-MAR-20
Dichlorodifluoromethane			102.1		%		50-140	02-MAR-20
Ethylbenzene			85.1		%		50-140	02-MAR-20
n-Hexane			75.9		%		50-140	02-MAR-20
m+p-Xylenes			87.2		%		50-140	02-MAR-20
Methyl Ethyl Ketone			105.0		%		50-140	02-MAR-20
Methyl Isobutyl Ketone			103.5		%		50-140	02-MAR-20
Methylene Chloride			100.6		%		50-140	02-MAR-20
MTBE			92.9		%		50-140	02-MAR-20
o-Xylene			93.2		%		50-140	02-MAR-20
Styrene			86.9		%		50-140	02-MAR-20
Tetrachloroethylene			89.7		%		50-140	02-MAR-20
Toluene			88.3		%		50-140	02-MAR-20
trans-1,2-Dichloroethylene			87.2		%		50-140	02-MAR-20
trans-1,3-Dichloropropene			94.0		%		50-140	02-MAR-20
Trichloroethylene			94.0		%		50-140	02-MAR-20
Trichlorofluoromethane			88.3		%		50-140	02-MAR-20
Vinyl chloride			105.6		%		50-140	02-MAR-20
Batch R5012126								
WG3282678-4 DUP		**WG3282678-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1,1-Trichloroethane		0.81	0.85		ug/L	4.8	30	02-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012126								
WG3282678-4 DUP		**WG3282678-3**						
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	02-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	02-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	02-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	02-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-MAR-20
WG3282678-1 LCS								
1,1,1,2-Tetrachloroethane			92.1		%		70-130	02-MAR-20
1,1,2,2-Tetrachloroethane			90.8		%		70-130	02-MAR-20
1,1,1-Trichloroethane			94.1		%		70-130	02-MAR-20
1,1,2-Trichloroethane			100.6		%		70-130	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012126								
WG3282678-1 LCS								
1,1-Dichloroethane			93.3		%		70-130	02-MAR-20
1,1-Dichloroethylene			86.0		%		70-130	02-MAR-20
1,2-Dibromoethane			99.6		%		70-130	02-MAR-20
1,2-Dichlorobenzene			95.3		%		70-130	02-MAR-20
1,2-Dichloroethane			84.3		%		70-130	02-MAR-20
1,2-Dichloropropane			88.1		%		70-130	02-MAR-20
1,3-Dichlorobenzene			94.0		%		70-130	02-MAR-20
1,4-Dichlorobenzene			93.3		%		70-130	02-MAR-20
Acetone			86.8		%		60-140	02-MAR-20
Benzene			93.1		%		70-130	02-MAR-20
Bromodichloromethane			90.2		%		70-130	02-MAR-20
Bromoform			92.0		%		70-130	02-MAR-20
Bromomethane			90.8		%		60-140	02-MAR-20
Carbon tetrachloride			91.6		%		70-130	02-MAR-20
Chlorobenzene			93.0		%		70-130	02-MAR-20
Chloroform			92.3		%		70-130	02-MAR-20
cis-1,2-Dichloroethylene			93.7		%		70-130	02-MAR-20
cis-1,3-Dichloropropene			81.9		%		70-130	02-MAR-20
Dibromochloromethane			97.0		%		70-130	02-MAR-20
Dichlorodifluoromethane			107.1		%		50-140	02-MAR-20
Ethylbenzene			86.9		%		70-130	02-MAR-20
n-Hexane			84.0		%		70-130	02-MAR-20
m+p-Xylenes			86.9		%		70-130	02-MAR-20
Methyl Ethyl Ketone			104.6		%		60-140	02-MAR-20
Methyl Isobutyl Ketone			79.3		%		60-140	02-MAR-20
Methylene Chloride			101.7		%		70-130	02-MAR-20
MTBE			95.1		%		70-130	02-MAR-20
o-Xylene			94.5		%		70-130	02-MAR-20
Styrene			85.8		%		70-130	02-MAR-20
Tetrachloroethylene			95.1		%		70-130	02-MAR-20
Toluene			92.4		%		70-130	02-MAR-20
trans-1,2-Dichloroethylene			86.0		%		70-130	02-MAR-20
trans-1,3-Dichloropropene			87.9		%		70-130	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012126								
WG3282678-1 LCS								
Trichloroethylene			101.7		%		70-130	02-MAR-20
Trichlorofluoromethane			96.9		%		60-140	02-MAR-20
Vinyl chloride			114.0		%		60-140	02-MAR-20
WG3282678-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	02-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	02-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	02-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-MAR-20
Acetone			<30		ug/L		30	02-MAR-20
Benzene			<0.50		ug/L		0.5	02-MAR-20
Bromodichloromethane			<2.0		ug/L		2	02-MAR-20
Bromoform			<5.0		ug/L		5	02-MAR-20
Bromomethane			<0.50		ug/L		0.5	02-MAR-20
Carbon tetrachloride			<0.20		ug/L		0.2	02-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	02-MAR-20
Chloroform			<1.0		ug/L		1	02-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	02-MAR-20
Dibromochloromethane			<2.0		ug/L		2	02-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	02-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	02-MAR-20
n-Hexane			<0.50		ug/L		0.5	02-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	02-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	02-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	02-MAR-20
Methylene Chloride			<5.0		ug/L		5	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012126								
WG3282678-2 MB								
MTBE			<2.0		ug/L		2	02-MAR-20
o-Xylene			<0.30		ug/L		0.3	02-MAR-20
Styrene			<0.50		ug/L		0.5	02-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	02-MAR-20
Toluene			<0.50		ug/L		0.5	02-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	02-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	02-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	02-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	02-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	02-MAR-20
Surrogate: 1,4-Difluorobenzene			101.4		%		70-130	02-MAR-20
Surrogate: 4-Bromofluorobenzene			97.3		%		70-130	02-MAR-20
WG3282678-5 MS		**WG3282678-3**						
1,1,1,2-Tetrachloroethane			92.5		%		50-140	02-MAR-20
1,1,2,2-Tetrachloroethane			85.7		%		50-140	02-MAR-20
1,1,1-Trichloroethane			94.5		%		50-140	02-MAR-20
1,1,2-Trichloroethane			97.2		%		50-140	02-MAR-20
1,1-Dichloroethane			91.2		%		50-140	02-MAR-20
1,1-Dichloroethylene			85.5		%		50-140	02-MAR-20
1,2-Dibromoethane			95.9		%		50-140	02-MAR-20
1,2-Dichlorobenzene			94.7		%		50-140	02-MAR-20
1,2-Dichloroethane			80.8		%		50-140	02-MAR-20
1,2-Dichloropropane			86.0		%		50-140	02-MAR-20
1,3-Dichlorobenzene			95.3		%		50-140	02-MAR-20
1,4-Dichlorobenzene			94.2		%		50-140	02-MAR-20
Acetone			80.9		%		50-140	02-MAR-20
Benzene			91.9		%		50-140	02-MAR-20
Bromodichloromethane			88.9		%		50-140	02-MAR-20
Bromoform			89.5		%		50-140	02-MAR-20
Bromomethane			89.3		%		50-140	02-MAR-20
Carbon tetrachloride			91.9		%		50-140	02-MAR-20
Chlorobenzene			93.1		%		50-140	02-MAR-20
Chloroform			91.2		%		50-140	02-MAR-20
cis-1,2-Dichloroethylene			92.5		%		50-140	02-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012126								
WG3282678-5 MS		**WG3282678-3**						
cis-1,3-Dichloropropene			79.9		%		50-140	02-MAR-20
Dibromochloromethane			95.7		%		50-140	02-MAR-20
Dichlorodifluoromethane			115.3		%		50-140	02-MAR-20
Ethylbenzene			88.1		%		50-140	02-MAR-20
n-Hexane			82.7		%		50-140	02-MAR-20
m+p-Xylenes			88.1		%		50-140	02-MAR-20
Methyl Ethyl Ketone			84.0		%		50-140	02-MAR-20
Methyl Isobutyl Ketone			71.8		%		50-140	02-MAR-20
Methylene Chloride			98.4		%		50-140	02-MAR-20
MTBE			94.3		%		50-140	02-MAR-20
o-Xylene			95.2		%		50-140	02-MAR-20
Styrene			85.7		%		50-140	02-MAR-20
Tetrachloroethylene			96.8		%		50-140	02-MAR-20
Toluene			92.9		%		50-140	02-MAR-20
trans-1,2-Dichloroethylene			84.7		%		50-140	02-MAR-20
trans-1,3-Dichloropropene			85.6		%		50-140	02-MAR-20
Trichloroethylene			102.0		%		50-140	02-MAR-20
Trichlorofluoromethane			96.8		%		50-140	02-MAR-20
Vinyl chloride			112.8		%		50-140	02-MAR-20
Batch R5012606								
WG3284732-4 DUP		**WG3284732-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	03-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,2-Dichloroethane		0.54	0.58		ug/L	7.1	30	03-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012606								
WG3284732-4 DUP		**WG3284732-3**						
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	03-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	03-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	03-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	03-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
m+p-Xylenes		0.46	0.45		ug/L	2.2	30	03-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	03-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	03-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	04-MAR-20
o-Xylene		0.62	0.61		ug/L	1.6	30	03-MAR-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	03-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	03-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	03-MAR-20
WG3284732-1 LCS								
1,1,1,2-Tetrachloroethane			96.1		%		70-130	03-MAR-20
1,1,2,2-Tetrachloroethane			101.2		%		70-130	03-MAR-20
1,1,1-Trichloroethane			93.6		%		70-130	03-MAR-20
1,1,2-Trichloroethane			96.3		%		70-130	03-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012606								
WG3284732-1 LCS								
1,1-Dichloroethane			91.2		%		70-130	03-MAR-20
1,1-Dichloroethylene			86.6		%		70-130	03-MAR-20
1,2-Dibromoethane			101.9		%		70-130	03-MAR-20
1,2-Dichlorobenzene			95.1		%		70-130	03-MAR-20
1,2-Dichloroethane			102.5		%		70-130	03-MAR-20
1,2-Dichloropropane			95.5		%		70-130	03-MAR-20
1,3-Dichlorobenzene			94.4		%		70-130	03-MAR-20
1,4-Dichlorobenzene			95.6		%		70-130	03-MAR-20
Acetone			119.9		%		60-140	03-MAR-20
Benzene			90.1		%		70-130	03-MAR-20
Bromodichloromethane			101.9		%		70-130	03-MAR-20
Bromoform			98.9		%		70-130	03-MAR-20
Bromomethane			92.2		%		60-140	03-MAR-20
Carbon tetrachloride			96.8		%		70-130	03-MAR-20
Chlorobenzene			90.3		%		70-130	03-MAR-20
Chloroform			99.2		%		70-130	03-MAR-20
cis-1,2-Dichloroethylene			97.0		%		70-130	03-MAR-20
cis-1,3-Dichloropropene			96.9		%		70-130	03-MAR-20
Dibromochloromethane			94.2		%		70-130	03-MAR-20
Dichlorodifluoromethane			116.7		%		50-140	03-MAR-20
Ethylbenzene			85.4		%		70-130	03-MAR-20
n-Hexane			82.3		%		70-130	03-MAR-20
m+p-Xylenes			87.2		%		70-130	03-MAR-20
Methyl Ethyl Ketone			113.1		%		60-140	03-MAR-20
Methyl Isobutyl Ketone			104.6		%		60-140	03-MAR-20
Methylene Chloride			103.9		%		70-130	03-MAR-20
MTBE			93.7		%		70-130	03-MAR-20
o-Xylene			92.9		%		70-130	03-MAR-20
Styrene			86.7		%		70-130	03-MAR-20
Tetrachloroethylene			91.8		%		70-130	03-MAR-20
Toluene			89.5		%		70-130	03-MAR-20
trans-1,2-Dichloroethylene			88.3		%		70-130	03-MAR-20
trans-1,3-Dichloropropene			97.5		%		70-130	03-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012606								
WG3284732-1 LCS								
Trichloroethylene			95.0		%		70-130	03-MAR-20
Trichlorofluoromethane			95.7		%		60-140	03-MAR-20
Vinyl chloride			113.3		%		60-140	03-MAR-20
WG3284732-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	03-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	03-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	03-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	03-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	03-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	03-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	03-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	03-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	03-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	03-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	03-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	03-MAR-20
Acetone			<30		ug/L		30	03-MAR-20
Benzene			<0.50		ug/L		0.5	03-MAR-20
Bromodichloromethane			<2.0		ug/L		2	03-MAR-20
Bromoform			<5.0		ug/L		5	03-MAR-20
Bromomethane			<0.50		ug/L		0.5	03-MAR-20
Carbon tetrachloride			<0.20		ug/L		0.2	03-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	03-MAR-20
Chloroform			<1.0		ug/L		1	03-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	03-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	03-MAR-20
Dibromochloromethane			<2.0		ug/L		2	03-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	03-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	03-MAR-20
n-Hexane			<0.50		ug/L		0.5	03-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	03-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	03-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	03-MAR-20
Methylene Chloride			<5.0		ug/L		5	03-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012606								
WG3284732-2 MB								
MTBE			<2.0		ug/L		2	03-MAR-20
o-Xylene			<0.30		ug/L		0.3	03-MAR-20
Styrene			<0.50		ug/L		0.5	03-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	03-MAR-20
Toluene			<0.50		ug/L		0.5	03-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	03-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	03-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	03-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	03-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	03-MAR-20
Surrogate: 1,4-Difluorobenzene			102.4		%		70-130	03-MAR-20
Surrogate: 4-Bromofluorobenzene			99.4		%		70-130	03-MAR-20
WG3284732-5 MS		**WG3284732-3**						
1,1,1,2-Tetrachloroethane			94.6		%		50-140	03-MAR-20
1,1,2,2-Tetrachloroethane			81.9		%		50-140	03-MAR-20
1,1,1-Trichloroethane			98.5		%		50-140	03-MAR-20
1,1,2-Trichloroethane			81.0		%		50-140	03-MAR-20
1,1-Dichloroethane			88.1		%		50-140	03-MAR-20
1,1-Dichloroethylene			89.3		%		50-140	03-MAR-20
1,2-Dibromoethane			81.7		%		50-140	03-MAR-20
1,2-Dichlorobenzene			95.8		%		50-140	03-MAR-20
1,2-Dichloroethane			84.4		%		50-140	03-MAR-20
1,2-Dichloropropane			87.0		%		50-140	03-MAR-20
1,3-Dichlorobenzene			101.4		%		50-140	03-MAR-20
1,4-Dichlorobenzene			100.8		%		50-140	03-MAR-20
Acetone			85.5		%		50-140	03-MAR-20
Benzene			87.2		%		50-140	03-MAR-20
Bromodichloromethane			92.1		%		50-140	03-MAR-20
Bromoform			81.9		%		50-140	03-MAR-20
Bromomethane			80.6		%		50-140	03-MAR-20
Carbon tetrachloride			104.5		%		50-140	03-MAR-20
Chlorobenzene			89.8		%		50-140	03-MAR-20
Chloroform			95.3		%		50-140	03-MAR-20
cis-1,2-Dichloroethylene			92.3		%		50-140	03-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5012606								
WG3284732-5 MS		**WG3284732-3**						
cis-1,3-Dichloropropene			84.6		%		50-140	03-MAR-20
Dibromochloromethane			82.8		%		50-140	03-MAR-20
Dichlorodifluoromethane			110.5		%		50-140	03-MAR-20
Ethylbenzene			92.1		%		50-140	03-MAR-20
n-Hexane			86.6		%		50-140	03-MAR-20
m+p-Xylenes			94.2		%		50-140	03-MAR-20
Methyl Ethyl Ketone			62.3		%		50-140	03-MAR-20
Methyl Isobutyl Ketone			71.8		%		50-140	03-MAR-20
Methylene Chloride			91.0		%		50-140	03-MAR-20
MTBE			93.3		%		50-140	03-MAR-20
o-Xylene			96.9		%		50-140	03-MAR-20
Styrene			85.4		%		50-140	03-MAR-20
Tetrachloroethylene			103.8		%		50-140	03-MAR-20
Toluene			92.9		%		50-140	03-MAR-20
trans-1,2-Dichloroethylene			89.8		%		50-140	03-MAR-20
trans-1,3-Dichloropropene			84.1		%		50-140	03-MAR-20
Trichloroethylene			99.5		%		50-140	03-MAR-20
Trichlorofluoromethane			100.1		%		50-140	03-MAR-20
Vinyl chloride			110.3		%		50-140	03-MAR-20

Quality Control Report

Workorder: L2422349 Report Date: 04-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

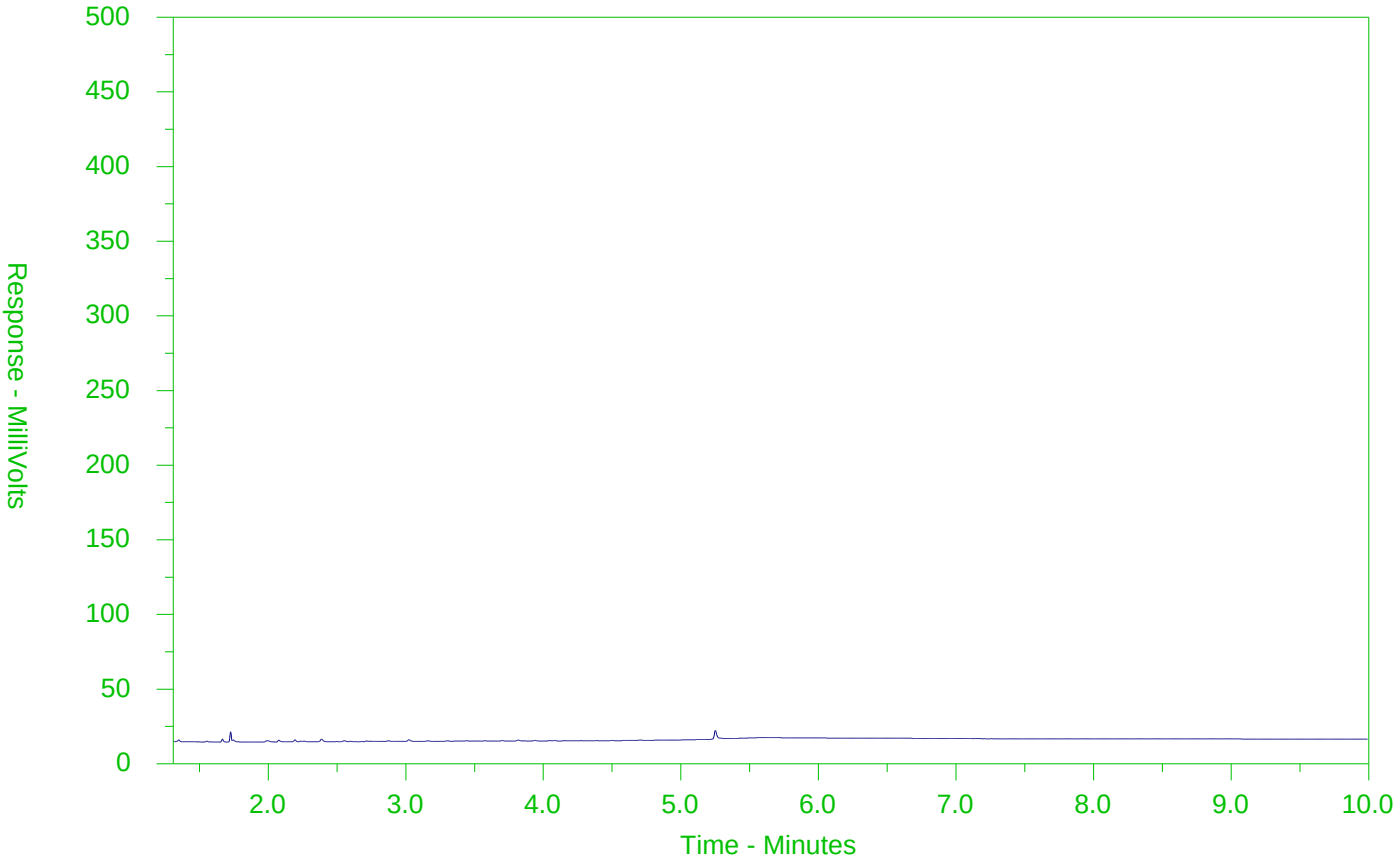
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2422349-19
Client Sample ID: MW19-137S



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analy Request Form

Canada Toll Free: 1 800 668 9878

L2422349-COFC

COC Number: 17 - 795245

Page 1 of 4

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Requested - Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: [X] PDF [X] EXCEL [X] EDD (DIGITAL)	Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report: [X] YES [ ] NO	PRIORITY (Business Days): [ ] 4 day [P4-20%] [ ] 3 day [P3-25%] [ ] 2 day [P2-50%]
Phone:	519-579-3580	[ ] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: [ ] 1 Business day [E - 100%] [ ] Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St S Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2: ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3: tania.mccarthy@jacobs.com	
Invoice To	Same as Report To [X] YES [ ] NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report [X] YES [ ] NO	Select Invoice Distribution: [X] EMAIL [ ] MAIL [ ] FAX	
Company:	Jacobs	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q78833	AFE/Cost Center:	PO#:
Job #:	6947S7CH	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	24-3	Location:	
ALS Lab Work Order # (lab use only):	L2422349	ALS Contact: E. Hansen	Sampler: V. Peters / A. Casey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	PHCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						P	P		
	MW18-121S	26-02-20	09:20	water	2	X			
	MW18-121D		10:10		2				
	MW17-107S		11:05		2				
	MW18-107D		11:50		2				
	MW18-116S		14:00		2				
	MW18-116D		14:55		2				
	MW17-102D		16:00		2				
	MW18-123D		16:55		2				
	OW22D		13:10		2				
	OW22S		14:00		2				
	MW18-123S		17:00		2				
	OW26D	26-02-20	16:05	water	2	X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [X] NO	O. Reg 153/04 Table 1
Are samples for human consumption/ use? [ ] YES [X] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [X] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				4.3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 2020/02/28	Time: 15:05	Received by:	Date:	Time:	Received by:	Date: 28-Feb-20	Time: 1505

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analy Request Form

L2422349-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 17 - 795246

Page 2 of 4

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format:	PDF X EXCEL X EDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report	X YES NO	PRIORITY (Business Days): 4 day [P4-20%] ; 3 day [P3-25%] ; 2 day [P2-50%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked		EMERGENCY: 1 Business day [E - 100%] ; Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution:	X EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh mm
Street:	72 Victoria St S. Suite 300	Email 1 or Fax	michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2	ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3	tania.murarthy@jacobs.com	
Invoice To	Same as Report To X YES NO	Invoice Distribution		
	Copy of Invoice with Report X YES NO	Select Invoice Distribution:	X EMAIL MAIL FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax		
Contact:		Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quota #:	Q76832	AFE/Cost Center	PO#
Job #:	6947570 H	Major/Minor Code	Routing Code
PO / AFE:		Requisitioner:	
LSD:		Location	
ALS Lab Work Order # (lab use only):	L2422349	ALS Contact:	Sampler:

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	F	P												SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						VOCs	PHCs													
	OW26S	26-02-20	15:15	water	2	X														
	Dup 4	26-02-20	—		2															
	MW18-136D	27-02-20	9:55		2															
	MW18-136G		10:30		2															
	MW18-134S		11:45		2															
	MW18-134D		12:25		2															
	MW19-137S		14:40		4	X	X													
	OW14		15:35		2															
	OW07-34S		9:55		2															
	OW07-34D		10:45		2															
	OW25		11:35		2															
	MW18-126D	27-02-20	12:10	water	2	X														

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES X NO	O.Reg. 153/04 Table 1
Are samples for human consumption/ use? [ ] YES X NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs	Ice Cubes X	Custody seal intact	Yes		No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				4.3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
Via Peters	2020/02/28	15:05				SH	28-Feb-20	1505

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2422349-COFC

COC Number: 17 - 795247

Page 3 of 4

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report YES NO	PRIORITY (Business Days): 4 day [P4-20%]; 3 day [P3-25%]; 2 day [P2-50%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%]; Same Day, Weekend or Statutory holiday [E2 -200%] (Laboratory opening fees may apply)
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St S. Suite 300	Email 1 or Fax michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2 ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3 tania.mccarthy@jacobs.com	
Invoice To	Same as Report To YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	Jacobs Accounts Payable	Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q78823	AFE/Cost Center:	PO#:
Job #:	6947571CH	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2422349 ALS Contact: E. Hansen Sampler: A. (Casey) V. Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs (P)	PFCs (P)	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	MW18-126D	27-02-20	12:10	water	2	X			
	DW07-33	27-02-20	14:45	water	2	X			
	MW18-125S	27-02-20	15:40	water	2	X			
	MW17-105S	28-02-20	8:55		2	X			
	MW17-105D		9:40		2	X			
	MW18-105G		10:20		2	X			
	DW13		9:10		2	X			
	MW18-129D		9:45		2	X			
	DW09-I		11:25		2	X			
	DW09-II		10:45		2	X			
	DW13-39S		13:10		2	X			
	DW13-39D	28-02-20	13:45	water	2	X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	O. Reg 153/04 Table 1
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			4.3		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2020/02/28	15:05					28-Feb-20	1505

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analyt Request Form

Canada Toll Free: 1 800 668 9878

L2422349-COFC

COC Number 17 - 795248

Page 4 of 4

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Turnaround Time (TAT) Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: [X] PDF [X] EXCEL [X] EDD (DIGITAL)	Regular [R] [X] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact	Michael Shiry	Quality Control (QC) Report with Report [X] YES [ ] NO	PRIORITY (Business Days): 4 day [P4-20%] [ ]; 3 day [P3-25%] [ ]; 2 day [P2-50%] [ ]
Phone:	519-579-3500	[ ] Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] [ ]; Same Day, Weekend or Statutory holiday (E2 -200% (Laboratory opening fees may apply)) [ ]
	Company address below will appear on the final report	Select Distribution: [X] EMAIL [ ] MAIL [ ] FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	72 Victoria St. S. Suite 300	Email 1 or Fax michael.shiry@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Kitchener, ON	Email 2 ed.taves@jacobs.com	
Postal Code:	N2G 4Y9	Email 3 tania.mccarthy@jacobs.com	
Invoice To	Same as Report To [X] YES [ ] NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report [X] YES [ ] NO	Select Invoice Distribution [X] EMAIL [ ] MAIL [ ] FAX	
Company	Jacobs	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q78833	AFE/Cost Center	PO#
Job #:	69475704	Major/Minor Code	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2422349

ALS Contact: Ed Hansen

Sampler: V. Peters/ A. Casey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	PHCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
						Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below			
						P	P		
	MW17-1015	25-02-20	13:45	water	2	X			
	MW17-101D	"	13:10	"	2	X			
	DUP5	"	—	"	2	X			
	DUP10	25-02-20	—	water	2	X			
	TB-002	—	—	QC	2	X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? [ ] YES [X] NO	O. Reg. 153/04 Table 1
Are samples for human consumption/ use? [ ] YES [X] NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen [ ] SIF Observations Yes [ ] No [ ]

Ice Packs [ ] Ice Cubes [X] Custody seal intact Yes [ ] No [ ]

Cooling Initiated [ ]

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				4.3			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time	Received by	Date:	Time:
V. Peters	2020/02/28	15:05					28 FEB 20	1505

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: Michael Shiry
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 03-MAR-20
Report Date: 06-MAR-20 11:34 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2423564

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH
C of C Numbers: 17-795249, 17-795250, 17-795251
Legal Site Desc:

Emily Hansen
Account Manager

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2423564-1	OW19						
Sampled By:	VP/AC on 02-MAR-20 @ 09:15						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	05-MAR-20	2700
	Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
	Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
	MTBE	<2.0		2.0	ug/L	05-MAR-20	15
	Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Tetrachloroethylene	0.83		0.50	ug/L	05-MAR-20	*0.5
	Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
	Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
	o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
	m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
	Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
	Surrogate: 4-Bromofluorobenzene	93.5		70-130	%	05-MAR-20	
	Surrogate: 1,4-Difluorobenzene	101.5		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-2 MW18-130D						
Sampled By: VP/AC on 02-MAR-20 @ 09:50						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	0.77		0.50	ug/L	05-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	31.1		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	0.92		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	6.93		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	94.2		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-3 MW18-132D						
Sampled By: VP/AC on 02-MAR-20 @ 10:45						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	12.8		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	3.05		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	94.7		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-4 OW18-II						
Sampled By: VP/AC on 02-MAR-20 @ 11:40						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	2.09		0.50	ug/L	05-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	1.85		0.50	ug/L	05-MAR-20	*0.5
cis-1,2-Dichloroethylene	105		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	2.42		0.50	ug/L	05-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	9.68		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	33.5		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	92.6		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-5 OW18-I						
Sampled By: VP/AC on 02-MAR-20 @ 12:25						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	0.54		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	7.65		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	95.1		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-6 OW24S						
Sampled By: VP/AC on 02-MAR-20 @ 14:15						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	13.0		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	144		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	94.3		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-7 OW24D						
Sampled By: VP/AC on 02-MAR-20 @ 15:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	6.41		0.50	ug/L	05-MAR-20	*0.5
cis-1,2-Dichloroethylene	141		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	12.2		0.50	ug/L	05-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	991	DLHC	5.0	ug/L	06-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	3.46		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2423564-8	OW31						
Sampled By:	VP/AC on 02-MAR-20 @ 15:50						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	05-MAR-20	2700
	Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
	Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,2-Dichloroethylene	1.39		0.50	ug/L	05-MAR-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
	MTBE	<2.0		2.0	ug/L	05-MAR-20	15
	Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Toluene	1.10		0.50	ug/L	05-MAR-20	*0.8
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
	Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
	o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
	m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
	Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
	Surrogate: 4-Bromofluorobenzene	94.2		70-130	%	05-MAR-20	
	Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-9 MW18-131S						
Sampled By: VP/AC on 02-MAR-20 @ 09:20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	1.28		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	3.15		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2423564-10 OW07-38S Sampled By: VP/AC on 02-MAR-20 @ 15:50 Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	05-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640			
MTBE	<2.0		2.0	ug/L	05-MAR-20	15			
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	05-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	92.5		70-130	%	05-MAR-20				
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	05-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-11 MW17-110S						
Sampled By: VP/AC on 02-MAR-20 @ 15:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	94.1		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2423564-12 OW17									
Sampled By: VP/AC on 02-MAR-20 @ 14:15									
Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	05-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640			
MTBE	<2.0		2.0	ug/L	05-MAR-20	15			
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	05-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%	05-MAR-20				
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%	05-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-13	MW17-109S						
Sampled By:	VP/AC on 02-MAR-20 @ 12:20						
Matrix:	WATER						
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	05-MAR-20	2700
	Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
	Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
	trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
	Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
	Ethylbenzene	8.46		0.50	ug/L	05-MAR-20	*0.5
	n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
	MTBE	<2.0		2.0	ug/L	05-MAR-20	15
	Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
	1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
	Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
	o-Xylene	0.69		0.30	ug/L	05-MAR-20	
	m+p-Xylenes	0.89		0.40	ug/L	05-MAR-20	
	Xylenes (Total)	1.58		0.50	ug/L	05-MAR-20	72
	Surrogate: 4-Bromofluorobenzene	93.0		70-130	%	05-MAR-20	
	Surrogate: 1,4-Difluorobenzene	99.1		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-14 MW17-104S						
Sampled By: VP/AC on 02-MAR-20 @ 11:30						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30	OWP	30	ug/L	05-MAR-20	2700
Benzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0	OWP	2.0	ug/L	05-MAR-20	2
Bromoform	<5.0	OWP	5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20	OWP	0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0	OWP	2.0	ug/L	05-MAR-20	2
Chloroform	<1.0	OWP	1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20	OWP	0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0	OWP	2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50	OWP	0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50	OWP	0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0	OWP	5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30	OWP	0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30	OWP	0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50	OWP	0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20	OWP	20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20	OWP	20	ug/L	05-MAR-20	640
MTBE	<2.0	OWP	2.0	ug/L	05-MAR-20	15
Styrene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0	OWP	5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50	OWP	0.50	ug/L	05-MAR-20	0.5
o-Xylene	2.26	OWP	0.30	ug/L	05-MAR-20	
m+p-Xylenes	0.85	OWP	0.40	ug/L	05-MAR-20	
Xylenes (Total)	3.11		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	93.0		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-15 MW17-104D						
Sampled By: VP/AC on 02-MAR-20 @ 10:50						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	93.7		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.6		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-16 MW18-133D						
Sampled By: VP/AC on 02-MAR-20 @ 10:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	0.97		0.50	ug/L	05-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	2.97		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.0		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.9		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-17 DUP8						
Sampled By: VP/AC on 02-MAR-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	1.96		0.50	ug/L	05-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	1.88		0.50	ug/L	05-MAR-20	*0.5
cis-1,2-Dichloroethylene	98.6		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	2.61		0.50	ug/L	05-MAR-20	*1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.75	DLQ	0.75	ug/L	05-MAR-20	**0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	10.3		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	31.7		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.0		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-18 DUP9						
Sampled By: VP/AC on 02-MAR-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	0.79		0.50	ug/L	05-MAR-20	*0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.0		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits
L2423564-19	DUP10						
Sampled By:	VP/AC on 02-MAR-20						
Matrix:	WATER						#1
Volatile Organic Compounds							
	Acetone	<30		30	ug/L	05-MAR-20	2700
	Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
	Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
	Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
	Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
	Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
	1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
	1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1-Dichloroethylene	6.47		0.50	ug/L	05-MAR-20	*0.5
	cis-1,2-Dichloroethylene	139		0.50	ug/L	05-MAR-20	*1.6
	trans-1,2-Dichloroethylene	12.7		0.50	ug/L	05-MAR-20	*1.6
	Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
	1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
	cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
	1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
	Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
	n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
	Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
	Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
	MTBE	<2.0		2.0	ug/L	05-MAR-20	15
	Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
	1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
	1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
	Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
	1,1,1-Trichloroethane	<0.65	DLQ	0.65	ug/L	05-MAR-20	**0.5
	1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
	Trichloroethylene	861		0.50	ug/L	05-MAR-20	*0.5
	Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
	Vinyl chloride	3.36		0.50	ug/L	05-MAR-20	*0.5
	o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
	m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
	Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
	Surrogate: 4-Bromofluorobenzene	99.2		70-130	%	05-MAR-20	
	Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

ANALYTICAL GUIDELINE REPORT

694757CH

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-20 MW18-128D						
Sampled By: VP/AC on 03-MAR-20 @ 08:55						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	0.93		0.50	ug/L	05-MAR-20	*0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	3.53		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	0.63		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.3		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-21 OW23D						
Sampled By: VP/AC on 03-MAR-20 @ 09:30						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	0.82		0.50	ug/L	05-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	21.7		0.50	ug/L	05-MAR-20	*1.6
trans-1,2-Dichloroethylene	0.76		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	5.44		0.50	ug/L	05-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	2.37		0.50	ug/L	05-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-22 MW18-135D						
Sampled By: VP/AC on 03-MAR-20 @ 10:10						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	0.79		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.7		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-23 OW10						
Sampled By: VP/AC on 03-MAR-20 @ 11:05						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.1		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-24 MW18-127S						
Sampled By: VP/AC on 03-MAR-20 @ 13:20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	05-MAR-20	2700
Benzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Bromoform	<5.0		5.0	ug/L	05-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	05-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	05-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	05-MAR-20	2
Chloroform	<1.0		1.0	ug/L	05-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	05-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	05-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	05-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	05-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	05-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	05-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	05-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	05-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	05-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	05-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	05-MAR-20	640
MTBE	<2.0		2.0	ug/L	05-MAR-20	15
Styrene	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	05-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	05-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	05-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	05-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	05-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	05-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	05-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.0		70-130	%	05-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.1		70-130	%	05-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-25 OW07-37						
Sampled By: VP/AC on 03-MAR-20 @ 14:00						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.3		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.3		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-26 OW02						
Sampled By: VP/AC on 03-MAR-20 @ 09:20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.1		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-27 OW03-I Sampled By: VP/AC on 03-MAR-20 @ 10:10 Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.0		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2423564-28 OW03-II Sampled By: VP/AC on 03-MAR-20 @ 13:45 Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	06-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640			
MTBE	<2.0		2.0	ug/L	06-MAR-20	15			
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	06-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	99.9		70-130	%	06-MAR-20				
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	06-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-29 MW17-103S						
Sampled By: VP/AC on 03-MAR-20 @ 11:20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	2.94		0.50	ug/L	06-MAR-20	*0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.5		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-30 MW17-103D						
Sampled By: VP/AC on 03-MAR-20 @ 10:50						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.7		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-31 OW07-32						
Sampled By: VP/AC on 03-MAR-20 @ 14:30						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	99.9		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2423564-32 DUP 7						
Sampled By: VP/AC on 03-MAR-20						
Matrix: WATER						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	06-MAR-20	2700
Benzene	0.78		0.50	ug/L	06-MAR-20	*0.5
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,2-Dichloroethylene	23.7		0.50	ug/L	06-MAR-20	*1.6
trans-1,2-Dichloroethylene	0.69		0.50	ug/L	06-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640
MTBE	<2.0		2.0	ug/L	06-MAR-20	15
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5
Trichloroethylene	5.04		0.50	ug/L	06-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150
Vinyl chloride	2.40		0.50	ug/L	06-MAR-20	*0.5
o-Xylene	<0.30		0.30	ug/L	06-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72
Surrogate: 4-Bromofluorobenzene	100.6		70-130	%	06-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.7		70-130	%	06-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2423564-33 TB-003									
Sampled By: VP/AC on 03-MAR-20									
Matrix: WATER									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	06-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	06-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	06-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	06-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	06-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	06-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	06-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	06-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	06-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	06-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	06-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	06-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	06-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	06-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	06-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	06-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	06-MAR-20	640			
MTBE	<2.0		2.0	ug/L	06-MAR-20	15			
Styrene	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	06-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	06-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	06-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	06-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	06-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	06-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	06-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	06-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%	06-MAR-20				
Surrogate: 1,4-Difluorobenzene	99.5		70-130	%	06-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLQ	Detection Limit raised due to co-eluting interference. GCMS qualifier ion ratio did not meet acceptance criteria.
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of sediment.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-795249 17-795250 17-795251

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5016846								
WG3286027-4 DUP		**WG3286027-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	05-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	05-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	05-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	05-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	05-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	05-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Styrene		<0.50	<0.50		ug/L			05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5016846								
WG3286027-4 DUP		**WG3286027-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Tetrachloroethylene		0.83	0.69		ug/L	18	30	05-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
WG3286027-1 LCS								
1,1,1,2-Tetrachloroethane			91.6		%		70-130	05-MAR-20
1,1,2,2-Tetrachloroethane			95.9		%		70-130	05-MAR-20
1,1,1-Trichloroethane			93.7		%		70-130	05-MAR-20
1,1,2-Trichloroethane			92.8		%		70-130	05-MAR-20
1,1-Dichloroethane			100.5		%		70-130	05-MAR-20
1,1-Dichloroethylene			90.9		%		70-130	05-MAR-20
1,2-Dibromoethane			92.1		%		70-130	05-MAR-20
1,2-Dichlorobenzene			96.8		%		70-130	05-MAR-20
1,2-Dichloroethane			97.4		%		70-130	05-MAR-20
1,2-Dichloropropane			94.6		%		70-130	05-MAR-20
1,3-Dichlorobenzene			96.4		%		70-130	05-MAR-20
1,4-Dichlorobenzene			96.8		%		70-130	05-MAR-20
Acetone			107.5		%		60-140	05-MAR-20
Benzene			99.96		%		70-130	05-MAR-20
Bromodichloromethane			95.3		%		70-130	05-MAR-20
Bromoform			85.5		%		70-130	05-MAR-20
Bromomethane			80.6		%		60-140	05-MAR-20
Carbon tetrachloride			100.7		%		70-130	05-MAR-20
Chlorobenzene			96.6		%		70-130	05-MAR-20
Chloroform			96.7		%		70-130	05-MAR-20
cis-1,2-Dichloroethylene			91.7		%		70-130	05-MAR-20
cis-1,3-Dichloropropene			87.8		%		70-130	05-MAR-20
Dibromochloromethane			87.1		%		70-130	05-MAR-20
Dichlorodifluoromethane			88.1		%		50-140	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5016846								
WG3286027-1 LCS								
Ethylbenzene			95.0		%		70-130	05-MAR-20
n-Hexane			89.3		%		70-130	05-MAR-20
m+p-Xylenes			94.8		%		70-130	05-MAR-20
Methyl Ethyl Ketone			100.1		%		60-140	05-MAR-20
Methyl Isobutyl Ketone			95.9		%		60-140	05-MAR-20
Methylene Chloride			98.5		%		70-130	05-MAR-20
MTBE			99.4		%		70-130	05-MAR-20
o-Xylene			103.2		%		70-130	05-MAR-20
Styrene			90.6		%		70-130	05-MAR-20
Tetrachloroethylene			95.7		%		70-130	05-MAR-20
Toluene			98.0		%		70-130	05-MAR-20
trans-1,2-Dichloroethylene			93.1		%		70-130	05-MAR-20
trans-1,3-Dichloropropene			87.5		%		70-130	05-MAR-20
Trichloroethylene			96.5		%		70-130	05-MAR-20
Trichlorofluoromethane			93.5		%		60-140	05-MAR-20
Vinyl chloride			107.4		%		60-140	05-MAR-20
WG3286027-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	05-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	05-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
Acetone			<30		ug/L		30	05-MAR-20
Benzene			<0.50		ug/L		0.5	05-MAR-20
Bromodichloromethane			<2.0		ug/L		2	05-MAR-20
Bromoform			<5.0		ug/L		5	05-MAR-20
Bromomethane			<0.50		ug/L		0.5	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5016846								
WG3286027-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	05-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	05-MAR-20
Chloroform			<1.0		ug/L		1	05-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	05-MAR-20
Dibromochloromethane			<2.0		ug/L		2	05-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	05-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	05-MAR-20
n-Hexane			<0.50		ug/L		0.5	05-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	05-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	05-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	05-MAR-20
Methylene Chloride			<5.0		ug/L		5	05-MAR-20
MTBE			<2.0		ug/L		2	05-MAR-20
o-Xylene			<0.30		ug/L		0.3	05-MAR-20
Styrene			<0.50		ug/L		0.5	05-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	05-MAR-20
Toluene			<0.50		ug/L		0.5	05-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	05-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	05-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	05-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	05-MAR-20
Surrogate: 1,4-Difluorobenzene			100.1		%		70-130	05-MAR-20
Surrogate: 4-Bromofluorobenzene			93.7		%		70-130	05-MAR-20
WG3286027-5 MS		**WG3286027-3**						
1,1,1,2-Tetrachloroethane			90.3		%		50-140	05-MAR-20
1,1,2,2-Tetrachloroethane			90.9		%		50-140	05-MAR-20
1,1,1-Trichloroethane			94.8		%		50-140	05-MAR-20
1,1,2-Trichloroethane			91.8		%		50-140	05-MAR-20
1,1-Dichloroethane			98.9		%		50-140	05-MAR-20
1,1-Dichloroethylene			89.2		%		50-140	05-MAR-20
1,2-Dibromoethane			90.6		%		50-140	05-MAR-20
1,2-Dichlorobenzene			95.1		%		50-140	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5016846								
WG3286027-5 MS		**WG3286027-3**						
1,2-Dichloroethane			96.3		%		50-140	05-MAR-20
1,2-Dichloropropane			93.3		%		50-140	05-MAR-20
1,3-Dichlorobenzene			95.9		%		50-140	05-MAR-20
1,4-Dichlorobenzene			95.7		%		50-140	05-MAR-20
Acetone			100.3		%		50-140	05-MAR-20
Benzene			98.5		%		50-140	05-MAR-20
Bromodichloromethane			93.3		%		50-140	05-MAR-20
Bromoform			81.8		%		50-140	05-MAR-20
Bromomethane			77.9		%		50-140	05-MAR-20
Carbon tetrachloride			99.5		%		50-140	05-MAR-20
Chlorobenzene			95.3		%		50-140	05-MAR-20
Chloroform			95.7		%		50-140	05-MAR-20
cis-1,2-Dichloroethylene			90.1		%		50-140	05-MAR-20
cis-1,3-Dichloropropene			86.9		%		50-140	05-MAR-20
Dibromochloromethane			85.5		%		50-140	05-MAR-20
Dichlorodifluoromethane			81.8		%		50-140	05-MAR-20
Ethylbenzene			94.6		%		50-140	05-MAR-20
n-Hexane			87.1		%		50-140	05-MAR-20
m+p-Xylenes			94.0		%		50-140	05-MAR-20
Methyl Ethyl Ketone			93.6		%		50-140	05-MAR-20
Methyl Isobutyl Ketone			88.9		%		50-140	05-MAR-20
Methylene Chloride			97.5		%		50-140	05-MAR-20
MTBE			98.2		%		50-140	05-MAR-20
o-Xylene			102.4		%		50-140	05-MAR-20
Styrene			89.0		%		50-140	05-MAR-20
Tetrachloroethylene			95.2		%		50-140	05-MAR-20
Toluene			97.5		%		50-140	05-MAR-20
trans-1,2-Dichloroethylene			91.7		%		50-140	05-MAR-20
trans-1,3-Dichloropropene			85.9		%		50-140	05-MAR-20
Trichloroethylene			95.6		%		50-140	05-MAR-20
Trichlorofluoromethane			91.2		%		50-140	05-MAR-20
Vinyl chloride			103.3		%		50-140	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5017088								
WG3286042-4 DUP		**WG3286042-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	05-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	05-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	05-MAR-20
cis-1,2-Dichloroethylene		0.79	0.79		ug/L	0.0	30	05-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	05-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	05-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	05-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	05-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Styrene		<0.50	<0.50		ug/L			05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5017088								
WG3286042-4 DUP		**WG3286042-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	05-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	05-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	05-MAR-20
WG3286042-1 LCS								
1,1,1,2-Tetrachloroethane			96.1		%		70-130	04-MAR-20
1,1,2,2-Tetrachloroethane			92.6		%		70-130	04-MAR-20
1,1,1-Trichloroethane			99.99		%		70-130	04-MAR-20
1,1,2-Trichloroethane			94.3		%		70-130	04-MAR-20
1,1-Dichloroethane			95.3		%		70-130	04-MAR-20
1,1-Dichloroethylene			92.3		%		70-130	04-MAR-20
1,2-Dibromoethane			94.4		%		70-130	04-MAR-20
1,2-Dichlorobenzene			98.8		%		70-130	04-MAR-20
1,2-Dichloroethane			95.8		%		70-130	04-MAR-20
1,2-Dichloropropane			96.7		%		70-130	04-MAR-20
1,3-Dichlorobenzene			99.8		%		70-130	04-MAR-20
1,4-Dichlorobenzene			99.4		%		70-130	04-MAR-20
Acetone			100.3		%		60-140	04-MAR-20
Benzene			98.9		%		70-130	04-MAR-20
Bromodichloromethane			100.0		%		70-130	04-MAR-20
Bromoform			94.0		%		70-130	04-MAR-20
Bromomethane			85.6		%		60-140	04-MAR-20
Carbon tetrachloride			99.7		%		70-130	04-MAR-20
Chlorobenzene			96.5		%		70-130	04-MAR-20
Chloroform			100.1		%		70-130	04-MAR-20
cis-1,2-Dichloroethylene			96.5		%		70-130	04-MAR-20
cis-1,3-Dichloropropene			91.6		%		70-130	04-MAR-20
Dibromochloromethane			94.1		%		70-130	04-MAR-20
Dichlorodifluoromethane			102.3		%		50-140	04-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5017088								
WG3286042-1 LCS								
Ethylbenzene			95.2		%		70-130	04-MAR-20
n-Hexane			92.8		%		70-130	04-MAR-20
m+p-Xylenes			95.4		%		70-130	04-MAR-20
Methyl Ethyl Ketone			98.1		%		60-140	04-MAR-20
Methyl Isobutyl Ketone			88.3		%		60-140	04-MAR-20
Methylene Chloride			99.9		%		70-130	04-MAR-20
MTBE			96.0		%		70-130	04-MAR-20
o-Xylene			103.2		%		70-130	04-MAR-20
Styrene			91.0		%		70-130	04-MAR-20
Tetrachloroethylene			96.6		%		70-130	04-MAR-20
Toluene			96.7		%		70-130	04-MAR-20
trans-1,2-Dichloroethylene			94.3		%		70-130	04-MAR-20
trans-1,3-Dichloropropene			88.7		%		70-130	04-MAR-20
Trichloroethylene			100.0		%		70-130	04-MAR-20
Trichlorofluoromethane			88.8		%		60-140	04-MAR-20
Vinyl chloride			105.7		%		60-140	04-MAR-20
WG3286042-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	05-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	05-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	05-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	05-MAR-20
Acetone			<30		ug/L		30	05-MAR-20
Benzene			<0.50		ug/L		0.5	05-MAR-20
Bromodichloromethane			<2.0		ug/L		2	05-MAR-20
Bromoform			<5.0		ug/L		5	05-MAR-20
Bromomethane			<0.50		ug/L		0.5	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5017088								
WG3286042-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	05-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	05-MAR-20
Chloroform			<1.0		ug/L		1	05-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	05-MAR-20
Dibromochloromethane			<2.0		ug/L		2	05-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	05-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	05-MAR-20
n-Hexane			<0.50		ug/L		0.5	05-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	05-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	05-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	05-MAR-20
Methylene Chloride			<5.0		ug/L		5	05-MAR-20
MTBE			<2.0		ug/L		2	05-MAR-20
o-Xylene			<0.30		ug/L		0.3	05-MAR-20
Styrene			<0.50		ug/L		0.5	05-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	05-MAR-20
Toluene			<0.50		ug/L		0.5	05-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	05-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	05-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	05-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	05-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	05-MAR-20
Surrogate: 1,4-Difluorobenzene			100.4		%		70-130	05-MAR-20
Surrogate: 4-Bromofluorobenzene			97.2		%		70-130	05-MAR-20
WG3286042-5 MS		**WG3286042-3**						
1,1,1,2-Tetrachloroethane			94.8		%		50-140	05-MAR-20
1,1,2,2-Tetrachloroethane			91.9		%		50-140	05-MAR-20
1,1,1-Trichloroethane			100.3		%		50-140	05-MAR-20
1,1,2-Trichloroethane			92.3		%		50-140	05-MAR-20
1,1-Dichloroethane			95.3		%		50-140	05-MAR-20
1,1-Dichloroethylene			92.4		%		50-140	05-MAR-20
1,2-Dibromoethane			92.0		%		50-140	05-MAR-20
1,2-Dichlorobenzene			97.8		%		50-140	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5017088								
WG3286042-5 MS		**WG3286042-3**						
1,2-Dichloroethane			94.9		%		50-140	05-MAR-20
1,2-Dichloropropane			96.4		%		50-140	05-MAR-20
1,3-Dichlorobenzene			99.4		%		50-140	05-MAR-20
1,4-Dichlorobenzene			99.1		%		50-140	05-MAR-20
Acetone			93.2		%		50-140	05-MAR-20
Benzene			98.5		%		50-140	05-MAR-20
Bromodichloromethane			99.3		%		50-140	05-MAR-20
Bromoform			92.2		%		50-140	05-MAR-20
Bromomethane			86.5		%		50-140	05-MAR-20
Carbon tetrachloride			100.2		%		50-140	05-MAR-20
Chlorobenzene			92.0		%		50-140	05-MAR-20
Chloroform			100.1		%		50-140	05-MAR-20
cis-1,2-Dichloroethylene			96.6		%		50-140	05-MAR-20
cis-1,3-Dichloropropene			93.1		%		50-140	05-MAR-20
Dibromochloromethane			92.4		%		50-140	05-MAR-20
Dichlorodifluoromethane			111.8		%		50-140	05-MAR-20
Ethylbenzene			94.6		%		50-140	05-MAR-20
n-Hexane			92.3		%		50-140	05-MAR-20
m+p-Xylenes			95.1		%		50-140	05-MAR-20
Methyl Ethyl Ketone			87.8		%		50-140	05-MAR-20
Methyl Isobutyl Ketone			86.4		%		50-140	05-MAR-20
Methylene Chloride			98.8		%		50-140	05-MAR-20
MTBE			96.0		%		50-140	05-MAR-20
o-Xylene			102.1		%		50-140	05-MAR-20
Styrene			89.5		%		50-140	05-MAR-20
Tetrachloroethylene			97.1		%		50-140	05-MAR-20
Toluene			95.4		%		50-140	05-MAR-20
trans-1,2-Dichloroethylene			95.1		%		50-140	05-MAR-20
trans-1,3-Dichloropropene			89.2		%		50-140	05-MAR-20
Trichloroethylene			100.3		%		50-140	05-MAR-20
Trichlorofluoromethane			89.7		%		50-140	05-MAR-20
Vinyl chloride			108.1		%		50-140	05-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018066								
WG3286751-4 DUP		**WG3286751-3**						
Trichloroethylene		2.19	2.19		ug/L	0.0	30	06-MAR-20
WG3286751-1 LCS								
Trichloroethylene			104.7		%		70-130	06-MAR-20
WG3286751-2 MB								
Trichloroethylene			<0.50		ug/L		0.5	06-MAR-20
WG3286751-5 MS		**WG3286751-3**						
Trichloroethylene			98.8		%		50-140	06-MAR-20
Batch R5018096								
WG3280592-4 DUP		**WG3280592-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,1,1-Trichloroethane		2.94	2.84		ug/L	3.5	30	06-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	06-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018096								
WG3280592-4 DUP		**WG3280592-3**						
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	06-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	06-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-MAR-20
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	06-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAR-20
WG3280592-1 LCS								
1,1,1,2-Tetrachloroethane			98.3		%		70-130	06-MAR-20
1,1,2,2-Tetrachloroethane			93.1		%		70-130	06-MAR-20
1,1,1-Trichloroethane			99.5		%		70-130	06-MAR-20
1,1,2-Trichloroethane			100.6		%		70-130	06-MAR-20
1,1-Dichloroethane			109.0		%		70-130	06-MAR-20
1,1-Dichloroethylene			98.9		%		70-130	06-MAR-20
1,2-Dibromoethane			101.4		%		70-130	06-MAR-20
1,2-Dichlorobenzene			101.2		%		70-130	06-MAR-20
1,2-Dichloroethane			100.2		%		70-130	06-MAR-20
1,2-Dichloropropane			100.4		%		70-130	06-MAR-20
1,3-Dichlorobenzene			102.4		%		70-130	06-MAR-20
1,4-Dichlorobenzene			103.7		%		70-130	06-MAR-20
Acetone			114.8		%		60-140	06-MAR-20
Benzene			101.4		%		70-130	06-MAR-20
Bromodichloromethane			98.0		%		70-130	06-MAR-20
Bromoform			97.0		%		70-130	06-MAR-20
Bromomethane			90.9		%		60-140	06-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018096								
WG3280592-1 LCS								
Carbon tetrachloride			101.1		%		70-130	06-MAR-20
Chlorobenzene			102.4		%		70-130	06-MAR-20
Chloroform			102.2		%		70-130	06-MAR-20
cis-1,2-Dichloroethylene			108.3		%		70-130	06-MAR-20
cis-1,3-Dichloropropene			96.5		%		70-130	06-MAR-20
Dibromochloromethane			98.1		%		70-130	06-MAR-20
Dichlorodifluoromethane			112.0		%		50-140	06-MAR-20
Ethylbenzene			101.1		%		70-130	06-MAR-20
n-Hexane			98.8		%		70-130	06-MAR-20
m+p-Xylenes			101.5		%		70-130	06-MAR-20
Methyl Ethyl Ketone			103.4		%		60-140	06-MAR-20
Methyl Isobutyl Ketone			96.2		%		60-140	06-MAR-20
Methylene Chloride			104.6		%		70-130	06-MAR-20
MTBE			101.2		%		70-130	06-MAR-20
o-Xylene			108.5		%		70-130	06-MAR-20
Styrene			95.7		%		70-130	06-MAR-20
Tetrachloroethylene			103.9		%		70-130	06-MAR-20
Toluene			103.6		%		70-130	06-MAR-20
trans-1,2-Dichloroethylene			100.0		%		70-130	06-MAR-20
trans-1,3-Dichloropropene			102.6		%		70-130	06-MAR-20
Trichloroethylene			100.8		%		70-130	06-MAR-20
Trichlorofluoromethane			101.8		%		60-140	06-MAR-20
Vinyl chloride			117.7		%		60-140	06-MAR-20
WG3280592-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	06-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	06-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	06-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	06-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	06-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	06-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	06-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	06-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	06-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	06-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018096								
WG3280592-2 MB								
1,3-Dichlorobenzene			<0.50		ug/L		0.5	06-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	06-MAR-20
Acetone			<30		ug/L		30	06-MAR-20
Benzene			<0.50		ug/L		0.5	06-MAR-20
Bromodichloromethane			<2.0		ug/L		2	06-MAR-20
Bromoform			<5.0		ug/L		5	06-MAR-20
Bromomethane			<0.50		ug/L		0.5	06-MAR-20
Carbon tetrachloride			<0.20		ug/L		0.2	06-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	06-MAR-20
Chloroform			<1.0		ug/L		1	06-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	06-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	06-MAR-20
Dibromochloromethane			<2.0		ug/L		2	06-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	06-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	06-MAR-20
n-Hexane			<0.50		ug/L		0.5	06-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	06-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	06-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	06-MAR-20
Methylene Chloride			<5.0		ug/L		5	06-MAR-20
MTBE			<2.0		ug/L		2	06-MAR-20
o-Xylene			<0.30		ug/L		0.3	06-MAR-20
Styrene			<0.50		ug/L		0.5	06-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	06-MAR-20
Toluene			<0.50		ug/L		0.5	06-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	06-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	06-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	06-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	06-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	06-MAR-20
Surrogate: 1,4-Difluorobenzene			100.7		%		70-130	06-MAR-20
Surrogate: 4-Bromofluorobenzene			99.4		%		70-130	06-MAR-20
WG3280592-5 MS		**WG3280592-3**						
1,1,1,2-Tetrachloroethane			98.2		%		50-140	06-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018096								
WG3280592-5 MS		**WG3280592-3**						
1,1,2,2-Tetrachloroethane			98.7		%		50-140	06-MAR-20
1,1,1-Trichloroethane			98.1		%		50-140	06-MAR-20
1,1,2-Trichloroethane			103.1		%		50-140	06-MAR-20
1,1-Dichloroethane			99.0		%		50-140	06-MAR-20
1,1-Dichloroethylene			95.7		%		50-140	06-MAR-20
1,2-Dibromoethane			104.2		%		50-140	06-MAR-20
1,2-Dichlorobenzene			101.0		%		50-140	06-MAR-20
1,2-Dichloroethane			103.1		%		50-140	06-MAR-20
1,2-Dichloropropane			101.1		%		50-140	06-MAR-20
1,3-Dichlorobenzene			101.1		%		50-140	06-MAR-20
1,4-Dichlorobenzene			102.5		%		50-140	06-MAR-20
Acetone			113.9		%		50-140	06-MAR-20
Benzene			101.1		%		50-140	06-MAR-20
Bromodichloromethane			99.6		%		50-140	06-MAR-20
Bromoform			100.7		%		50-140	06-MAR-20
Bromomethane			89.5		%		50-140	06-MAR-20
Carbon tetrachloride			99.1		%		50-140	06-MAR-20
Chlorobenzene			101.9		%		50-140	06-MAR-20
Chloroform			102.6		%		50-140	06-MAR-20
cis-1,2-Dichloroethylene			96.5		%		50-140	06-MAR-20
cis-1,3-Dichloropropene			97.3		%		50-140	06-MAR-20
Dibromochloromethane			99.3		%		50-140	06-MAR-20
Dichlorodifluoromethane			117.4		%		50-140	06-MAR-20
Ethylbenzene			98.7		%		50-140	06-MAR-20
n-Hexane			93.6		%		50-140	06-MAR-20
m+p-Xylenes			99.6		%		50-140	06-MAR-20
Methyl Ethyl Ketone			110.1		%		50-140	06-MAR-20
Methyl Isobutyl Ketone			103.0		%		50-140	06-MAR-20
Methylene Chloride			103.1		%		50-140	06-MAR-20
MTBE			100.4		%		50-140	06-MAR-20
o-Xylene			107.5		%		50-140	06-MAR-20
Styrene			96.2		%		50-140	06-MAR-20
Tetrachloroethylene			100.5		%		50-140	06-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5018096								
WG3280592-5 MS		**WG3280592-3**						
Toluene			100.7		%		50-140	06-MAR-20
trans-1,2-Dichloroethylene			97.9		%		50-140	06-MAR-20
trans-1,3-Dichloropropene			102.4		%		50-140	06-MAR-20
Trichloroethylene			99.3		%		50-140	06-MAR-20
Trichlorofluoromethane			98.9		%		50-140	06-MAR-20
Vinyl chloride			116.8		%		50-140	06-MAR-20

Quality Control Report

Workorder: L2423564 Report Date: 06-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental
www.alsglobal.com

Chain of Custody (COC) / Analy Request Form

L2423564-COFC

Canada Toll Free: 1 800 668 9878

COC Number: 17 - 795249

Page 1 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company	Jacobs	Select Report Format: PDF EXCEL EDD (DIGITAL)	Regular [R] Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report: YES NO	4 day [P4-20%] 1 Business day [E - 100%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	3 day [P3-25%] Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	2 day [P2-50%]
Street:	72 Victoria St S. Suite 300	Email 1 or Fax: Michael.Shiry@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Kitchener ON	Email 2: ed.tavsel@ontario.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3: tonia.mccarthy@jacobs.com	Analysis Request
Invoice To	Same as Report To YES NO	Invoice Distribution	
	Copy of Invoice with Report YES NO	Select Invoice Distribution: EMAIL MAIL FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q78833	AFE/Cost Center:	PO#
Job #:	69475/CH	Major/Minor Code:	Routing Code:
PO / AFE		Requisitioner:	
LSD:		Location	
ALS Lab Work Order # (lab use only):	L2423564	ALS Contact: E. Hansen	Sampler: V. Peters/ A. Casey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	OW19	02-03-20	9:15	water	2	X		
	MW18-130D		9:50		2			
	MW18-132D		10:45		2			
	OW18-II		11:40		2			
	OW18-I		12:25		2			
	OW24S		14:15		2			
	OW24D		15:00		2			
	OW31		15:50		2			
	MW18-131S		9:20		2			
	OW07-38S		15:50		2			
	MW17-110S		15:00		2			
	OW17	02-03-20	14:15	water	2	X		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? YES NO	O. Reg. 153/04 Table 1
Are samples for human consumption/ use? YES NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen		SIF Observations	Yes		No
Ice Packs		Ice Cubes	Custody seal intact	Yes	No
Cooling Initiated					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			7.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date: 2020/03/03	Time: 15:40	Received by:	Date:	Time:	Received by:	Date: 3-3-2020	Time: 15:40

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a Regulated Drinking Water (DW) System please submit using an Authorized DW COC form

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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2423564-COFC

COC Number: 17 - 795250

Page 2 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	Jacobs	Select Report Format: PDF ✓ EXCEL ✓ EDD (DIGITAL)	Regular [R] ✓ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Michael Shiry	Quality Control (QC) Report with Report: YES ✓ NO	4 day [P4-20%] / 1 Business day [E - 100%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked	3 day [P3-25%] / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
	Company address below will appear on the final report	Select Distribution: EMAIL MAIL FAX	2 day [P2-50%]
Street	72 Victoria St S Suite 300	Email 1 or Fax: michael.shiry@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province	Kitchener, ON	Email 2: ed.taves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3: tania.mcCarthy@jacobs.com	
Invoice To	Same as Report To ✓ YES NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ✓ YES NO	Select Invoice Distribution: ✓ EMAIL MAIL FAX	
Company:	Jacobs	Email 1 or Fax	
Contact:	Accounts Payable	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q78833	AFE/Cost Center	PO#
Job #	69475TCH	Major/Minor Code	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location	
ALS Lab Work Order # (lab use only):		ALS Contact: E. Hanson	Sampler: V. Peters / A. Casey

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	MW17-109S	02-03-20	12:20	water	2	X		
	MW17-104S	"	11:30	"	2	"		
	MW17-104D	"	10:50	"	2	"		
	MW18-133D	02-03-20	10:00	water	2	X		
	DUP8	"	—	water	2	X		
	DUP9	"	—	water	2	X		
	DUP10	02-03-20	—	water	2	X		
	MW18-128D	03-03-20	8:55	water	2	"		
	OW23D	"	9:30	"	2	"		
	MW18-135D	"	10:10	"	2	"		
	OW10	"	11:05	"	2	"		
	MW18-127S	03-03-20	13:20	water	2	X		

Drinking Water (DW) Samples* (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ✓ NO	O. Reg 153/04 Table 1
Are samples for human consumption/ use? ☐ YES ✓ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact ✓ Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7.8			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: V. Peters	Date: 2020/03/03	Time: 15:40	Received by:	Date:	Time:	Received by:	Date: 3-3-2020	Time: 1540

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

June 2018 FRONT

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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Chain of Custody (COC) / Analyti Request Form

Canada Toll Free: 1 800 668 9878

L2423564-COFC

COC Number: 17 - 795251

Page 3 of 3

Report To	Contact and company name below will appear on the final report	Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company	Jacobs	Select Report Format	PDF X EXCEL X EDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact	Michael Shiry	Quality Control (QC) Report with Report	X YES NO	4 day [P4-20%]
Phone:	519-579-3500	Compare Results to Criteria on Report - provide details below if box checked		3 day [P3-25%]
	Company address below will appear on the final report	Select Distribution:	X EMAIL MAIL FAX	2 day [P2-50%]
Street:	72 Victoria St. S Suite 300	Email 1 or Fax	michael.shiry@jacobs.com	1 Business day [E - 100%]
City/Province:	Kitchener, ON	Email 2	ed.taves@jacobs.com	Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]
Postal Code	N2G 4Y9	Email 3	tania.mccarthy@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Invoice To	Same as Report To X YES NO	Invoice Distribution		For tests that can not be performed according to the service level selected, you will be contacted
	Copy of Invoice with Report X YES NO	Select Invoice Distribution	X EMAIL MAIL FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax		
Contact:		Email 2		

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q75833	AFE/Cost Center:	PO#
Job #	6947576H	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner	
LSD		Location	
ALS Lab Work Order # (lab use only):		ALS Contact: E. Hansen	Sampler: V. Peters/ A. Carey

Analysis Request

Indicate Filtered (F), Preserved (P), or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	VOCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	OW07-37	03-03-20	14:00	Water	2	X		
	OW02	"	9:20	"	2	X		
	OW03-I	"	10:10	"	2			
	OW03-II	"	13:45	"	2			
	MW17-103S	"	11:20	"	2			
	MW17-103D	"	10:50	"	2			
	OW07-32	"	14:30	"	2			
	DUP7	03-03-20	—	Water	2	X		
	TB-003	—	—	QC	2	X		

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? X NO	O. Reg 153/04 Table 1
Are samples for human consumption/use? X NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☒ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				7.8			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2020/03/03	15:40					3-3-2020	1540

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1 If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form

CH2M HILL CANADA LIMITED
ATTN: Michael Shiry
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9

Date Received: 11-MAR-20
Report Date: 13-MAR-20 12:29 (MT)
Version: FINAL

Client Phone: 519-579-3500

Certificate of Analysis

Lab Work Order #: L2426955

Project P.O. #: NOT SUBMITTED
Job Reference: 694757CH
C of C Numbers: 17-795252
Legal Site Desc:

Emily Hansen
Account Manager

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-1 MW19-137S						
Sampled By: V.PETERS on 11-MAR-20 @ 08:45						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	0.55		0.50	ug/L	13-MAR-20	*0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.3		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.6		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-2 MW18-113S						
Sampled By: V.PETERS on 11-MAR-20 @ 12:2(						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	97.5		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	99.6		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-3 MW18-114S						
Sampled By: V.PETERS on 11-MAR-20 @ 10:45						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	1.12		0.50	ug/L	13-MAR-20	*0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	96.5		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-4 MW18-115S						
Sampled By: V.PETERS on 11-MAR-20 @ 10:0						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	0.56		0.50	ug/L	13-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.9		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.2		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2426955-5 MW18-117S									
Sampled By: V.PETERS on 11-MAR-20 @ 11:2									
Matrix: CLIENT									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	13-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640			
MTBE	<2.0		2.0	ug/L	13-MAR-20	15			
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	13-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	97.6		70-130	%	13-MAR-20				
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	13-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1			
L2426955-6 MW18-124S									
Sampled By: V.PETERS on 11-MAR-20 @ 09:3(									
Matrix: CLIENT									
Volatile Organic Compounds									
Acetone	<30		30	ug/L	13-MAR-20	2700			
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2			
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5			
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89			
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2			
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2			
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2			
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2			
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590			
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6			
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6			
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5			
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5			
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20				
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20				
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5			
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5			
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5			
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400			
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640			
MTBE	<2.0		2.0	ug/L	13-MAR-20	15			
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1			
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8			
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5			
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5			
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150			
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5			
o-Xylene	<0.30		0.30	ug/L	13-MAR-20				
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20				
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72			
Surrogate: 4-Bromofluorobenzene	98.3		70-130	%	13-MAR-20				
Surrogate: 1,4-Difluorobenzene	100.9		70-130	%	13-MAR-20				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-7 DUP1						
Sampled By: V.PETERS on 11-MAR-20						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.2		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1
L2426955-8 TB-001						
Sampled By: V.PETERS on 11-MAR-20						
Matrix: CLIENT						
Volatile Organic Compounds						
Acetone	<30		30	ug/L	13-MAR-20	2700
Benzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Bromodichloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Bromoform	<5.0		5.0	ug/L	13-MAR-20	5
Bromomethane	<0.50		0.50	ug/L	13-MAR-20	0.89
Carbon tetrachloride	<0.20		0.20	ug/L	13-MAR-20	0.2
Chlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dibromochloromethane	<2.0		2.0	ug/L	13-MAR-20	2
Chloroform	<1.0		1.0	ug/L	13-MAR-20	2
1,2-Dibromoethane	<0.20		0.20	ug/L	13-MAR-20	0.2
1,2-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,3-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,4-Dichlorobenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
Dichlorodifluoromethane	<2.0		2.0	ug/L	13-MAR-20	590
1,1-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,2-Dichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
trans-1,2-Dichloroethylene	<0.50		0.50	ug/L	13-MAR-20	1.6
Methylene Chloride	<5.0		5.0	ug/L	13-MAR-20	5
1,2-Dichloropropane	<0.50		0.50	ug/L	13-MAR-20	0.5
cis-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
trans-1,3-Dichloropropene	<0.30		0.30	ug/L	13-MAR-20	
1,3-Dichloropropene (cis & trans)	<0.50		0.50	ug/L	13-MAR-20	0.5
Ethylbenzene	<0.50		0.50	ug/L	13-MAR-20	0.5
n-Hexane	<0.50		0.50	ug/L	13-MAR-20	5
Methyl Ethyl Ketone	<20		20	ug/L	13-MAR-20	400
Methyl Isobutyl Ketone	<20		20	ug/L	13-MAR-20	640
MTBE	<2.0		2.0	ug/L	13-MAR-20	15
Styrene	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,1,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	1.1
1,1,2,2-Tetrachloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Tetrachloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Toluene	<0.50		0.50	ug/L	13-MAR-20	0.8
1,1,1-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
1,1,2-Trichloroethane	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichloroethylene	<0.50		0.50	ug/L	13-MAR-20	0.5
Trichlorofluoromethane	<5.0		5.0	ug/L	13-MAR-20	150
Vinyl chloride	<0.50		0.50	ug/L	13-MAR-20	0.5
o-Xylene	<0.30		0.30	ug/L	13-MAR-20	
m+p-Xylenes	<0.40		0.40	ug/L	13-MAR-20	
Xylenes (Total)	<0.50		0.50	ug/L	13-MAR-20	72
Surrogate: 4-Bromofluorobenzene	98.5		70-130	%	13-MAR-20	
Surrogate: 1,4-Difluorobenzene	101.4		70-130	%	13-MAR-20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

T1-Ground Water-All Types of Property Uses

#1: T1-Ground Water-All Types of Property Uses

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
VOC-1,3-DCP-CALC-WT	Water	Regulation 153 VOCs	SW8260B/SW8270C
VOC-511-HS-WT	Water	VOC by GCMS HS O.Reg 153/04 (July 2011)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

*** ALS test methods may incorporate modifications from specified reference methods to improve performance.

Chain of Custody numbers:

17-795252

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2426955 Report Date: 13-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5023926								
WG3290969-4 DUP		**WG3290969-3**						
1,1,1,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,1,1-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,1,2-Trichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,1-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,1-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,2-Dibromoethane		<0.20	<0.20	RPD-NA	ug/L	N/A	30	13-MAR-20
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,2-Dichloropropane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,3-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Acetone		<30	<30	RPD-NA	ug/L	N/A	30	13-MAR-20
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-MAR-20
Bromoform		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-MAR-20
Bromomethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	13-MAR-20
Chlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	13-MAR-20
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
cis-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-MAR-20
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-MAR-20
Dichlorodifluoromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-MAR-20
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
n-Hexane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	13-MAR-20
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	13-MAR-20
Methyl Isobutyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	13-MAR-20
Methylene Chloride		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-MAR-20
MTBE		<2.0	<2.0	RPD-NA	ug/L	N/A	30	13-MAR-20
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-MAR-20
Styrene		<0.50	<0.50		ug/L			13-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5023926								
WG3290969-4 DUP		**WG3290969-3**						
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
trans-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	13-MAR-20
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
Trichlorofluoromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	13-MAR-20
Vinyl chloride		<0.50	<0.50	RPD-NA	ug/L	N/A	30	13-MAR-20
WG3290969-1 LCS								
1,1,1,2-Tetrachloroethane			89.0		%		70-130	12-MAR-20
1,1,2,2-Tetrachloroethane			83.9		%		70-130	12-MAR-20
1,1,1-Trichloroethane			88.5		%		70-130	12-MAR-20
1,1,2-Trichloroethane			87.1		%		70-130	12-MAR-20
1,1-Dichloroethane			85.8		%		70-130	12-MAR-20
1,1-Dichloroethylene			81.3		%		70-130	12-MAR-20
1,2-Dibromoethane			88.1		%		70-130	12-MAR-20
1,2-Dichlorobenzene			90.0		%		70-130	12-MAR-20
1,2-Dichloroethane			86.1		%		70-130	12-MAR-20
1,2-Dichloropropane			84.6		%		70-130	12-MAR-20
1,3-Dichlorobenzene			91.0		%		70-130	12-MAR-20
1,4-Dichlorobenzene			90.6		%		70-130	12-MAR-20
Acetone			82.7		%		60-140	12-MAR-20
Benzene			86.5		%		70-130	12-MAR-20
Bromodichloromethane			88.9		%		70-130	12-MAR-20
Bromoform			88.2		%		70-130	12-MAR-20
Bromomethane			76.7		%		60-140	12-MAR-20
Carbon tetrachloride			91.4		%		70-130	12-MAR-20
Chlorobenzene			88.8		%		70-130	12-MAR-20
Chloroform			88.9		%		70-130	12-MAR-20
cis-1,2-Dichloroethylene			85.6		%		70-130	12-MAR-20
cis-1,3-Dichloropropene			84.0		%		70-130	12-MAR-20
Dibromochloromethane			87.3		%		70-130	12-MAR-20
Dichlorodifluoromethane			101.2		%		50-140	12-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5023926								
WG3290969-1 LCS								
Ethylbenzene			85.8		%		70-130	12-MAR-20
n-Hexane			78.8		%		70-130	12-MAR-20
m+p-Xylenes			86.2		%		70-130	12-MAR-20
Methyl Ethyl Ketone			66.4		%		60-140	12-MAR-20
Methyl Isobutyl Ketone			78.5		%		60-140	12-MAR-20
Methylene Chloride			88.5		%		70-130	12-MAR-20
MTBE			90.4		%		70-130	12-MAR-20
o-Xylene			93.8		%		70-130	12-MAR-20
Styrene			82.6		%		70-130	12-MAR-20
Tetrachloroethylene			88.7		%		70-130	12-MAR-20
Toluene			87.0		%		70-130	12-MAR-20
trans-1,2-Dichloroethylene			81.5		%		70-130	12-MAR-20
trans-1,3-Dichloropropene			85.1		%		70-130	12-MAR-20
Trichloroethylene			88.5		%		70-130	12-MAR-20
Trichlorofluoromethane			88.0		%		60-140	12-MAR-20
Vinyl chloride			101.9		%		60-140	12-MAR-20
WG3290969-2 MB								
1,1,1,2-Tetrachloroethane			<0.50		ug/L		0.5	13-MAR-20
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	13-MAR-20
1,1,1-Trichloroethane			<0.50		ug/L		0.5	13-MAR-20
1,1,2-Trichloroethane			<0.50		ug/L		0.5	13-MAR-20
1,1-Dichloroethane			<0.50		ug/L		0.5	13-MAR-20
1,1-Dichloroethylene			<0.50		ug/L		0.5	13-MAR-20
1,2-Dibromoethane			<0.20		ug/L		0.2	13-MAR-20
1,2-Dichlorobenzene			<0.50		ug/L		0.5	13-MAR-20
1,2-Dichloroethane			<0.50		ug/L		0.5	13-MAR-20
1,2-Dichloropropane			<0.50		ug/L		0.5	13-MAR-20
1,3-Dichlorobenzene			<0.50		ug/L		0.5	13-MAR-20
1,4-Dichlorobenzene			<0.50		ug/L		0.5	13-MAR-20
Acetone			<30		ug/L		30	13-MAR-20
Benzene			<0.50		ug/L		0.5	13-MAR-20
Bromodichloromethane			<2.0		ug/L		2	13-MAR-20
Bromoform			<5.0		ug/L		5	13-MAR-20
Bromomethane			<0.50		ug/L		0.5	13-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5023926								
WG3290969-2 MB								
Carbon tetrachloride			<0.20		ug/L		0.2	13-MAR-20
Chlorobenzene			<0.50		ug/L		0.5	13-MAR-20
Chloroform			<1.0		ug/L		1	13-MAR-20
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	13-MAR-20
cis-1,3-Dichloropropene			<0.30		ug/L		0.3	13-MAR-20
Dibromochloromethane			<2.0		ug/L		2	13-MAR-20
Dichlorodifluoromethane			<2.0		ug/L		2	13-MAR-20
Ethylbenzene			<0.50		ug/L		0.5	13-MAR-20
n-Hexane			<0.50		ug/L		0.5	13-MAR-20
m+p-Xylenes			<0.40		ug/L		0.4	13-MAR-20
Methyl Ethyl Ketone			<20		ug/L		20	13-MAR-20
Methyl Isobutyl Ketone			<20		ug/L		20	13-MAR-20
Methylene Chloride			<5.0		ug/L		5	13-MAR-20
MTBE			<2.0		ug/L		2	13-MAR-20
o-Xylene			<0.30		ug/L		0.3	13-MAR-20
Styrene			<0.50		ug/L		0.5	13-MAR-20
Tetrachloroethylene			<0.50		ug/L		0.5	13-MAR-20
Toluene			<0.50		ug/L		0.5	13-MAR-20
trans-1,2-Dichloroethylene			<0.50		ug/L		0.5	13-MAR-20
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	13-MAR-20
Trichloroethylene			<0.50		ug/L		0.5	13-MAR-20
Trichlorofluoromethane			<5.0		ug/L		5	13-MAR-20
Vinyl chloride			<0.50		ug/L		0.5	13-MAR-20
Surrogate: 1,4-Difluorobenzene			100.5		%		70-130	13-MAR-20
Surrogate: 4-Bromofluorobenzene			98.1		%		70-130	13-MAR-20
WG3290969-5 MS		**WG3290969-3**						
1,1,1,2-Tetrachloroethane			88.8		%		50-140	13-MAR-20
1,1,2,2-Tetrachloroethane			80.2		%		50-140	13-MAR-20
1,1,1-Trichloroethane			89.2		%		50-140	13-MAR-20
1,1,2-Trichloroethane			85.4		%		50-140	13-MAR-20
1,1-Dichloroethane			85.9		%		50-140	13-MAR-20
1,1-Dichloroethylene			81.7		%		50-140	13-MAR-20
1,2-Dibromoethane			85.8		%		50-140	13-MAR-20
1,2-Dichlorobenzene			90.7		%		50-140	13-MAR-20

Quality Control Report

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-511-HS-WT	**Water**							
Batch R5023926								
WG3290969-5 MS		**WG3290969-3**						
1,2-Dichloroethane			84.7		%		50-140	13-MAR-20
1,2-Dichloropropane			83.9		%		50-140	13-MAR-20
1,3-Dichlorobenzene			93.3		%		50-140	13-MAR-20
1,4-Dichlorobenzene			92.5		%		50-140	13-MAR-20
Acetone			78.8		%		50-140	13-MAR-20
Benzene			86.7		%		50-140	13-MAR-20
Bromodichloromethane			87.6		%		50-140	13-MAR-20
Bromoform			84.9		%		50-140	13-MAR-20
Bromomethane			73.7		%		50-140	13-MAR-20
Carbon tetrachloride			92.5		%		50-140	13-MAR-20
Chlorobenzene			88.6		%		50-140	13-MAR-20
Chloroform			88.3		%		50-140	13-MAR-20
cis-1,2-Dichloroethylene			84.9		%		50-140	13-MAR-20
cis-1,3-Dichloropropene			81.0		%		50-140	13-MAR-20
Dibromochloromethane			85.7		%		50-140	13-MAR-20
Dichlorodifluoromethane			98.8		%		50-140	13-MAR-20
Ethylbenzene			86.5		%		50-140	13-MAR-20
n-Hexane			79.4		%		50-140	13-MAR-20
m+p-Xylenes			87.2		%		50-140	13-MAR-20
Methyl Ethyl Ketone			59.7		%		50-140	13-MAR-20
Methyl Isobutyl Ketone			75.0		%		50-140	13-MAR-20
Methylene Chloride			87.1		%		50-140	13-MAR-20
MTBE			90.7		%		50-140	13-MAR-20
o-Xylene			94.0		%		50-140	13-MAR-20
Styrene			82.0		%		50-140	13-MAR-20
Tetrachloroethylene			90.3		%		50-140	13-MAR-20
Toluene			87.9		%		50-140	13-MAR-20
trans-1,2-Dichloroethylene			82.0		%		50-140	13-MAR-20
trans-1,3-Dichloropropene			81.1		%		50-140	13-MAR-20
Trichloroethylene			88.9		%		50-140	13-MAR-20
Trichlorofluoromethane			88.7		%		50-140	13-MAR-20
Vinyl chloride			101.3		%		50-140	13-MAR-20

Quality Control Report

Workorder: L2426955 Report Date: 13-MAR-20

Client: CH2M HILL CANADA LIMITED
72 VICTORIA ST S, SUITE 300
KITCHENER ON N2G 4Y9
Contact: Michael Shiry

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2426955-COFC

COC Number: 17 - 795252

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / D	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company	Jacobs	Select Report Format: X PDF X EXCEL X CDD (DIGITAL)	Regular [R] X Standard TAT if received by 3 pm - business days - no surcharges apply
Contact	Michael Shiry	Quality Control (QC) Report with Report X YES | NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	519-571-3580	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E - 100%] ☐ / Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: X EMAIL | MAIL | FAX	
Street:	72 Victoria St S Suite 300	Email 1 or Fax michael.shiry@jacobs.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh mm
City/Province:	Kitchener, ON	Email 2 ed.faves@jacobs.com	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	N2G 4Y9	Email 3 todd.mccarthy@jacobs.com	
Invoice To	Same as Report To X YES | NO	Invoice Distribution	Analysis Request
	Copy of Invoice with Report X YES | NO	Select Invoice Distribution: X EMAIL ☐ MAIL ☐ FAX	
Company:	Jacobs Accounts Payable	Email 1 or Fax	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #	Q75533	AFE/Cost Center:	PO#
Job #:	69475TCH	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only):	L2426955	ALS Contact: E. Hansen	Sampler: V. Peters

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	P	VOCs	SAMPLES ON HOLD	SUSPECTED HAZARD (see Special Instructions)
	MW19-1375	11-03-20	8:45	water	2	X			
	MW16-1135	"	12:20	"	2	"			
	MW18-1145	"	10:45	"	2	"			
	MW18-1155	"	10:05	"	2	"			
	MW18-1175	"	11:25	"	2	"			
	MW18-1245	"	9:30	"	2	"			
	DUP1	11-03-20	—	water	2	"			
	TB-001	—	—	QC	2	X			

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? | YES X NO	O.Reg. 153/04 Table 1
Are samples for human consumption/ use? | YES X NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			6.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
V. Peters	2020/03/11	15:30				AM	Mar 11/20	15:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1 If drinking water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Appendix E
List of Supporting Documents

APPENDIX E

List of Supporting Documents

AECOM Canada Limited (AECOM). 2012. *2010 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. April 23.

AECOM Canada Limited (AECOM). 2013. *2011 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. August 15.

AECOM Canada Limited (AECOM). 2014. *2012 & 2013 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. March 21.

AECOM Canada Limited (AECOM). 2015. *2014 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. April 30.

AECOM Canada Limited (AECOM). 2016. *2015 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. January 31.

AECOM Canada Limited (AECOM). 2017. *2016 Annual Groundwater Monitoring Report, Former IMICO Site, 200 Beverly Street, Guelph, Ontario*. Prepared for the City of Guelph. June 26.

CH2M HILL Canada Limited (CH2M). 2017. *Phase One Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph Ontario*. Prepared for City of Guelph. August 18.

Decommissioning Consulting Services Limited (DCS). 2007a. *Phase I Environmental Site Assessment, Former IMICO Property, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. December 20.

Decommissioning Consulting Services Limited (DCS). 2007b. *Phase II Environmental Site Assessment, Former IMICO Property, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. December 21.

Decommissioning Consulting Services Limited (DCS). 2014a. *Phase One Environmental Site Assessment, Former IMICO Property, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. February 11.

Decommissioning Consulting Services Limited (DCS). 2014b. *Phase Two Environmental Site Assessment, Former IMICO Property, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. April 2.

Decommissioning Consulting Services Limited (DCS). 2014c. *Preliminary Remedial Action Plan, Former IMICO Property, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. April 14.

Earth Tech (Canada) Inc. (Earth Tech). 1999. *City of Guelph, Former IMICO Facility Demolition and Waste Removal Report*. Prepared for the City of Guelph Work Department, Engineering Services Division. October 7.

Gartner Lee Limited (GLL). 1999. *Supplemental Hydrogeological Investigation Former IMICO Site. Prepared for the City of Guelph*. March 8.

Gartner Lee Limited (GLL). 2004. *Contaminant Investigation 490 York Road, Guelph, Ontario*. Prepared for the City of Guelph. May 12.

Jacobs Engineering Group Inc. (Jacobs). 2020. *Phase Two Environmental Site Assessment, Former International Malleable Iron Company, 200 Beverley Street, Guelph, Ontario*. Draft. Prepared for the City of Guelph.

Proctor & Redfern Limited (P&R). 1991. *Environmental Investigation, International Malleable Iron Company, 200 Beverley Street, Guelph Ontario*. Prepared for the Bank of Montreal. June 10.

WSP Canada Inc. (WSP). 2016. *Vertical Delineation of the Extent of Groundwater Impacts at the Former IMICO Site, 200 Beverley Street, Guelph, Ontario*. Prepared for the City of Guelph. December 8.

Appendix F
Screening Tables

Appendix F1
Screening Tables

Table F1-1. Summary of COC Screening in Soil
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration b	Units	Applicable SCS [c]	Other Screening Value [d,e]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
2-(1-)Methylnaphthalene	54	86	4.93	0.5	4.93	µg/g	0.99	--	9	--	Yes, included (Max > Table 6 SCS)
Acenaphthene	89	125	94	0.63	94	µg/g	7.9	--	1	--	Yes, included (Max > Table 6 SCS)
Acenaphthylene	89	125	1	2	2	µg/g	0.15	--	6	13	Yes, included (Max > Table 6 SCS)
Anthracene	89	125	160	0.5	160	µg/g	0.67	--	9	--	Yes, included (Max > Table 6 SCS)
Antimony	116	194	18.6	2	18.6	µg/g	7.5	--	3	--	Yes, included (Max > Table 6 SCS)
Arsenic	101	179	23	--	23	µg/g	18	--	3	--	Yes, included (Max > Table 6 SCS)
Benzene	90	146	0.26	0.1	0.26	µg/g	0.21	--	3	--	Yes, included (Max > Table 6 SCS)
Benzo(a)anthracene	89	125	200	0.5	200	µg/g	0.5	--	21	--	Yes, included (Max > Table 6 SCS)
Benzo(a)pyrene	89	125	130	0.5	130	µg/g	0.3	--	26	7	Yes, included (Max > Table 6 SCS)
Benzo(b)fluoranthene	89	125	190	0.5	190	µg/g	0.78	--	16	--	Yes, included (Max > Table 6 SCS)
Benzo(g,h,i)perylene	89	125	70	0.5	70	µg/g	6.6	--	4	--	Yes, included (Max > Table 6 SCS)
Benzo(k)fluoranthene	89	125	66	0.5	66	µg/g	0.78	--	11	--	Yes, included (Max > Table 6 SCS)
Bismuth	61	103	150	1	150	µg/g	--	--	--	--	Yes, included (no standard available; detected results)
Cadmium	143	229	83.4	0.5	83.4	µg/g	1.2	--	68	--	Yes, included (Max > Table 6 SCS)
Calcium	89	135	220000	--	220000	µg/g	--	54000	80	--	Yes, included (Max > OTR value)
Chrysene	89	125	180	0.5	180	µg/g	7	--	5	--	Yes, included (Max > Table 6 SCS)
Cobalt	143	228	393	2	393	µg/g	22	--	2	--	Yes, included (Max > Table 6 SCS)
Copper	143	228	2460	--	2460	µg/g	140	--	6	--	Yes, included (Max > Table 6 SCS)
Dibenzo(a,h)anthracene	89	125	26	0.5	26	µg/g	0.1	--	21	13	Yes, included (Max > Table 6 SCS)
Electrical Conductivity	71	101	2.19	--	2.19	mS/cm	0.7	--	3	--	Yes, included (Max > Table 6 SCS; Retained for Ecological Health)[f]
Ethylbenzene	90	146	4.1	0.05	4.1	µg/g	1.1	--	1	--	Yes, included (Max > Table 6 SCS)
Fluoranthene	89	125	660	0.5	660	µg/g	0.69	--	24	--	Yes, included (Max > Table 6 SCS)
Fluorene	89	125	150	0.63	150	µg/g	62	--	1	--	Yes, included (Max > Table 6 SCS)
Indeno(1,2,3-Cd)Pyrene	89	125	80	0.5	80	µg/g	0.38	--	20	7	Yes, included (Max > Table 6 SCS)
Iron	89	135	128000	--	128000	µg/g	--	38000	26	--	Yes, included (Max > OTR value)
Lead	143	231	10100	--	10100	µg/g	120	--	76	--	Yes, included (Max > Table 6 SCS)
Magnesium	89	135	120000	--	120000	µg/g	--	17000	85	--	Yes, included (Max > OTR value)
Mercury	79	111	0.319	0.05	0.319	µg/g	0.27	--	1	--	Yes, included (Max > Table 6 SCS)
Molybdenum	140	229	35	3	35	µg/g	6.9	--	9	--	Yes, included (Max > Table 6 SCS)
Naphthalene	89	125	220	0.25	220	µg/g	0.6	--	11	--	Yes, included (Max > Table 6 SCS)
Nickel	143	228	117	2	117	µg/g	100	--	1	--	Yes, included (Max > Table 6 SCS)
PCB, Total	53	72	1.65	0.05	1.65	µg/g	0.35	--	6	--	Yes, included (Max > Table 6 SCS)
Petroleum Hydrocarbons F2 (C10-C16)	90	130	3600	50	3600	µg/g	98	--	4	--	Yes, included (Max > Table 6 SCS)
Petroleum Hydrocarbons F3 (C16-C34)	90	130	23000	50	23000	µg/g	300	--	27	--	Yes, included (Max > Table 6 SCS)
Petroleum Hydrocarbons F4 (C34-C50)	90	130	7300	50	7300	µg/g	2800	--	1	--	Yes, included (Max > Table 6 SCS)
Phenanthrene	89	125	900	0.46	900	µg/g	6.2	--	3	--	Yes, included (Max > Table 6 SCS)
Pyrene	89	125	470	0.5	470	µg/g	78	--	1	--	Yes, included (Max > Table 6 SCS)
Thallium	123	205	6	2	6	µg/g	1	--	4	23	Yes, included (Max > Table 6 SCS)
Trichloroethylene	79	126	35.4	0.05	35.4	µg/g	0.061	--	12	--	Yes, included (Max > Table 6 SCS)
Vanadium	136	221	100	0.3	100	µg/g	86	--	1	--	Yes, included (Max > Table 6 SCS)
Xylenes, Total	90	147	3.9	0.07	3.9	µg/g	3.1	--	1	--	Yes, included (Max > Table 6 SCS)
Zinc	143	230	67200	--	67200	µg/g	340	--	139	--	Yes, included (Max > Table 6 SCS)
1,1,1,2-Tetrachloroethane	79	126	--	0.05	0.05	µg/g	0.058	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1,1-Trichloroethane	79	126	0.01	0.05	0.05	µg/g	0.38	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1,2,2-Tetrachloroethane	79	125	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1,2-Trichloroethane	50	86	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1'-Biphenyl	13	21	0.237	0.25	0.25	µg/g	0.31	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1-Dichloroethane	79	126	--	0.05	0.05	µg/g	0.47	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1-Dichloroethene	79	126	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2,4-Trichlorobenzene	48	67	--	0.25	0.25	µg/g	0.36	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dibromoethane	79	126	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichlorobenzene	79	126	--	0.05	0.05	µg/g	1.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloroethane	79	126	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloropropane	79	126	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,3-Dichlorobenzene	79	126	--	0.05	0.05	µg/g	4.8	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,3-Dichloropropene	79	127	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,4-Dichlorobenzene	79	126	--	0.05	0.05	µg/g	0.083	--	--	--	No, excluded (Max < or = Table 6 SCS)

Table F1-1. Summary of COC Screening in Soil
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration b	Units	Applicable SCS [c]	Other Screening Value [d,e]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
1,4-Dioxane	2	3	--	0.2	0.2	µg/g	1.8	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4 & 2,6-Dinitrotoluene	19	21	--	0.35	0.35	µg/g	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4,5-Trichlorophenol	13	23	--	1.3	1.3	µg/g	4.4	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4,6-Trichlorophenol	13	23	--	1.3	1.3	µg/g	2.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dichlorophenol	13	16	--	0.1	0.1	µg/g	0.19	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dimethylphenol	13	23	--	1.3	1.3	µg/g	38	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dinitrophenol	13	16	--	1	1	µg/g	2	--	--	--	No, excluded (Max < or = Table 6 SCS)
2-Chloronaphthalene	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
2-Chlorophenol	13	23	--	1.3	1.3	µg/g	1.6	--	--	--	No, excluded (Max < or = Table 6 SCS)
2-Hexanone	29	40	--	0.47	0.47	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
3,3'-Dichlorobenzidine	19	21	--	0.5	0.5	µg/g	1	--	--	--	No, excluded (Max < or = Table 6 SCS)
4-Bromophenyl Phenyl Ether	6	6	--	0.5	0.5	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
4-Chloroaniline	13	21	--	0.5	0.5	µg/g	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
4-Chlorophenyl Phenylether	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
4-Methyl-2-Pentanone	50	86	--	0.5	0.5	µg/g	1.7	--	--	--	No, excluded (Max < or = Table 6 SCS)
Acetone	79	126	0.68	1	1	µg/g	16	--	--	--	No, excluded (Max < or = Table 6 SCS)
Aluminum	37	43	16000	--	16000	µg/g	--	29000	--	--	No, excluded (Max < or = OTR value)
Barium	136	221	277	--	277	µg/g	390	--	--	--	No, excluded (Max < or = Table 6 SCS)
Beryllium	137	222	4	2	4	µg/g	4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bis (2-chloroethoxy) methane	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Bis (2-chloroethyl) ether	19	27	--	0.5	0.5	µg/g	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
bis (2-Chloroisopropyl) ether	19	29	--	0.5	0.5	µg/g	0.67	NA	--	2	No, excluded (Max < or = Table 6 SCS)
Bis (2-ethylhexyl) phthalate	19	29	--	1.3	1.3	µg/g	5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Boron	64	105	23	100	100	µg/g	120	--	--	--	No, excluded (Max < or = Table 6 SCS)
Boron (HWS)	35	63	0.87	0.1	0.87	µg/g	1.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromodichloromethane	79	125	--	0.05	0.05	µg/g	1.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromoform	79	126	--	0.05	0.05	µg/g	0.27	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromomethane	79	125	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
Butyl benzyl phthalate	6	6	--	0.5	0.5	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Carbon tetrachloride	79	126	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloride (Cl)	17	19	122	--	122	µg/g	--	200	--	--	No, excluded (Max < or = OTR value)
Chlorobenzene	79	126	--	0.05	0.05	µg/g	2.4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chlorodibromomethane	50	86	--	0.05	0.05	µg/g	2.3	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloroethane	29	40	--	0.08	0.08	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Chloroform	79	125	--	0.05	0.05	µg/g	0.05	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloromethane	30	41	--	1	1	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Chromium	143	228	84.7	10	84.7	µg/g	160	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chromium, Hexavalent (Cr6+)	77	83	0.32	0.4	0.4	µg/g	8	--	--	--	No, excluded (Max < or = Table 6 SCS)
cis-1,2-Dichloroethene	79	126	--	0.05	0.05	µg/g	1.9	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cyanide	35	63	--	0.05	0.05	µg/g	0.051	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cyanide, Free	23	0	--	--	0	µg/g	0.051	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cyanide, Weak Acid Dissociable	35	63	--	0.05	0.05	µg/g	0.051	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dichlorodifluoromethane	50	86	--	0.05	0.05	µg/g	16	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dichloromethane	79	125	--	0.05	0.05	µg/g	0.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
Diethylphthalate	19	27	--	0.5	0.5	µg/g	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dimethylphthalate	19	21	--	0.5	0.5	µg/g	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Di-N-Butylphthalate	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Di-n-octyl phthalate	6	6	--	0.5	0.5	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Dioxins and Furans, Total (TEQ)	1	1	5.19	--	5.19	pg/g	13	--	--	--	No, excluded (Max < or = Table 6 SCS)
Hexachlorobenzene	6	6	--	0.5	0.5	µg/g	0.52	--	--	--	No, excluded (Max < or = Table 6 SCS)
Hexachlorobutadiene	6	0	--	--	0	µg/g	0.012	--	--	--	No, excluded (Max < or = Table 6 SCS)
Hexachlorocyclopentadiene	6	6	--	2	2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Hexachloroethane	6	0	--	--	0	µg/g	0.089	--	--	--	No, excluded (Max < or = Table 6 SCS)
Isophorone	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Manganese	37	43	1810	--	1810	µg/g	--	1800	--	--	No, excluded (Max < or = OTR value)
Methyl Ethyl Ketone	79	126	--	0.7	0.7	µg/g	16	--	--	--	No, excluded (Max < or = Table 6 SCS)
Methyl tert-butyl ether (MTBE)	79	126	--	0.06	0.06	µg/g	0.75	--	--	--	No, excluded (Max < or = Table 6 SCS)
n-Hexane	50	86	0.861	0.17	0.861	µg/g	2.8	--	--	--	No, excluded (Max < or = Table 6 SCS)

Table F1-1. Summary of COC Screening in Soil
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration b	Units	Applicable SCS [c]	Other Screening Value [d,e]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
Nitrobenzene	6	6	--	0.2	0.2	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
N-Nitrosodi-N-propylamine	6	6	--	1	1	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
N-Nitrosodiphenylamine	6	6	--	0.5	0.5	µg/g	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Pentachlorophenol	13	16	--	0.1	0.1	µg/g	0.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
Petroleum Hydrocarbons F1 (C6-C10)	79	111	36.6	20	36.6	µg/g	55	--	--	--	No, excluded (Max < or = Table 6 SCS)
Phenol	20	30	--	1.3	1.3	µg/g	9.4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Phosphorus	37	41	830	20	830	µg/g	--	1600	--	--	No, excluded (Max < or = OTR value)
Potassium	37	43	2000	--	2000	µg/g	--	6000	--	--	No, excluded (Max < or = OTR value)
Selenium	116	192	1.9	1	1.9	µg/g	2.4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Silver	143	228	7.8	2	7.8	µg/g	20	--	--	--	No, excluded (Max < or = Table 6 SCS)
Sodium	72	96	210	100	210	µg/g	--	220	--	--	No, excluded (Max < or = OTR value)
Sodium Absorption Ratio	52	82	2	0.23	2	SAR	5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Strontium	37	36	78.1	--	78.1	µg/g	--	87	--	--	No, excluded (Max < or = OTR value)
Styrene	79	126	--	0.05	0.05	µg/g	0.7	--	--	--	No, excluded (Max < or = Table 6 SCS)
Tetrachloroethene	79	126	--	0.05	0.05	µg/g	0.28	--	--	--	No, excluded (Max < or = Table 6 SCS)
Tin	10	12	9.6	5	9.6	µg/g	--	5 - 9.2 [e]	--	--	No, excluded (Max Considered within Background Range) [e]
Titanium	27	31	532	--	532	µg/g	--	5400	--	--	No, excluded (Max < or = OTR value)
Toluene	90	146	1.2	0.08	1.2	µg/g	2.3	--	--	--	No, excluded (Max < or = Table 6 SCS)
trans-1,2-Dichloroethene	79	126	--	0.05	0.05	µg/g	0.084	--	--	--	No, excluded (Max < or = Table 6 SCS)
Trichlorofluoromethane	79	126	--	0.08	0.08	µg/g	4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Uranium	68	109	2.6	1	2.6	µg/g	23	--	--	--	No, excluded (Max < or = Table 6 SCS)
Vinyl Chloride	79	125	--	0.02	0.02	µg/g	0.02	--	--	--	No, excluded (Max < or = Table 6 SCS)
Zirconium	23	27	19	--	19	µg/g	--	230	--	--	No, excluded (Max < or = Background value)

Notes:

[a] The representative maximum concentration (the maximum concentration of similar analytes or total concentration of multiple isomers) is used for comparison.
[b] Column lists the greater of the maximum detected concentration and the maximum nondetect concentration.
[c] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils (MECP 2011).
[d] For aluminun, calcium, chloride, iron, magnesium, manganese, phosphorus, potasium, sodium, strontium, and titanium the Ontario Typical Ranges for an urban scenario are applied (MECP 2011). OTR values were adjusted to match the MECP derivation of the Table 1 Standards as presented on the "Background Calculations" tab of the MGRA (2016) and rounded to two significant figures per the rules applied in the MGRA. The value for zirconium is the average value reported by USGS.
U.S. Geological Survey. 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States.

[e] For tin, a range has been shown represented by the CCME agricultural value of 5 µg/g (CCME 2020) on the low end; the high end value of 9.2 µg/g is the 98th percentile value of tin based on a soil survey conducted in agricultural soils in Southern Ontario by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMFRA). These values represent the reasonable range of background tin concentrations that could be encountered in Ontario soils. The British Columbia Ministry of the Environment has derived a risk-based value for tin protective of human health of 25,000 µg/g and appears to have adopted the CCME value of 5 µg/g for the protection of ecological health. A search of soil screening values for ecological health on the Risk Assessment Information System (RAIS) website indicates that values between 7.62 µg/g and 2,000 µg/g are generally protective of ecological receptors (7.62 µg/g protective of mammals [masked shrew]; 50 µg/g protective of plants; 2,000 µg/g protective of soil microbes; 19 µg/g representing Dutch Background). Therefore, the CCME and background values are considered appropriate to use in the absence of MECP screening values for the selection of COCs. All tin concentrations measured onsite, apart from the maximum concentration are within the 5 to 9.2 µg/g range considered to be representative of "background". The maximum concentration of 9.6 µg/g is within the same order-of-magnitude as the "background" concentration range and could be within range if 20% analytical variability (a typical assumption) is considered. As such, tin was not retained as a COC for the Site.
Ontario Ministry of Agriculture, Food and Rural Affairs (OMFRA). 2005. Crop Advances: Field Project Reports, Volume 1. Field Crops Team, Crop Technology Branch, OMFRA.
British Columbia Ministry of the Environment. 1996. B.C. Reg. 375/96 - Contaminated Sites Regulation. Schedule 3.1, Parts 2 and 3
[f] Parameter is not applicable to human health.

Bold parameters are identified as COCs.

-- = no value or not applicable
< = less than
> = greater than
µg/g = microgram per gram
COC = contaminant of concern
F = fraction
Max = maximum concentration
OTR = Ontario Typical Range
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
NA = not available
No. = number
PCB = polychlorinated biphenyls
PHC = petroleum hydrocarbons
SCS = Site Condition Standard
MGRA = modified generic risk assessment model

Table F1-2. Summary of COC Screening in Groundwater
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration [b]	Units	Applicable SCS [c]	Other Screening Criteria [d]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects Exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
1,1,1-Trichloroethane	94	362	37.1	20	37.1	µg/L	23	--	4	--	**Yes, included (Max > Table 6 SCS)**
1,1-Dichloroethane	94	359	29.5	5	29.5	µg/L	5	--	12	--	**Yes, included (Max > Table 6 SCS)**
1,1-Dichloroethene	94	365	64	25	64	µg/L	0.5	--	42	11	**Yes, included (Max > Table 6 SCS)**
2-(1-)Methylnaphthalene	55	197	280	14	280	µg/L	3.2	--	5	2	**Yes, included (Max > Table 6 SCS)**
Acenaphthene	55	197	40	10	40	µg/L	4.1	--	3	2	**Yes, included (Max > Table 6 SCS)**
Anthracene	55	197	31	20	31	µg/L	1	--	5	2	**Yes, included (Max > Table 6 SCS)**
Arsenic	72	180	45.7	1	45.7	µg/L	25	--	4	--	**Yes, included (Max > Table 6 SCS)**
Benzene	94	371	66.8	5	66.8	µg/L	0.5	--	67	11	**Yes, included (Max > Table 6 SCS)**
Benzo(a)anthracene	55	197	21	5	21	µg/L	1	--	5	1	**Yes, included (Max > Table 6 SCS)**
Benzo(a)pyrene	55	195	2.4	2	2.4	µg/L	0.01	--	11	5	**Yes, included (Max > Table 6 SCS)**
Benzo(b&j)fluoranthene	55	192	6.1	10	10	µg/L	0.1	--	5	4	**Yes, included (Max > Table 6 SCS)**
Benzo(k)fluoranthene	55	195	0.06	10	10	µg/L	0.1	--	--	8	**Yes, included (Max > Table 6 SCS)**
Chrysene	55	197	38	10	38	µg/L	0.1	--	9	6	**Yes, included (Max > Table 6 SCS)**
cis-1,2-Dichloroethene	94	365	960	5	960	µg/L	1.6	--	139	6	**Yes, included (Max > Table 6 SCS)**
Ethylbenzene	94	371	8.46	5	8.46	µg/L	2.4	--	3	8	**Yes, included (Max > Table 6 SCS)**
Fluoranthene	55	197	24	20	24	µg/L	0.41	--	7	2	**Yes, included (Max > Table 6 SCS)**
Lead	70	175	17	0.5	17	µg/L	10	--	4	--	**Yes, included (Max > Table 6 SCS)**
Naphthalene	55	197	27	15	27	µg/L	7	--	1	2	**Yes, included (Max > Table 6 SCS)**
n-Hexane	94	313	7.46	5	7.46	µg/L	5	--	1	--	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F1 (C6-C10)	64	209	550	100	550	µg/L	420	--	4	--	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F2 (C10-C16)	64	210	210000	100	210000	µg/L	150	--	15	--	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F3 (C16-C34)	64	211	850000	500	850000	µg/L	500	--	19	--	**Yes, included (Max > Table 6 SCS)**
Petroleum Hydrocarbons F4 (C34-C50)	64	211	37000	500	37000	µg/L	500	--	8	--	**Yes, included (Max > Table 6 SCS)**
Phenanthrene	55	197	110	1.4	110	µg/L	1	--	9	1	**Yes, included (Max > Table 6 SCS)**
Pyrene	55	197	59	0.05	59	µg/L	4.1	--	6	--	**Yes, included (Max > Table 6 SCS)**
Tetrachloroethene	94	345	1.14	0.5	1.14	µg/L	0.5	--	6	--	**Yes, included (Max > Table 6 SCS)**
trans-1,2-Dichloroethene	94	365	81	5	81	µg/L	1.6	--	38	6	**Yes, included (Max > Table 6 SCS)**
Trichloroethylene	94	365	7900	5	7900	µg/L	0.5	--	119	10	**Yes, included (Max > Table 6 SCS)**
Vinyl Chloride	94	365	86	100	100 (990)[e]	µg/L	0.5	--	98	17	**Yes, included (Max > Table 6 SCS)**
Zinc	70	241	4500	10	4500	µg/L	890	--	53	--	**Yes, included (Max > Table 6 SCS)**
1,1,1,2-Tetrachloroethane	94	346	--	1	1	µg/L	1.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1,2,2-Tetrachloroethane	94	323	--	0.5	0.5	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1,2-Trichloroethane	94	317	--	0.5	0.5	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,1'-Biphenyl	25	46	--	0.4	0.4	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2,4-Trichlorobenzene	14	20	--	0.4	0.4	µg/L	3	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dibromoethane	94	304	--	0.2	0.2	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichlorobenzene	94	351	--	2	2	µg/L	3	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloroethane	94	325	--	0.5	0.5	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,2-Dichloropropane	94	345	--	0.5	0.5	µg/L	0.58	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,3-Dichlorobenzene	94	364	--	50	50	µg/L	59	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,3-Dichloropropene	94	250	--	0.5	0.5	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,4-Dichlorobenzene	94	325	--	0.5	0.5	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)
1,4-Dioxane	13	16	--	20	20	µg/L	50	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4 & 2,6-Dinitrotoluene	10	13	--	0.57	0.57	µg/L	5	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4,5-Trichlorophenol	10	13	--	0.2	0.2	µg/L	8.9	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4,6-Trichlorophenol	10	13	--	0.2	0.2	µg/L	2	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dichlorophenol	10	13	--	0.3	0.3	µg/L	20	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dimethylphenol	10	13	--	0.5	0.5	µg/L	59	--	--	--	No, excluded (Max < or = Table 6 SCS)
2,4-Dinitrophenol	10	13	--	1	1	µg/L	10	--	--	--	No, excluded (Max < or = Table 6 SCS)
2-Chlorophenol	10	13	--	0.3	0.3	µg/L	8.9	--	--	--	No, excluded (Max < or = Table 6 SCS)
2-Hexanone	7	7	--	0.3	0.3	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
3,3'-Dichlorobenzidine	10	13	--	0.4	0.4	µg/L	0.5	--	--	--	No, excluded (Max < or = Table 6 SCS)

Table F1-2. Summary of COC Screening in Groundwater
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration [b]	Units	Applicable SCS [c]	Other Screening Criteria [d]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects Exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
4-Chloroaniline	10	13	--	0.4	0.4	µg/L	10	--	--	--	No, excluded (Max < or = Table 6 SCS)
Acenaphthylene	55	191	0.553	0.5	0.553	µg/L	1	--	--	--	No, excluded (Max < or = Table 6 SCS)
Acetone	94	364	14	2500	2500	µg/L	2700	--	--	--	No, excluded (Max < or = Table 6 SCS)
Aluminum	1	1	--	5	5	µg/L	--	86.9	--	--	No, excluded (Max < or = PGMIS value)
Antimony	72	104	3.5	1	3.5	µg/L	6	--	--	--	No, excluded (Max < or = Table 6 SCS)
Barium	70	99	283	--	283	µg/L	1000	--	--	--	No, excluded (Max < or = Table 6 SCS)
Benzo(e)pyrene	15	15	0.065	5	5	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Benzo(g,h,i)perylene	55	189	0.1	0.1	0.1	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Beryllium	70	99	--	1	1	µg/L	4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bis (2-chloroethyl) ether	10	13	--	0.4	0.4	µg/L	5	--	--	--	No, excluded (Max < or = Table 6 SCS)
bis (2-Chloroisopropyl) ether	10	13	--	0.4	0.4	µg/L	120	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bis (2-ethylhexyl) phthalate	10	13	--	2	2	µg/L	10	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bismuth	1	1	--	0.05	0.05	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Boron	70	99	251	100	251	µg/L	5000	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromodichloromethane	94	359	7.3	5	7.3	µg/L	16	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromoform	94	355	--	5	5	µg/L	5	--	--	--	No, excluded (Max < or = Table 6 SCS)
Bromomethane	94	305	--	0.5	0.5	µg/L	0.89	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cadmium	70	99	1.33	0.5	1.33	µg/L	2.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
Carbon tetrachloride	94	315	--	0.2	0.2	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloride (Cl)	50	190	327000	2500	327000	µg/L	790000	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chlorobenzene	94	364	--	25	25	µg/L	30	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chlorodibromomethane	94	352	7.4	10	10	µg/L	25	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloroethane	29	104	--	50	50	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Chloroform	94	350	1.6	2	2	µg/L	2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chloromethane	29	104	--	130	130	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Chromium	70	99	13.3	5	13.3	µg/L	50	--	--	--	No, excluded (Max < or = Table 6 SCS)
Chromium, Hexavalent (Cr6+)	50	64	--	5	5	µg/L	25	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cobalt	70	97	2.29	1	2.29	µg/L	3.8	--	--	--	No, excluded (Max < or = Table 6 SCS)
Copper	70	156	14.4	20	20	µg/L	69	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cyanide	49	56	--	20	20	µg/L	52	--	--	--	No, excluded (Max < or = Table 6 SCS)
Cyanide, Free	7	7	--	2	2	µg/L	52	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dibenzo(a,h)anthracene	55	189	0.1	0.1	0.1	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dichlorodifluoromethane	94	321	--	250	250	µg/L	590	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dichloromethane	94	359	--	25	25	µg/L	26	--	--	--	No, excluded (Max < or = Table 6 SCS)
Diethylphthalate	10	13	--	0.2	0.2	µg/L	30	--	--	--	No, excluded (Max < or = Table 6 SCS)
Dimethylphthalate	10	13	--	0.2	0.2	µg/L	30	--	--	--	No, excluded (Max < or = Table 6 SCS)
Fluorene	55	197	83	50	83	µg/L	120	--	--	--	No, excluded (Max < or = Table 6 SCS)
Indeno(1,2,3-Cd)Pyrene	55	189	0.1	0.1	0.1	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Magnesium	28	134	46000	--	46000	µg/L	--	134000	--	--	No, excluded (Max < or = PGMIS value)
Mercury	50	64	--	0.02	0.02	µg/L	0.1	--	--	--	No, excluded (Max < or = Table 6 SCS)
Methyl Ethyl Ketone	94	364	--	1300	1300	µg/L	1800	--	--	--	No, excluded (Max < or = Table 6 SCS)
Methyl isobutyl ketone	94	352	--	250	250	µg/L	640	--	--	--	No, excluded (Max < or = Table 6 SCS)
Methyl tert-butyl ether (MTBE)	94	359	--	10	10	µg/L	15	--	--	--	No, excluded (Max < or = Table 6 SCS)
Molybdenum	70	99	52.4	0.5	52.4	µg/L	70	--	--	--	No, excluded (Max < or = Table 6 SCS)
Nickel	70	99	16.2	5	16.2	µg/L	100	--	--	--	No, excluded (Max < or = Table 6 SCS)
Nitrate, as NO3	34	141	1370	1000	1370	µg/L	--	10000	--	--	No, excluded (Max < or = PGMIS value)
Nitrite, as NO2	34	141	36	100	100	µg/L	--	1000	--	--	No, excluded (Max < or = PGMIS value)
PCB, Total	17	26	--	0.2	0.2	µg/L	0.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Pentachlorophenol	10	13	--	0.5	0.5	µg/L	30	--	--	--	No, excluded (Max < or = Table 6 SCS)
Perylene	15	15	--	5	5	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Phenol	10	13	--	0.5	0.5	µg/L	890	--	--	--	No, excluded (Max < or = Table 6 SCS)
Phosphorus	1	1	--	50	50	µg/L	--	7970	--	--	No, excluded (Max < or = PGMIS value)
Selenium	72	105	6.26	0.8	6.26	µg/L	10	--	--	--	No, excluded (Max < or = Table 6 SCS)

Table F1-2. Summary of COC Screening in Groundwater
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Contaminant [a]	No. of Stations	No. of Samples	Max Detected Concentration	Max Nondetect Concentration	Maximum Measured Concentration [b]	Units	Applicable SCS [c]	Other Screening Criteria [d]	No. of Detects Exceeding Table 6 SCS	No. of Nondetects Exceeding Table 6 SCS	Retained as a Contaminant for Risk Assessment? (Rationale)
Silver	70	99	--	0.5	0.5	µg/L	1.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Sodium	65	219	183000	5000	183000	µg/L	490000	--	--	--	No, excluded (Max < or = Table 6 SCS)
Strontium	1	1	1050	--	1050	µg/L	--	20200	--	--	No, excluded (Max < or = PGMIS value)
Styrene	94	355	--	5	5	µg/L	5.4	--	--	--	No, excluded (Max < or = Table 6 SCS)
Sulfate	28	134	910000	--	910000	µg/L	--	1070000	--	--	No, excluded (Max < or = PGMIS value)
Tellurium	1	1	--	0.2	0.2	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Thallium	70	99	0.984	0.3	0.984	µg/L	2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Thorium	1	1	--	0.1	0.1	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Titanium	1	1	--	0.3	0.3	µg/L	--	4.8	--	--	No, excluded (Max < or = PGMIS value)
Toluene	94	372	1.74	10	10	µg/L	24	--	--	--	No, excluded (Max < or = Table 6 SCS)
Trichlorofluoromethane	94	365	--	100	100	µg/L	150	--	--	--	No, excluded (Max < or = Table 6 SCS)
Tungsten	1	1	--	0.1	0.1	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)
Uranium	70	91	17	--	17	µg/L	20	--	--	--	No, excluded (Max < or = Table 6 SCS)
Vanadium	70	99	1.66	5	5	µg/L	6.2	--	--	--	No, excluded (Max < or = Table 6 SCS)
Xylenes, Total	94	371	38.6	5	38.6	µg/L	72	--	--	--	No, excluded (Max < or = Table 6 SCS)
Zirconium	1	1	--	0.3	0.3	µg/L	--	NA	--	--	No, excluded (no standard available; all results nondetect)

[a] The representative maximum concentration (the maximum concentration of similar analytes or total concentration of multiple isomers) is used for comparison.
[b] Column lists the greater of the maximum detected concentration or the maximum nondetect concentration.
[c] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils (MECP 2011).
[d] For nitrate, nitrite, sulfate, aluminum, magnesium, strontium, and titatnium, the Provincial Groundwater Monitoring Information System (PGMIS) is applied (MECP 2011).
[e] Value in brackets represents the theoretical maximum concentration of vinyl chloride. Refer to Table 4-7.
Notes:
Bold parameters are identified as COCs
-- = no value or not applicable
< = less than
> = greater than
µg/L = microgram(s) per litre
COC = contaminant of concern
F = fraction
INO = inorganic
MECP = Ontario Ministry of the Environment, Conservation and Parks
No. = number
PHC = petroleum hydrocarbon
SCS = Site Condition Standard

Table F1-3. Human Health Secondary Soil Screening
Table 2 S1 (Direct Contact) Component
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Units	Table 6 SCS [b]	Estimated Max Concentration	Human Health Component Values [c] Direct Contact (S1)	Included or Excluded for Quantitative Assessment of Direct Contact and Dust Inhalation in HHRA
2-(1-)Methylnaphthalene	µg/g	0.99	5.9	72	No, excluded (Est Max < or = S1)
Acenaphthene	µg/g	7.9	110	78	**Yes, included (Est Max > S1)**
Acenaphthylene	µg/g	0.15	2	7.8	No, excluded (Est Max < or = S1)
Anthracene	µg/g	0.67	190	5400	No, excluded (Est Max < or = S1)
Antimony	µg/g	7.5	22	7.5	**Yes, included (Est Max > S1)**
Arsenic	µg/g	18	27	0.95	**Yes, included (Est Max > S1)**
Benzene	µg/g	0.21	0.31	9.3	No, excluded (Est Max < or = S1)
Benzo(a)anthracene	µg/g	0.5	240	0.78	**Yes, included (Est Max > S1)**
Benzo(a)pyrene	µg/g	0.3	150	0.078	**Yes, included (Est Max > S1)**
Benzo(b)fluoranthene	µg/g	0.78	220	0.78	**Yes, included (Est Max > S1)**
Benzo(g,h,i)perylene	µg/g	6.6	84	7.8	**Yes, included (Est Max > S1)**
Benzo(k)fluoranthene	µg/g	0.78	79	0.78	**Yes, included (Est Max > S1)**
Bismuth	µg/g	--	180	--	**Yes, included (No Secondary Screening Value Available)**
Cadmium	µg/g	1.2	100	0.69	**Yes, included (Est Max > S1)**
Calcium	µg/g	--	260000	--	**Yes, included (No Secondary Screening Value Available)**
Chrysene	µg/g	7	210	7.8	**Yes, included (Est Max > S1)**
Cobalt	µg/g	22	470	22	**Yes, included (Est Max > S1)**
Copper	µg/g	140	2900	600	**Yes, included (Est Max > S1)**
Dibenzo(a,h)anthracene	µg/g	0.1	31	0.078	**Yes, included (Est Max > S1)**
Ethylbenzene	µg/g	1.1	4.9	2100	No, excluded (Est Max < or = S1)
Fluoranthene	µg/g	0.69	790	7.8	**Yes, included (Est Max > S1)**
Fluorene	µg/g	62	180	720	No, excluded (Est Max < or = S1)
Indeno(1,2,3-Cd)Pyrene	µg/g	0.38	96	0.78	**Yes, included (Est Max > S1)**
Iron	µg/g	--	150000	--	**Yes, included (No Secondary Screening Value Available)**
Lead	µg/g	120	12000	120	**Yes, included (Est Max > S1)**
Magnesium	µg/g	--	140000	--	**Yes, included (No Secondary Screening Value Available)**
Mercury	µg/g	0.27	0.38	9.8	No, excluded (Est Max < or = S1)
Molybdenum	µg/g	6.9	42	110	No, excluded (Est Max < or = S1)
Naphthalene	µg/g	0.6	260	360	No, excluded (Est Max < or = S1)
Nickel	µg/g	100	140	330	No, excluded (Est Max < or = S1)
PCB, Total	µg/g	0.35	1.9	0.35	**Yes, included (Est Max > S1)**
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	98	4300	3100	**Yes, included (Est Max > S1)**
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	300	27000	5800	**Yes, included (Est Max > S1)**
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	2800	8700	6100	**Yes, included (Est Max > S1)**
Phenanthrene	µg/g	6.2	1000	--	**Yes, included (No Secondary Screening Value Available)**
Pyrene	µg/g	78	560	78	**Yes, included (Est Max > S1)**
Thallium	µg/g	1	7.2	0.29	**Yes, included (Est Max > S1)**

Table F1-3. Human Health Secondary Soil Screening
Table 2 S1 (Direct Contact) Component
Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values [c]	
Parameter	**Units**	**Table 6 SCS [b]**	**Estimated Max Concentration**	**Direct Contact (S1)**	**Included or Excluded for Quantitative Assessment of Direct Contact and Dust Inhalation in HHRA**
Trichloroethylene	µg/g	0.061	42	31	**Yes, included (Est Max > S1)**
Vanadium	µg/g	86	120	39	**Yes, included (Est Max > S1)**
Xylenes, Total	µg/g	3.1	4.6	4200	No, excluded (Est Max < or = S1)
Zinc	µg/g	340	80000	5600	**Yes, included (Est Max > S1)**

Source:
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 15.

Notes:

[a] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and
[b] Estimated maximum concentration is the maximum detected concentration plus 20 percent, or the maximum detection limit.
[c] Human Health component values from the table entitled Soil Components Table 2: Full Depth, Potable Water Scenario for residential/parkland/institutional use and Coarse Textured Soils (MECP 2011).
Bold parameters are evaluated quantitatively.

-- = no value
< = less than
> = greater than
µg/g = microgram(s) per gram
atm-m^3/mol = atmosphere(s) per cubic metre per mol
COC = contaminant of concern
Est = estimated
F = fraction
H = Henry's Law Constant
MECP = Ontario Ministry of the Environment, Conservation and Parks
S1 = direct contact with soil
SCS = site condition standard
S-IA = Soil-to-Indoor Air
Torr = Torricelli

Table F1-4. Human Health Secondary Groundwater Screening
Table 2 GW1 (Direct Contact)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values	
COCs	**Units**	**Table 6 SCS [a]**	**Estimated Max Concentration [b]**	**Direct Contact (GW1) [c]**	**Included/Excluded for Quantitative Assessment in HHRA - Direct Contact**
1,1,1-Trichloroethane	µg/L	0.05	44	200	No, Excluded (Est Max < or = to GW1)
1,1-Dichloroethane	µg/L	5	35	5	**Yes, Included (Est Max > GW1)**
1,1-Dichloroethene	µg/L	0.5	76	14	**Yes, Included (Est Max > GW1)**
2-(1-)Methylnaphthalene	µg/L	3.2	330	12	**Yes, Included (Est Max > GW1)**
Acenaphthene	µg/L	4.1	48	4.1	**Yes, Included (Est Max > GW1)**
Anthracene	µg/L	0.003	37	890	No, Excluded (Est Max < or = to GW1)
Arsenic	µg/L	25	54	25	**Yes, Included (Est Max > GW1)**
Benzene	µg/L	0.5	80	5	**Yes, Included (Est Max > GW1)**
Benzo(a)anthracene	µg/L	1	25	1	**Yes, Included (Est Max > GW1)**
Benzo(a)pyrene	µg/L	0.01	2.8	0.01	**Yes, Included (Est Max > GW1)**
Benzo(b&j)fluoranthene	µg/L	0.1	10	0.1	**Yes, Included (Est Max > GW1)**
Benzo(k)fluoranthene	µg/L	0.1	10	0.1	**Yes, Included (Est Max > GW1)**
Chrysene	µg/L	0.1	45	0.1	**Yes, Included (Est Max > GW1)**
cis-1,2-Dichloroethene	µg/L	1.6	1100	20	**Yes, Included (Est Max > GW1)**
Ethylbenzene	µg/L	2.4	10	2.4	**Yes, Included (Est Max > GW1)**
Fluoranthene	µg/L	0.41	28	0.41	**Yes, Included (Est Max > GW1)**
Lead	µg/L	10	20	10	**Yes, Included (Est Max > GW1)**
Naphthalene	µg/L	0.003	32	59	No, Excluded (Est Max < or = to GW1)
n-Hexane	µg/L	5	8.9	--	**Yes, Included (No GW1 Component Available)**
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	20	660	820	No, Excluded (Est Max < or = to GW1)
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	150	250000	300	**Yes, Included (Est Max > GW1)**
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	500	1000000	1000	**Yes, Included (Est Max > GW1)**
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	500	44000	1100	**Yes, Included (Est Max > GW1)**
Phenanthrene	µg/L	1	130	1	**Yes, Included (Est Max > GW1)**
Pyrene	µg/L	4.1	70	4.1	**Yes, Included (Est Max > GW1)**

Table F1-4. Human Health Secondary Groundwater Screening
Table 2 GW1 (Direct Contact)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values	
COCs	**Units**	**Table 6 SCS [a]**	**Estimated Max Concentration [b]**	**Direct Contact (GW1) [c]**	**Included/Excluded for Quantitative Assessment in HHRA - Direct Contact**
Tetrachloroethene	µg/L	0.05	1.3	20	No, Excluded (Est Max < or = to GW1)
trans-1,2-Dichloroethene	µg/L	1.6	97	20	**Yes, Included (Est Max > GW1)**
Trichloroethylene	µg/L	0.5	9400	5	**Yes, Included (Est Max > GW1)**
Vinyl Chloride	µg/L	0.5	100 (990) [d]	2	**Yes, Included (Est Max > GW1)**
Zinc	µg/L	890	5400	5000	**Yes, Included (Est Max > GW1)**

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* April 15
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 15

Notes:

[a] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils
[b] Estimated maximum concentration is the maximum detected concentration plus 20 percent, or the maximum detection limit.
[c] Human Health component values from the table entitled Groundwater Components for Potable Water Scenario (MECP 2011b).
[d] Value in brackets represents the theoretical maximum concentration of vinyl chloride. Refer to Table 4-7.
Bold parameters retained for quantitative assessment in HHRA

-- = no value
< = less than
> = greater than
µg/L - microgram(s) per litre
atm-m^3/mol = atmosphere(s) per cubic metre per mol
COC = contaminant of concern
Est = estimated
F = fraction
GW1 = Groundwater Direct Contact
H = Henry's Law Constant
HHRA = human health risk assessment
m = metre
Max = maximum concentration
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
SCS = Site Condition Standards

Table F1-5a. Ecological Health Secondary Soil Screening
Table 2 S-GW3 (Soil to Groundwater to Surface Water) Component

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	S-GW3 [b]	Assessment	Site Specific S-GW3 [c]	Estimated Max > Site-specific S-GW3?
2-(1-)Methylnaphthalene	µg/g	5.9	0.99	76	Est Max < or = S-GW3	NA	No
Acenaphthene	µg/g	110	7.9	560	Est Max < or = S-GW3	NA	No
Acenaphthylene	µg/g	2	0.15	0.15	**Est Max > S-GW3**	1.6	**Yes**
Anthracene	µg/g	190	0.67	0.67	**Est Max > S-GW3**	5.6	**Yes**
Antimony	µg/g	22	7.5	--	No value	--	No value
Arsenic	µg/g	27	18	--	No value	--	No value
Benzene	µg/g	0.31	0.21	14	Est Max < or = S-GW3	NA	No
Benzo(a)anthracene	µg/g	240	0.5	5.1E+11	Est Max < or = S-GW3	NA	No
Benzo(a)pyrene	µg/g	150	0.3	3.8E+13	Est Max < or = S-GW3	NA	No
Benzo(b)fluoranthene	µg/g	220	0.78	7.7E+13	Est Max < or = S-GW3	NA	No
Benzo(g,h,i)perylene	µg/g	84	6.6	1.2E+13	Est Max < or = S-GW3	NA	No
Benzo(k)fluoranthene	µg/g	79	0.78	2.5E+13	Est Max < or = S-GW3	NA	No
Cadmium	µg/g	100	1.2	--	No value	--	No value
Chrysene	µg/g	210	7	3.6E+11	Est Max < or = S-GW3	NA	No
Cobalt	µg/g	470	22	--	No value	--	No value
Copper	µg/g	2900	140	--	No value	--	No value
Dibenzo(a,h)anthracene	µg/g	31	0.1	2.4E+13	Est Max < or = S-GW3	NA	No
Electrical Conductivity	mS/cm	2.6	0.7	--	No value	--	No value
Ethylbenzene	µg/g	4.9	1.1	17	Est Max < or = S-GW3	NA	No
Fluoranthene	µg/g	790	0.69	40000	Est Max < or = S-GW3	NA	No
Fluorene	µg/g	180	62	62	**Est Max > S-GW3**	640	No
Indeno(1,2,3-Cd)Pyrene	µg/g	96	0.38	8.6E+13	Est Max < or = S-GW3	NA	No
Lead	µg/g	12000	120	--	No value	--	No value
Mercury	µg/g	0.38	0.27	1.2E+14	Est Max < or = S-GW3	NA	No
Molybdenum	µg/g	42	6.9	--	No value	--	No value
Naphthalene	µg/g	260	0.6	200	**Est Max > S-GW3**	2200	No
Nickel	µg/g	140	100	--	No value	--	No value
PCB, Total	µg/g	1.9	0.35	9.9E+11	Est Max < or = S-GW3	NA	No
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	4300	98	230	**Est Max > S-GW3**	2500	**Yes**
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	27000	300	--	No value	--	No value
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	8700	2800	--	No value	--	No value
Phenanthrene	µg/g	1000	6.2	270	**Est Max > S-GW3**	2200	No
Pyrene	µg/g	560	78	2600	Est Max < or = S-GW3	NA	No
Thallium	µg/g	7.2	1	--	No value	--	No value

Table F1-5a. Ecological Health Secondary Soil Screening
Table 2 S-GW3 (Soil to Groundwater to Surface Water) Component

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	S-GW3 [b]	Assessment	Site Specific S-GW3 [c]	Estimated Max > Site-specific S-GW3?
Trichloroethylene	µg/g	42	0.061	300	Est Max < or = S-GW3	NA	No
Vanadium	µg/g	120	86	--	No value	--	No value
Xylenes, Total	µg/g	4.6	3.1	26	Est Max < or = S-GW3	NA	No
Zinc	µg/g	80000	340	--	No value	--	No value
Bismuth	µg/g	180	--	--	No value	--	No value
Calcium	µg/g	260000	--	--	No value	--	No value
Iron	µg/g	150000	--	--	No value	--	No value
Magnesium	µg/g	140000	--	--	No value	--	No value

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

Notes:

Bold parameters retained for further assessment in ERA

[a.] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured

[b.] Ecological component values from the table entitled Soil Components for Table 2 – Full Depth, Potable Water Scenario (Coarse Textured Soil, Residential/Parkland Land Use) (MECP,

[c.] Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. Modified Generic Risk Assessment Model. Calculated using the site-specific distance to the water body (500 metres). Refer to Appendix F1, Tables F1-5b, F1-5c, and F1-5d.

-- = no value
< = less than
= = equals
> = greater than
µg/g = microgram per gram
COC = contaminant of concern
ERA = Ecological Risk Assessment
Est Max = estimated maximum concentration
F = fraction
NA = not applicable
MECP = Ontario Ministry of the Environment, Conservation and Parks
mS/cm = milliSiemen per centimetre
SCS = Site Condition Standard
S-GW3 = Soil to Groundwater to Surface Water
PCB = polychlorinated biphenyl

Table F1-5b. MGRA Tier 2 Inputs - Groundwater - MECP Defaults - No Modifications

MGRA (Tier 2) Input

Site Descriptors (determines correct Table)

IMPORTANT - Ensure that "Analysis Tool Pak" and "Solver Add-in" are activated (Tools/Add-Ins...)

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Proposed Land Use	**Residential/Parkland/Institutional**
Site Soil Texture	**Coarse**
Is the ground water potable or non-potable?	**Potable**
Is this a stratified clean-up?	**Full Depth**
Is site within 30 m of surface water?	**More than 30 m to surface water**
Is the soil less than 2 m deep?	**More than 2 m**

Does Property Oversight

You Are Using

TIER 2 INPUT PARAMETERS	**Tier 2 Adjustable Values**			**Acceptable Tier 2 Lower Limit**	**Acceptable Tier 2 Upper Limit**
Distance from source centre to downgradient surface water body	**36.5**		**m**	36.5	5,000
SUBSURFACE PROPERTIES					
	Coarse Soil Setting	**Medium/Fine Soil Setting**			
Fraction of organic carbon (FOC) – water table to soil surface	**0.005**	**0.005**	**g/g**	0.0001	0.02
Fraction of organic carbon (FOC) – in upper 0.5 m	**0.01**	**0.035**	**g/g**	0.0001	0.57
Minimum depth below soil surface to the highest annual water table	**300**		**cm**	0.1	2000
Soil Type – vadose zone	**Generic Coarse**	**Generic Medium&Fine**	**NOTE :** Soil Type should normally be consistent with Site Soil Texture	From SCS table *	
Soil Type – capillary fringe	**Sand**	**Loam**		From SCS table *	
Number of frozen ground days per year	**100**		**days**	50	170
Aquifer horizontal hydraulic conductivity	**3.0E-05**		**m/sec**	1.00E-06	1.00E-03
Aquifer hydraulic gradient	**0.003**		**m/m**	0.0001	0.05
Aquifer dry bulk density	**1.81**		**g/cm^3**	1.4	2.00
Aquifer fraction organic carbon	**0.0003**		**g/g**	0.0002	0.01
Depth below soil surface to soil vapour measurement	**258**		**cm**	258	2000

Table F1-5c - MGRA Table of Drivers - Soil - MECP Defaults - No Modifications

Soil Components for Table 2 - Full Depth, Potable Water Scenario													
Coarse Textured Soil		**Residential /Parkland Land Use (ug/g)**											
	MOE	Mass.	Ont. Soil	Plants &	Mammals	Soil Contact	Soil Leaching		Indoor Air	Indoor Air	Outdoor Air	Free Phase	Soil Odour
Chemical Parameter	Soil RL	PQL	Bkgrd	Soil Org.	& Birds	S1 Risk	S-GW1	S-GW3	S-IA	Odour		Threshold	S-Nose
Acenaphthene	0.05		0.072		6600	78	21	560	7.9	3900	1300	2800	100
Acenaphthylene	0.05		0.093			7.8	2.3	0.15	0.45		96	2900	
Acetone	0.5		0.5		56	19000	320	16	720	4300	120000	92000	140
Aldrin	0.05		0.05	0.044	0.0024	0.56	31	150000		260000		5000	5200
Anthracene	0.05		0.16	2.5	38000	5400	15000	0.67				2700	
Antimony	1		1.3	20	25	7.5						8000	
Arsenic	1		18	20	51	0.95						12000	
Barium	5		220	750	390	3800						7700	
Benzene	0.02		0.02	25	370	9.3	0.92	14	0.21	820	17	5000	63
Benz[a]anthracene	0.05		0.36	0.5		0.78	190	5.1E+11	65		330	7600	
Benzo[a]pyrene	0.05		0.3	20	1600	0.078	6.6	3.8E+13	820		170	7600	
Benzo[b]fluoranthene	0.05		0.47			0.78	67	7.7E+13	5500		2000	7600	
Benzo[ghi]perylene	0.1		0.68	6.6		7.8	2200	1.2E+13				7600	
Benzo[k]fluoranthene	0.05		0.48	7.6		0.78	66	2.5E+13	6700		2100	7600	
Beryllium	2		2.5	4	13	38						3900	
Biphenyl 1,1'-	0.05		0.05			710	590	190		11		2600	0.31
Bis(2-chloroethyl)ether	0.5		0.5			0.32	0.0014	92		69		6400	1.9
Bis(2-chloroisopropyl)ether	0.5		0.5			840	12	120		18		11	0.67
Bis(2-ethylhexyl)phthalate	5		5	14	0.8	1100	830	2.5E+09				7100	
Boron (Hot Water Soluble)*	0.5		0.5	1.5								5000	
Boron (total)	5		36		120	4300						5000	
Bromodichloromethane	0.05		0.05			13	1.5	50				5500	
Bromoform	0.05		0.05			72	2.3	21		220		11000	5.4
Bromomethane	0.05		0.05			6.3	0.097	1.4	0.035	27	71	7300	6
Cadmium	1		1.2	12	1.9	0.69						18000	
Carbon Tetrachloride	0.05		0.05	5.8	7.6	15	0.51	2.3	0.013	470	30	3900	120
Chlordane	0.05		0.05	1.1	0.0085	0.59	510	180	7.6	5700	210	8400	110
Chloroaniline p-	0.5		0.5	20		38	0.66	0.45				6100	
Chlorobenzene	0.05		0.05	6		1300	8	2.4	91	78	8900	3700	3.7
Chloroform	0.05		0.05	34	81	310	2.3	9.5	3.1	1400	880	6600	260
Chlorophenol, 2-	0.1		0.1	1.6		63	3.7	21				130000	
Chromium Total	5		70	310	160	28000						11000	
Chromium VI	0.2		0.66	8	910	160							
Chrysene	0.05		2.8	7		7.8	20	3.6E+11	1900		6600	7700	
Cobalt	2		21	40	180	22						19000	
Copper	5		92	140	770	600							
Cyanide (CN-)	0.05		0.051	0.9	0.11	380	22	0.022				240000	
Dibenz[a h]anthracene	0.1		0.1			0.078	22	2.4E+13	33000		430	7600	
Dibromochloromethane	0.05		0.05			9.4	2.3	48				10000	
Dichlorobenzene, 1,2-	0.05		0.05	3.4		6300	1.2	60	35	160	9200	3100	6.1
Dichlorobenzene, 1,3-	0.05		0.05	4.8		420	24	59				3300	
Dichlorobenzene, 1,4-	0.05		0.05	3.6		47	0.4	59	0.083	22	18	3000	0.85
Dichlorobenzidine, 3,3'-	1		1			0.52	0.16	66				5000	
Dichlorodifluoromethane	0.05		0.05	40		4200	150	16				710	
DDD	0.05		0.05	6.8		3.3	1300	34000000				5000	
DDE	0.05		0.05	0.26		2.3	1300	310000000				5000	
DDT	0.05		1.4	1	0.0011	2.3	1800	730000000				5000	
Dichloroethane, 1,1-	0.05		0.05	8.4		840	0.47	1600	3.5	130	1500	4800	24
Dichloroethane, 1,2-	0.05		0.05	48	29	8.7	0.48	180	0.025	640	1.4	5300	45
Dichloroethylene, 1,1-	0.05		0.05	50	43	1000	1.3	11	0.004	180	1300	3900	44
Dichloroethylene, 1,2-cis-	0.05		0.05		84	630	1.9	130	3.4		1300	4600	
Dichloroethylene, 1,2-trans-	0.05		0.05		84	420	1.9	220	0.084	34	700	4600	8.5
Dichlorophenol, 2,4-	0.1		0.1	1.7		63	0.19	46				33000	
Dichloropropane, 1,2-	0.05		0.05	25		22	0.54	76	0.01	4.5	27	2100	0.34
Dichloropropene,1,3-	0.05		0.05	25		8.7	0.059	3.8	0.027	17	9	5000	1.2
Dieldrin	0.05		0.05	0.044	0.00096	0.94	3.1	0.11				8700	
Diethyl Phthalate	0.5		0.5	11	85	94000	2200	0.07				7600	
Dimethylphthalate	0.5		0.5	17		94000	1400	0.023				1800	
Dimethylphenol, 2,4-	0.2		0.2			420	38	390				57000	
Dinitrophenol, 2,4-	2		2			38	2	59				13000	
Dinitrotoluene, 2,4 & 2,6-	0.5		0.5			0.92	0.015	15				3800	
Dioxane, 1,4	0.2		0.2		1.8	72	7.5	810	180		57000	82000	
Dioxin/Furan (TEQ)		5.4E-07	0.000007		0.000013	0.000048	0.0018	780	0.0028		0.11	7000	
Endosulfan	0.04		0.04	0.15	0.023	38	110	0.46				8700	
Endrin	0.04		0.04	0.019	0.0011	4.7	18	0.071				5000	
Ethylbenzene	0.05		0.05	55	90	2100	1.1	17	2.1	100	7900	2700	5.2
Ethylene dibromide	0.05		0.05			0.22	0.0048	86	0.0014	1600	0.099	2000	51
Fluoranthene	0.05		0.56	50	0.69	7.8	24	40000	250		2500	7600	
Fluorene	0.05		0.12			720	1100	62				2800	
Heptachlor	0.05		0.05	0.2	3.9	0.15	66	1.8		19000		8300	370
Heptachlor Epoxide	0.05		0.05			0.11	6.6	0.0035		8800		5000	180
Hexachlorobenzene	0.01		0.01	100		0.52	2.9	14				9300	
Hexachlorobutadiene	0.01		0.01			7.1	0.52	1.6	0.012	210	2.8	8300	8.6
Hexachlorocyclohexane Gamma-	0.01		0.01	5.9		0.25	11	0.056				5000	
Hexachloroethane	0.01		0.01			21	0.49	22	0.089	51	54	9400	0.46
Hexane (n)	0.05		0.05					54	2.8		130000	1500	
Indeno[1 2 3-cd]pyrene	0.1		0.23	0.38		0.78	220	8.6E+13	46000		4000	7600	
Lead	10		120	250	32	120						24000	
Mercury	0.1		0.27	10	20	9.8	550	1.2E+14	0.25		36	34000	
Methoxychlor	0.05		0.05		0.13	0.38	32000	3.9				8000	
Methyl Ethyl Ketone	0.5		0.5	35	9900	13000	160	230	16	750	44000	26000	26
Methyl Isobutyl Ketone	0.5		0.5			21000	440	150	6.6	39	23000	5100	1.7
Methyl Mercury **				0.8	0.034	2	1	0.0084				1300000	

Soil Components for Table 2 - Full Depth, Potable Water Scenario													
Coarse Textured Soil		**Residential /Parkland Land Use (ug/g)**											
	MOE	Mass.	Ont. Soil	Plants &	Mammals	Soil Contact	Soil Leaching		Indoor Air	Indoor Air	Outdoor Air	Free Phase	Soil Odour
Chemical Parameter	Soil RL	PQL	Bkgrd	Soil Org.	& Birds	S1 Risk	S-GW1	S-GW3	S-IA	Odour		Threshold	S-Nose
Methyl tert-Butyl Ether (MTBE)	0.05		0.05	25		440	1.6	220	0.75		170	8000	
Methylene Chloride	0.05		0.05	0.78	350	110	4.8	7.4	0.1	670	2200	6400	150
Methlynaphthalene, 2-(1-) ***	0.05		0.59			72	30	76		34		3600	0.99
Molybdenum	2		2	40	6.9	110						22000	
Naphthalene	0.05		0.09	0.6	380	360	93	200	0.65	150	270	2800	4.5
Nickel	5		82	100	5000	330							
Pentachlorophenol	0.1		0.1	17	0.013	3.6	86	2.9				9200	
Petroleum Hydrocarbons F1****	10		25	210		6900	4100	55	130		26000	1700	
Aliphatic C6-C8						200000	150000	39	320		560000	1700	
Aliphatic C>8-C10						4100	20000	230	76		18000	1700	
Aromatic C>8-C10						1600	410	39	61		4900	2900	
Petroleum Hydrocarbons F2	10		10	150		3100	4300	230	98		25000	2700	
Aliphatic C>10-C12						4100	160000	3.9E+13	390		20000	1700	
Aliphatic C>12-C16						4100	3100000	8.5E+13	170		42000	6600	
Aromatic C>10-C12						1600	630	42	22		11000	2500	
Aromatic C>12-C16						1600	1200	49	44		26000	2200	
Petroleum Hydrocarbons F3	50		240	300		5800	20000					5800	
Aliphatic C>16-C21						82000	7.8E+09					6700	
Aliphatic C>21-C34						82000	1.2E+14					6900	
Aromatic C>16-C21						1200	2900					3000	
Aromatic C>21-C34						1200	23000					7900	
Petroleum Hydrocarbons F4	50		120	2800		6100	1600000					6900	
Aliphatic C>34						820000	1.2E+20					6900	
Aromatic C>34						1200	330000					6900	
Phenanthrene	0.05		0.69	6.2	2700		17	270				2300	
Phenol	0.5		0.5	17	9.4	5400	240	46	940	34000	16000	230000	970
Polychlorinated Biphenyls	0.3		0.3	33	1.1	0.35	770	9.9E+11	3.1		120	5000	
Pyrene	0.05		1		4700	78	240	2600	1900		23000	7700	
Selenium	1		1.5	10	2.4	110							
Silver	0.5		0.5	20		77						22000	
Styrene	0.05		0.05	17		2500	47	66	16	18	3400	3500	0.7
Tetrachloroethane, 1,1,1,2-	0.05		0.05			30	0.15	37	0.058		5.1	4400	
Tetrachloroethane, 1,1,2,2-	0.05		0.05			4	0.14	48	0.0045	2400	1.6	6700	86
Tetrachloroethylene	0.05		0.05	3.8	4.5	130	1.9	18	0.28	320	190	3700	61
Thallium	1		1	1.4	3.9	0.29						22000	
Toluene	0.2		0.2	150	140	1700	6.4	68	6.2	35	34000	3300	2.3
Trichlorobenzene, 1,2,4-	0.05		0.05	13		210	45	43	0.36	1100	290	3400	32
Trichloroethane, 1,1,1-	0.05		0.05	18	820	42000	20	9.8	0.38	1000	12000	3700	250
Trichloroethane, 1,1,2-	0.05		0.05	80		14	0.54	120	0.03		2.9	3900	
Trichloroethylene	0.05		0.05	100	8.1	10	0.55	300	0.00044	480	12	4100	91
Trichlorofluoromethane	0.05		0.25	16		6300	20	4				4400	
Trichlorophenol, 2,4,5-	0.1		0.1	4.4		56	9.1	27				14000	
Trichlorophenol, 2,4,6-	0.1		0.1	4.4		56	2.1	3.8				13000	
Uranium	1		2.8	500	33	23						40000	
Vanadium	10		86	200	18	39						7100	
Vinyl Chloride	0.02		0.02	3.4	12	0.57	0.19	270	0.0021	1000	14	6100	230
Xylene Mixture	0.05		0.05	95	96	4200	120	26	3.1	580	4900	2300	35
Zinc	30		290	400	340	5600						15000	
Electrical Conductivity (mS/cm)			0.57	0.7									
Chloride	5		210				52000	220				3000	
Sodium Adsorption Ratio			2.4	5									
Sodium	50		1300										

Table F1-5d - MGRA Table of Drivers - Soil - With Distance Modifications

Soil Components for Table 2 - Full Depth, Potable Water Scenario													
Coarse Textured Soil		**Residential /Parkland Land Use (ug/g)**											
	MOE	Mass.	Ont. Soil	Plants &	Mammals	Soil Contact	Soil Leaching		Indoor Air	Indoor Air	Outdoor Air	Free Phase	Soil Odour
Chemical Parameter	Soil RL	PQL	Bkgrd	Soil Org.	& Birds	S1 Risk	S-GW1	S-GW3	S-IA	Odour		Threshold	S-Nose
Acenaphthene	0.05		0.072		6600	78	21	6100	7.9	3900	1300	2800	100
Acenaphthylene	0.05		0.23			7.8	2.3	1.6	0.45		96	2900	
Acetone	0.5		0.5		56	19000	320	170	720	4300	120000	92000	140
Aldrin	0.05		0.05	0.044	0.0024	0.56	31	200000		260000		5000	5200
Anthracene	0.05		0.16	2.5	38000	5400	15000	5.6				2700	
Antimony	1		1.3	20	25	7.5						8000	
Arsenic	1		18	20	51	0.95						12000	
Barium	5		220	750	390	3800						7700	
Benzene	0.02		0.02	25	370	9.3	0.92	150	0.21	820	17	5000	63
Benz[a]anthracene	0.05		0.36	0.5		0.78	190	5.7E+10	65		330	7600	
Benzo[a]pyrene	0.05		0.3	20	1600	0.078	6.6	4.1E+14	820		170	7600	
Benzo[b]fluoranthene	0.05		0.47			0.78	67	8.4E+14	5500		2000	7600	
Benzo[ghi]perylene	0.1		0.68	6.6		7.8	2200	1.3E+14				7600	
Benzo[k]fluoranthene	0.05		0.48	7.6		0.78	66	2.7E+14	6700		2100	7600	
Beryllium	2		2.5	4	13	38						3900	
Biphenyl 1,1'-	0.05		0.05			710	590	2000		11		2600	0.31
Bis(2-chloroethyl)ether	0.5		0.5			0.32	0.0014	1000		69		6400	1.9
Bis(2-chloroisopropyl)ether	0.5		0.5			840	12	1300		18		11	0.67
Bis(2-ethylhexyl)phthalate	5		5	14	0.8	1100	830	1E+09				7100	
Boron (Hot Water Soluble)*	0.5		0.5	1.5								5000	
Boron (total)	5		36		120	4300						5000	
Bromodichloromethane	0.05		0.05			13	1.5	540				5500	
Bromoform	0.05		0.05			72	2.3	230		220		11000	5.4
Bromomethane	0.05		0.05			6.3	0.097	15	0.035	27	71	7300	6
Cadmium	1		1.2	12	1.9	0.69						18000	
Carbon Tetrachloride	0.05		0.05	5.8	7.6	15	0.51	25	0.013	470	30	3900	120
Chlordane	0.05		0.05	1.1	0.0085	0.59	510	360	7.6	5700	210	8400	110
Chloroaniline p-	0.5		0.5	20		38	0.66	4.8				6100	
Chlorobenzene	0.05		0.05	6		1300	8	26	91	78	8900	3700	3.7
Chloroform	0.05		0.05	34	81	310	2.3	100	3.1	1400	880	6600	260
Chlorophenol, 2-	0.1		0.1	1.6		63	3.7	220				130000	
Chromium Total	5		70	310	160	28000						11000	
Chromium VI	0.2		0.66	8	910	160							
Chrysene	0.05		2.8	7		7.8	20	3.7E+10	1900		6600	7700	
Cobalt	2		21	40	180	22						19000	
Copper	5		92	140	770	600							
Cyanide (CN-)	0.05		0.051	0.9	0.11	380	22	0.24				240000	
Dibenz[a h]anthracene	0.1		0.1			0.078	22	2.6E+14	33000		430	7600	
Dibromochloromethane	0.05		0.05			9.4	2.3	520				10000	
Dichlorobenzene, 1,2-	0.05		0.05	3.4		6300	1.2	650	35	160	9200	3100	6.1
Dichlorobenzene, 1,3-	0.05		0.05	4.8		420	24	640				3300	
Dichlorobenzene, 1,4-	0.05		0.05	3.6		47	0.4	640	0.083	22	18	3000	0.85
Dichlorobenzidine, 3,3'-	1		1			0.52	0.16	710				5000	
Dichlorodifluoromethane	0.05		0.05	40		4200	150	170				710	
DDD	0.05		0.05	6.8		3.3	1300	18000000				5000	
DDE	0.05		0.05	0.26		2.3	1300	160000000				5000	
DDT	0.05		1.4	1	0.0011	2.3	1800	100000000				5000	
Dichloroethane, 1,1-	0.05		0.05	8.4		840	0.47	17000	3.5	130	1500	4800	24
Dichloroethane, 1,2-	0.05		0.05	48	29	8.7	0.48	1900	0.025	640	1.4	5300	45
Dichloroethylene, 1,1-	0.05		0.05	50	43	1000	1.3	120	0.004	180	1300	3900	44
Dichloroethylene, 1,2-cis-	0.05		0.05		84	630	1.9	1400	3.4		1300	4600	
Dichloroethylene, 1,2-trans-	0.05		0.05		84	420	1.9	2400	0.084	34	700	4600	8.5
Dichlorophenol, 2,4-	0.1		0.1	1.7		63	0.19	500				33000	
Dichloropropane, 1,2-	0.05		0.05	25		22	0.54	820	0.01	4.5	27	2100	0.34
Dichloropropene,1,3-	0.05		0.05	25		8.7	0.059	41	0.027	17	9	5000	1.2
Dieldrin	0.05		0.05	0.044	0.00096	0.94	3.1	1.2				8700	
Diethyl Phthalate	0.5		0.5	11	85	94000	2200	0.76				7600	
Dimethylphthalate	0.5		0.5	17		94000	1400	0.25				1800	
Dimethylphenol, 2,4-	0.2		0.2			420	38	4300				57000	
Dinitrophenol, 2,4-	2		2			38	2	630				13000	
Dinitrotoluene, 2,4 & 2,6-	0.5		0.5			0.92	0.015	160				3800	
Dioxane, 1,4	0.2		0.2		1.8	72	7.5	8700	180		57000	82000	
Dioxin/Furan (TEQ)		5.4E-07	0.000007		0.000013	0.000048	0.0018	470	0.0028		0.11	7000	
Endosulfan	0.04		0.04	0.15	0.023	38	110	3.7				8700	
Endrin	0.04		0.04	0.019	0.0011	4.7	18	0.74				5000	
Ethylbenzene	0.05		0.05	55	90	2100	1.1	180	2.1	100	7900	2700	5.2
Ethylene dibromide	0.05		0.05			0.22	0.0048	930	0.0014	1600	0.099	2000	51
Fluoranthene	0.05		0.56	50	0.69	7.8	24	110000	250		2500	7600	
Fluorene	0.05		0.12			720	1100	640				2800	
Heptachlor	0.05		0.05	0.2	3.9	0.15	66	7.3		19000		8300	370
Heptachlor Epoxide	0.05		0.05			0.11	6.6	0.038		8800		5000	180
Hexachlorobenzene	0.01		0.01	100		0.52	2.9	150				9300	
Hexachlorobutadiene	0.01		0.01			7.1	0.52	18	0.012	210	2.8	8300	8.6
Hexachlorocyclohexane Gamma-	0.01		0.01	5.9		0.25	11	0.61				5000	
Hexachloroethane	0.01		0.01			21	0.49	240	0.089	51	54	9400	0.46
Hexane (n)	0.05		0.05					590	2.8		130000	1500	
Indeno[1 2 3-cd]pyrene	0.1		0.23	0.38		0.78	220	9.4E+14	46000		4000	7600	
Lead	10		120	250	32	120						24000	
Mercury	0.1		0.27	10	20	9.8	550	1.3E+15	0.25		36	34000	
Methoxychlor	0.05		0.05		0.13	0.38	32000	19				8000	
Methyl Ethyl Ketone	0.5		0.5	35	9900	13000	160	2500	16	750	44000	26000	26
Methyl Isobutyl Ketone	0.5		0.5			21000	440	1600	6.6	39	23000	5100	1.7
Methyl Mercury **				0.8	0.034	2	1	0.091				1300000	

Soil Components for Table 2 - Full Depth, Potable Water Scenario													
Coarse Textured Soil		**Residential /Parkland Land Use (ug/g)**											
	MOE	Mass.	Ont. Soil	Plants &	Mammals	Soil Contact	Soil Leaching		Indoor Air	Indoor Air	Outdoor Air	Free Phase	Soil Odour
Chemical Parameter	Soil RL	PQL	Bkgrd	Soil Org.	& Birds	S1 Risk	S-GW1	S-GW3	S-IA	Odour		Threshold	S-Nose
Methyl tert-Butyl Ether (MTBE)	0.05		0.05	25		440	1.6	2400	0.75		170	8000	
Methylene Chloride	0.05		0.05	0.78	350	110	4.8	80	0.1	670	2200	6400	150
Methlynaphthalene, 2-(1-) ***	0.05		0.59			72	30	830		34		3600	0.99
Molybdenum	2		2	40	6.9	110						22000	
Naphthalene	0.05		0.09	0.6	380	360	93	2200	0.65	150	270	2800	4.5
Nickel	5		82	100	5000	330							
Pentachlorophenol	0.1		0.1	17	0.013	3.6	86	32				9200	
Petroleum Hydrocarbons F1****	10		25	210		6900	4100	560	130		26000	1700	
Aliphatic C6-C8						200000	150000	420	320		560000	1700	
Aliphatic C>8-C10						4100	20000	1500	76		18000	1700	
Aromatic C>8-C10						1600	410	420	61		4900	2900	
Petroleum Hydrocarbons F2	10		10	150		3100	4300	2500	98		25000	2700	
Aliphatic C>10-C12						4100	160000	3E+12	390		20000	1700	
Aliphatic C>12-C16						4100	3100000	9.4E+14	170		42000	6600	
Aromatic C>10-C12						1600	630	460	22		11000	2500	
Aromatic C>12-C16						1600	1200	530	44		26000	2200	
Petroleum Hydrocarbons F3	50		240	300		5800	20000					5800	
Aliphatic C>16-C21						82000	7.8E+09					6700	
Aliphatic C>21-C34						82000	1.2E+14					6900	
Aromatic C>16-C21						1200	2900					3000	
Aromatic C>21-C34						1200	23000					7900	
Petroleum Hydrocarbons F4	50		120	2800		6100	1600000					6900	
Aliphatic C>34						820000	1.2E+20					6900	
Aromatic C>34						1200	330000					6900	
Phenanthrene	0.05		0.69	6.2	2700		17	2200				2300	
Phenol	0.5		0.5	17	9.4	5400	240	500	940	34000	16000	230000	970
Polychlorinated Biphenyls	0.3		0.3	33	1.1	0.35	770	1.1E+13	3.1		120	5000	
Pyrene	0.05		1		4700	78	240	7200	1900		23000	7700	
Selenium	1		1.5	10	2.4	110							
Silver	0.5		0.5	20		77						22000	
Styrene	0.05		0.05	17		2500	47	720	16	18	3400	3500	0.7
Tetrachloroethane, 1,1,1,2-	0.05		0.05			30	0.15	400	0.058		5.1	4400	
Tetrachloroethane, 1,1,2,2-	0.05		0.05			4	0.14	520	0.0045	2400	1.6	6700	86
Tetrachloroethylene	0.05		0.05	3.8	4.5	130	1.9	190	0.28	320	190	3700	61
Thallium	1		1	1.4	3.9	0.29						22000	
Toluene	0.2		0.2	150	140	1700	6.4	740	6.2	35	34000	3300	2.3
Trichlorobenzene, 1,2,4-	0.05		0.05	13		210	45	470	0.36	1100	290	3400	32
Trichloroethane, 1,1,1-	0.05		0.05	18	820	42000	20	110	0.38	1000	12000	3700	250
Trichloroethane, 1,1,2-	0.05		0.05	80		14	0.54	1300	0.03		2.9	3900	
Trichloroethylene	0.05		0.05	100	8.1	10	0.55	3300	0.00044	480	12	4100	91
Trichlorofluoromethane	0.05		0.25	16		6300	20	43				4400	
Trichlorophenol, 2,4,5-	0.1		0.1	4.4		56	9.1	290				14000	
Trichlorophenol, 2,4,6-	0.1		0.1	4.4		56	2.1	41				13000	
Uranium	1		2.8	500	33	23						40000	
Vanadium	10		86	200	18	39						7100	
Vinyl Chloride	0.02		0.02	3.4	12	0.57	0.19	2900	0.0021	1000	14	6100	230
Xylene Mixture	0.05		0.05	95	96	4200	120	280	3.1	580	4900	2300	35
Zinc	30		290	400	340	5600						15000	
Electrical Conductivity (mS/cm)			0.57	0.7									
Chloride	5		210				52000	2400				3000	
Sodium Adsorption Ratio			2.4	5									
Sodium	50		1300										

Table F1-5e. Ecological Health Secondary Groundwater Screening
GW3 (Groundwater to Surface Water)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Units	Estimated Maximum Concentration	Table 6 SCS [a]	GW3 [b]	Estimated Max > GW3?
1,1,1-Trichloroethane	µg/L	44	23	9000	No
1,1-Dichloroethane	µg/L	35	5	2000000	No
1,1-Dichloroethene	µg/L	76	0.5	12000	No
2-(1-)Methylnaphthalene	µg/L	330	3.2	1500	No
Acenaphthene	µg/L	48	4.1	5200	No
Anthracene	µg/L	37	1	1	**Yes**
Arsenic	µg/L	54	25	1500	No
Benzene	µg/L	80	0.5	4600	No
Benzo(a)anthracene	µg/L	25	1	1.8	**Yes**
Benzo(a)pyrene	µg/L	2.8	0.01	2.1	**Yes**
Benzo(b&j)fluoranthene	µg/L	10	0.1	4.2	**Yes**
Benzo(k)fluoranthene	µg/L	10	0.1	1.4	**Yes**
Chrysene	µg/L	45	0.1	0.7	**Yes**
cis-1,2-Dichloroethene	µg/L	1100	1.6	140000	No
Ethylbenzene	µg/L	10	2.4	1800	No
Fluoranthene	µg/L	28	0.41	73	No
Lead	µg/L	20	10	20	No
Naphthalene	µg/L	32	7	6200	No
n-Hexane	µg/L	8.9	5	2500	No
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	660	420	420	**Yes**
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	250000	150	170	**Yes**
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	1000000	500	NA	No
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	44000	500	NA	No
Phenanthrene	µg/L	130	1	380	No
Pyrene	µg/L	70	4.1	5.7	**Yes**
Tetrachloroethene	µg/L	1.3	0.5	8400	No
trans-1,2-Dichloroethene	µg/L	97	1.6	220000	No
Trichloroethylene	µg/L	9400	0.5	220000	No
Vinyl Chloride	µg/L	990	0.5	360000	No
Zinc	µg/L	5400	890	890	**Yes**

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. Prepared by Standards Development Branch. April 15.

[a.] O. Reg. 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition (MECP, 2011a).

[b.] GW3 (groundwater-to-surface water) from table entitled Groundwater Components for Potable Water, Shallow Soil Scenario (MECP, 2011b).

Notes:

Bold parameters retained for further assessment in the ERA

-- = no value
< = less than
= = equal to
> = greater than
µg/L = microgram(s) per litre
COC = contaminant of concern
ERA = Ecological Risk Assessment
Est Max = estimated maximum concentration
F = fraction
m = metre(s)
Max = maximum concentration
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
SCS = Site Condition Standard

Table F1-6. Human Health Secondary Groundwater Screening
Table 2 GW1- Odour (Aesthetic)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values	
COCs	Units	Table 6 SCS [a]	Estimated Max Concentration [b]	Odour (GW1) [c]	Qualitative Assessment
1,1,1-Trichloroethane	µg/L	0.05	44	3000	Odours Unlikely (Est Max < or = to GW1 Odour)
1,1-Dichloroethane	µg/L	5	35	540	Odours Unlikely (Est Max < or = to GW1 Odour)
1,1-Dichloroethene	µg/L	0.5	76	710	Odours Unlikely (Est Max < or = to GW1 Odour)
2-(1-)Methylnaphthalene	µg/L	3.2	330	3.2	**Potential for Odours (Est Max > GW1 Odour)**
Acenaphthene	µg/L	4.1	48	67	Odours Unlikely (Est Max < or = to GW1 Odour)
Anthracene	µg/L	0.003	37	--	Odours Unlikely (No Established Odour Value)
Arsenic	µg/L	25	54	--	Odours Unlikely (No Established Odour Value)
Benzene	µg/L	0.5	80	860	Odours Unlikely (Est Max < or = to GW1 Odour)
Benzo(a)anthracene	µg/L	1	25	--	Odours Unlikely (No Established Odour Value)
Benzo(a)pyrene	µg/L	0.01	2.8	--	Odours Unlikely (No Established Odour Value)
Benzo(b&j)fluoranthene	µg/L	0.1	10	--	Odours Unlikely (No Established Odour Value)
Benzo(k)fluoranthene	µg/L	0.1	10	--	Odours Unlikely (No Established Odour Value)
Chrysene	µg/L	0.1	45	--	Odours Unlikely (No Established Odour Value)
cis-1,2-Dichloroethene	µg/L	1.6	1100	--	Odours Unlikely (No Established Odour Value)
Ethylbenzene	µg/L	2.4	10	31	Odours Unlikely (Est Max < or = to GW1 Odour)
Fluoranthene	µg/L	0.41	28	--	Odours Unlikely (No Established Odour Value)
Lead	µg/L	10	20	--	Odours Unlikely (No Established Odour Value)
Naphthalene	µg/L	0.003	32	11	**Potential for Odours (Est Max > GW1 Odour)**
n-Hexane	µg/L	5	8.9	--	Odours Unlikely (No Established Odour Value)
Petroleum Hydrocarbons F1 (C6-C10)	µg/L	20	660	--	Odours Unlikely (No Established Odour Value)
Petroleum Hydrocarbons F2 (C10-C16)	µg/L	150	250000	--	Odours Unlikely (No Established Odour Value)
Petroleum Hydrocarbons F3 (C16-C34)	µg/L	500	1000000	--	Odours Unlikely (No Established Odour Value)
Petroleum Hydrocarbons F4 (C34-C50)	µg/L	500	44000	--	Odours Unlikely (No Established Odour Value)
Phenanthrene	µg/L	1	130	--	Odours Unlikely (No Established Odour Value)
Pyrene	µg/L	4.1	70	--	Odours Unlikely (No Established Odour Value)
Tetrachloroethene	µg/L	0.05	1.3	440	Odours Unlikely (Est Max < or = to GW1 Odour)
trans-1,2-Dichloroethene	µg/L	1.6	97	170	Odours Unlikely (Est Max < or = to GW1 Odour)
Trichloroethylene	µg/L	0.5	9400	1100	**Potential for Odours (Est Max > GW1 Odour)**
Vinyl Chloride	µg/L	0.5	100 (990) [d]	5300	Odours Unlikely (Est Max < or = to GW1 Odour)
Zinc	µg/L	890	5400	--	Odours Unlikely (No Established Odour Value)

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.* April 15
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 15

Notes:

[a] Ontario Regulation 153/04. Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse Textured Soils
[b] Estimated maximum concentration is the maximum detected concentration plus 20 percent, or the maximum detection limit.
[c] Human Health component values from the table entitled Groundwater Components for Potable Water, Shallow Soil Scenario (Table 6) (MECP 2011b).
[d] Value in brackets represents the theoretical maximum concentration of vinyl chloride. Refer to Table 4-7.
Bold parameters retained for quantitative assessment in HHRA

-- = no value
< = less than
GW1 = Groundwater Direct Contact
H = Henry's Law Constant

Table F1-6. Human Health Secondary Groundwater Screening
Table 2 GW1- Odour (Aesthetic)
Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values	
COCs	Units	Table 6 SCS [a]	Estimated Max Concentration [b]	Odour (GW1) [c]	Qualitative Assessment

> = greater than
µg/L - microgram(s) per litre
atm-m^3/mol = atmosphere(s) per cubic metre per mol
COC = contaminant of concern
Est = estimated
F = fraction
HHRA = human health risk assessment
m = metre
Max = maximum concentration
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
SCS = Site Condition Standards

Table F1-7. Human Health Secondary Soil Screening

Table 6 S-GW1 (Soil Leaching to Potable Groundwater) Component

Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values [c]	
Parameter	Units	Table 6 SCS [b]	Estimated Max Concentration	Soil Leaching to Potable Groundwater (S-GW1)	Qualitative Assessment
2-(1-)Methylnaphthalene	µg/g	0.99	5.9	30	Leaching Unlikey (Est Max < or = S-GW1)
Acenaphthene	µg/g	7.9	110	21	**Potential for Leaching (Est Max > S-GW1)**
Acenaphthylene	µg/g	0.15	2	2.3	Leaching Unlikey (Est Max < or = S-GW1)
Anthracene	µg/g	0.67	190	15000	Leaching Unlikey (Est Max < or = S-GW1)
Antimony	µg/g	7.5	22	--	Leaching Unlikely (No Secondary Screening Value Available)
Arsenic	µg/g	18	27	--	Leaching Unlikely (No Secondary Screening Value Available)
Benzene	µg/g	0.21	0.31	0.92	Leaching Unlikey (Est Max < or = S-GW1)
Benzo(a)anthracene	µg/g	0.5	240	190	**Potential for Leaching (Est Max > S-GW1)**
Benzo(a)pyrene	µg/g	0.3	150	6.6	**Potential for Leaching (Est Max > S-GW1)**
Benzo(b)fluoranthene	µg/g	0.78	220	67	**Potential for Leaching (Est Max > S-GW1)**
Benzo(g,h,i)perylene	µg/g	6.6	84	2200	Leaching Unlikey (Est Max < or = S-GW1)
Benzo(k)fluoranthene	µg/g	0.78	79	66	**Potential for Leaching (Est Max > S-GW1)**
Bismuth	µg/g	--	180	--	Leaching Unlikely (No Secondary Screening Value Available)
Cadmium	µg/g	1.2	100	--	Leaching Unlikely (No Secondary Screening Value Available)
Calcium	µg/g	--	260000	--	Leaching Unlikely (No Secondary Screening Value Available)
Chrysene	µg/g	7	210	20	**Potential for Leaching (Est Max > S-GW1)**
Cobalt	µg/g	22	470	--	Leaching Unlikely (No Secondary Screening Value Available)
Copper	µg/g	140	2900	--	Leaching Unlikely (No Secondary Screening Value Available)
Dibenzo(a,h)anthracene	µg/g	0.1	31	22	**Potential for Leaching (Est Max > S-GW1)**
Ethylbenzene	µg/g	1.1	4.9	1.1	**Potential for Leaching (Est Max > S-GW1)**
Fluoranthene	µg/g	0.69	790	24	**Potential for Leaching (Est Max > S-GW1)**
Fluorene	µg/g	62	180	1100	Leaching Unlikey (Est Max < or = S-GW1)
Indeno(1,2,3-Cd)Pyrene	µg/g	0.38	96	220	Leaching Unlikey (Est Max < or = S-GW1)
Iron	µg/g	--	150000	--	Leaching Unlikely (No Secondary Screening Value Available)
Lead	µg/g	120	12000	--	Leaching Unlikely (No Secondary Screening Value Available)
Magnesium	µg/g	--	140000	--	Leaching Unlikely (No Secondary Screening Value Available)
Mercury	µg/g	0.27	0.38	550	Leaching Unlikey (Est Max < or = S-GW1)
Molybdenum	µg/g	6.9	42	--	Leaching Unlikely (No Secondary Screening Value Available)
Naphthalene	µg/g	0.6	260	93	**Potential for Leaching (Est Max > S-GW1)**
Nickel	µg/g	100	140	--	Leaching Unlikely (No Secondary Screening Value Available)
PCB, Total	µg/g	0.35	1.9	770	Leaching Unlikey (Est Max < or = S-GW1)
Petroleum Hydrocarbons F2 (C10-C16)	µg/g	98	4300	4300	Leaching Unlikey (Est Max < or = S-GW1)
Petroleum Hydrocarbons F3 (C16-C34)	µg/g	300	27000	20000	**Potential for Leaching (Est Max > S-GW1)**
Petroleum Hydrocarbons F4 (C34-C50)	µg/g	2800	8700	1600000	Leaching Unlikey (Est Max < or = S-GW1)
Phenanthrene	µg/g	6.2	1000	17	**Potential for Leaching (Est Max > S-GW1)**
Pyrene	µg/g	78	560	240	**Potential for Leaching (Est Max > S-GW1)**
Thallium	µg/g	1	7.2	--	Leaching Unlikely (No Secondary Screening Value Available)

Table F1-7. Human Health Secondary Soil Screening

Table 6 S-GW1 (Soil Leaching to Potable Groundwater) Component

Risk Assessment, 200 Beverley Street, Guelph, Ontario

				Human Health Component Values [c]	
Parameter	**Units**	**Table 6 SCS [b]**	**Estimated Max Concentration**	**Soil Leaching to Potable Groundwater (S-GW1)**	**Qualitative Assessment**
Trichloroethylene	µg/g	0.061	42	0.55	**Potential for Leaching (Est Max > S-GW1)**
Vanadium	µg/g	86	120	--	Leaching Unlikely (No Secondary Screening Value Available)
Xylenes, Total	µg/g	3.1	4.6	120	Leaching Unlikey (Est Max < or = S-GW1)
Zinc	µg/g	340	80000	--	Leaching Unlikely (No Secondary Screening Value Available)

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 15.

Notes:

[a] Ontario Regulation 153/04, Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Ground Water Condition for residential/parkland/institutional use and Coarse

[b] Estimated maximum concentration is the maximum detected concentration plus 20 percent, or the maximum detection limit.

[c] Human Health component values from the table entitled Soil Components Table 2: Full Depth, Potable Water Scenario for residential/parkland/institutional use and Coarse Textured Soils (MECP 2011).

Bold parameters are evaluated quantitatively.

-- = no value
< = less than
> = greater than
µg/g = microgram(s) per gram
atm-m^3/mol = atmosphere(s) per cubic metre per mol
COC = contaminant of concern
Est = estimated
F = fraction
H = Henry's Law Constant
MECP = Ontario Ministry of the Environment, Conservation and Parks
S1 = direct contact with soil
SCS = site condition standard
S-IA = Soil-to-Indoor Air
Torr = Torricelli

Appendix F2
Volatility Screening Tables

APPENDIX F2

Volatility Assessment

Approach

The potential fate and transport of a chemical is characterized, in part, by its physical and chemical properties. The vapour pressure of a chemical can indicate the likelihood that it will volatilize from its pure compound state; chemicals with high vapour pressures are expected to readily volatilize. The Henry's Law Constant (H) for a chemical indicates the theoretical amount of a chemical that will volatilize from the dissolved water phase to the vapour phase. The Ontario Ministry of the Environment, Conservation and Parks' (MECP's) definition of volatile includes chemicals with an H greater than 1×10^{-5} atmospheres per cubic metre per mol (atm-m^3/mol) or a vapour pressure greater than 0.05 Torricelli (Torr) (equivalent to 0.05 millimetres of mercury [mm Hg]) (MECP, 2019). Jacobs applied this definition to determine which chemicals were considered volatile for the purposes of risk assessment (RA), and to identify those that may require further analysis for the potential for risk and hazard from the inhalation of indoor or outdoor air, as applicable.

The MECP (2019) has provided a two-step screening process to determine if a chemical is of potential concern for vapour intrusion:

- **Step 1:** A chemical is considered to be sufficiently volatile and should be assessed as part of Step 2 if the chemical has either an H greater than 1×10^{-5} atm-m^3/mol), **or** a vapour pressure greater than 1.0 mm Hg (equivalent to 1.0 Torr)
- **Step 2:** If the maximum theoretical indoor air concentration of a chemical (based on conservative assumptions [C_{air}]) exceeds the applicable health based indoor air criteria (HBIAC) or odour thresholds (if available), then the chemical should be retained for vapour intrusion assessment in the RA.

Jacobs has added additional considerations to the Step 2 screening process, to incorporate the MECP (2016) soil-to-indoor air (S-IA), soil-to-indoor air odour (S-IA Odour), groundwater-to-indoor air (GW2), and groundwater-to-indoor air odour (GW2 Odour) component values (MECP, 2011). Therefore, chemicals retained for vapour intrusion assessment in the RA must meet **all** of the following criteria:

- The chemical is considered sufficiently volatile (per Step 1)
- The maximum theoretical indoor air concentration is greater than the associated HBIAC (or odour threshold)
- The associated soil or groundwater concentration is greater than the S-IA or S-IA Odour component (for soil) or the GW2 or GW Odour component (for groundwater)

In cases where the generic site condition standards may not be protective of the vapour pathway (that is, where the water table is less than 3 metres below ground surface), the Table 6 or Table 7 Standards (as applicable) were used in the screening process for groundwater. Under this scenario, chemicals were retained for vapour intrusion assessment if the maximum groundwater concentration was greater than the applied Table 6 or Table 7 Standard[1].

Table F2-1 applies the volatility definitions under Step 1 for the Site contaminants of concern (COCs) to determine which are considered volatile and require further assessment. Note, chemical properties provided in the Rationale Document (MECP, 2011) were used to complete this comparison (as noted in Table F2-1), unless otherwise indicated.

[1] The theoretical indoor air concentration does not also have to exceed the HBIAC (or odour threshold) for the chemical to be retained.

Jacobs has applied the MECP (2019) volatility guidance per Step 1 in all cases, apart from the following chemicals which were classified as nonvolatile for the purposes of the RA:

PHC F3 and F4 - The exclusion of the heavier PHC fractions as volatile is supported by guidance from other jurisdictions and agencies. The Canadian Council of Ministers of the Environment (CCME) (2008) considers PHC fraction (F)1 and F2 as volatile, and PHC F3 and F4 as nonvolatile. CCME indicates the heavier PHCs (that is, those in the C>16 range) are insufficiently volatile to pose an inhalation risk. PHC F3 is described as sparingly soluble in water and having very low volatility, and based on physical and chemical properties, PHCs of C>34 (that is, PHC F4) cannot dissolve in water or volatilize significantly.

Table F2-1 identifies the volatility designation for each RA Property COC and which COCs were retained for review under Step 2.

Table F2-2 applies the screening process described under Step 2 for the COCs retained under Step 1, and identifies the subset which will be carried forward as COCs for the vapour intrusion pathway. Jacobs also carried forward this subset of COCs for the outdoor air inhalation pathway.

References

Blok, Rebekah, Ontario Ministry of the Environment, Conservation and Parks (MECP), Streamlined Risk Assessment Coordinator. 2019. Tier 2 & Tier 3 RA Email Update -- Recent MECP TRV selections; Preparing MGRAs; Defining volatiles in RA. Personal communication (email) with Katherine Appleby, Jacobs. September 11.

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale. Supporting Technical Document.* January.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*, Ontario Ministry of the Environment and Climate Change. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. Modified Generic Risk Assessment Model. Microsoft Excel spreadsheet. November 1.

Tables

Table F2-1. Volatility Assessment - Step 1

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Vapour Pressure (mm Hg) [a,b]	Reference	Henry's Law Constant ($atm\text{-}m^3/mol$)	Reference	Volatility Designation [c]	Retained for Step 2?
Acenaphthene	2.50E-03	MECP, 2011	1.82E-04	MECP, 2011	Volatile	Yes
Acenaphthylene	9.12E-04	MECP, 2011	1.25E-04	MECP, 2011	Volatile	Yes
Anthracene	2.67E-06	MECP, 2011	5.55E-05	MECP, 2011	Volatile	Yes
Antimony	--	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Arsenic	1.01E+04	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Benzene	9.48E+01	MECP, 2011	5.55E-03	MECP, 2011	Volatile	Yes
Benzo(a)anthracene	1.90E-06	MECP, 2011	1.20E-05	MECP, 2011	Volatile	Yes
Benzo(a)pyrene	5.49E-09	MECP, 2011	4.58E-07	MECP, 2011	Non-Volatile	No
Benzo(b&j)fluoranthene	5.00E-07	MECP, 2011	6.58E-07	MECP, 2011	Non-Volatile	No
Benzo(g,h,i)perylene	1.00E-10	MECP, 2011	3.30E-07	MECP, 2011	Non-Volatile	No
Benzo(k)fluoranthene	9.65E-10	MECP, 2011	5.85E-07	MECP, 2011	Non-Volatile	No
Cadmium	8.98E-18	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Chrysene	6.23E-09	MECP, 2011	5.24E-06	MECP, 2011	Non-Volatile	No
Cobalt	--	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Copper	--	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Dibenzo(a,h)anthracene	1.39E-11	MECP, 2011	1.23E-07	MECP, 2011	Non-Volatile	No
Dichloroethane, 1,1-	2.27E+02	MECP, 2011	5.63E-03	MECP, 2011	Volatile	Yes
Dichloroethene, 1,1-	6.34E+02	MECP, 2011	2.62E-02	MECP, 2011	Volatile	Yes
Dichloroethene, 1,2-cis-	2.01E+02	MECP, 2011	4.09E-03	MECP, 2011	Volatile	Yes
Dichloroethene, 1,2-trans-	2.01E+02	MECP, 2011	9.37E-03	MECP, 2011	Volatile	Yes
Ethylbenzene	9.60E+00	MECP, 2011	7.88E-03	MECP, 2011	Volatile	Yes
Fluoranthene	9.22E-06	MECP, 2011	8.86E-06	MECP, 2011	Non-Volatile	No
Fluorene	8.42E-03	MECP, 2011	9.62E-05	MECP, 2011	Volatile	Yes
n-Hexane	1.51E+02	MECP, 2011	1.80E+00	MECP, 2011	Volatile	Yes
Indeno(1,2,3-cd)pyrene	1.25E-10	MECP, 2011	3.47E-07	MECP, 2011	Non-Volatile	No
Lead	7.28E-11	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Mercury	1.96E-03	MECP, 2011	1.15E-02	MECP, 2011	Volatile	Yes
Methylnaphthalenes, 2-(1-)	5.50E-02	MECP, 2011	5.19E-04	MECP, 2011	Volatile	Yes
Naphthalene	8.50E-02	MECP, 2011	4.40E-04	MECP, 2011	Volatile	Yes
Nickel	4.24E-09	MECP, 2011	--	MECP, 2011	Non-Volatile	No
PHC F1 (C6-C10)	--	--	--	--	Volatile	Yes
Aliphatic C6-C8	4.80E+01	MECP, 2011	1.22E+00	MECP, 2011	Volatile	Yes
Aliphatic C>8-C10	4.80E+00	MECP, 2011	1.96E+00	MECP, 2011	Volatile	Yes
Aromatic C>8-C10	4.80E+00	MECP, 2011	1.17E-02	MECP, 2011	Volatile	Yes
PHC F2 (C10-C16)	--	--	--	--	Volatile	Yes
Aliphatic C>10-C12	4.80E-01	MECP, 2011	2.94E+00	MECP, 2011	Volatile	Yes
Aliphatic C>12-C16	3.64E-02	MECP, 2011	1.27E+01	MECP, 2011	Volatile	Yes
Aromatic C>10-C12	4.80E-01	MECP, 2011	3.43E-03	MECP, 2011	Volatile	Yes
Aromatic C>12-C16	3.64E-02	MECP, 2011	1.30E-03	MECP, 2011	Volatile	Yes
PHC F3 (C16-C34)	--	--	--	--	Non-Volatile [d]	No
Aliphatic C>16-C21	8.73E-04	MECP, 2011	1.20E+02	MECP, 2011	Non-Volatile	No
Aliphatic C>21-C34	5.02E-07	MECP, 2011	1.34E+04	MECP, 2011	Non-Volatile	No
Aromatic C>16-C21	8.73E-04	MECP, 2011	3.18E-04	MECP, 2011	Non-Volatile	No
Aromatic C>21-C34	5.02E-07	MECP, 2011	1.64E-05	MECP, 2011	Non-Volatile	No
PHC F4 (C34-C50)	--	--	--	--	Non-Volatile[e]	No
Aliphatic C>34	2.30E-09	MECP, 2011	2.87E+06	MECP, 2011	Non-Volatile	No
Aromatic C>34	2.30E-09	MECP, 2011	4.36E-08	MECP, 2011	Non-Volatile	No
Phenanthrene	1.12E-04	MECP, 2011	4.23E-05	MECP, 2011	Volatile	Yes
Total PCBs	8.63E-05	MECP, 2011	1.21E-04	MECP, 2011	Volatile	Yes
Pyrene	4.50E-06	MECP, 2011	1.19E-05	MECP, 2011	Volatile	Yes
Tetrachloroethene	1.85E+01	MECP, 2011	1.77E-02	MECP, 2011	Volatile	Yes
Thallium	1.81E-36	MECP, 2011	--	MECP, 2011	Non-Volatile	No

Table F2-1. Volatility Assessment - Step 1

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Vapour Pressure (mm Hg) [a,b]	Reference	Henry's Law Constant (atm-m^3/mol)	Reference	Volatility Designation [c]	Retained for Step 2?
Trichloroethane, 1,1,1-	1.24E+02	MECP, 2011	1.72E-02	MECP, 2011	Volatile	Yes
Trichloroethylene	6.90E+01	MECP, 2011	9.86E-03	MECP, 2011	Volatile	Yes
Vanadium	4.24E-09	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Vinyl Chloride	2.98E+03	MECP, 2011	2.79E-02	MECP, 2011	Volatile	Yes
Xylenes, total	7.99E+00	MECP, 2011	6.63E-03	MECP, 2011	Volatile	Yes
Zinc	7.99E-23	MECP, 2011	--	MECP, 2011	Non-Volatile	No
Bismuth	NV	RAIS, 2021	NV	RAIS, 2021	Non-Volatile	No
Calcium	NV	RAIS, 2021	NV	RAIS, 2021	Non-Volatile	No
Iron	NV	RAIS, 2021	NV	RAIS, 2021	Non-Volatile	No
Magnesium	NV	RAIS, 2021	NV	RAIS, 2021	Non-Volatile	No

Source:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

Canadian Council of Ministers of the Environment (CCME). 2008. *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale. Supporting Technical Document.* January.

Risk Assessment Information System (RAIS). 2021. https://rais.ornl.gov/index.html

[a.] Chemical properties obtained from MECP (2011), unless otherwise indicated.

[b.] 1.0 millimeter of mercury is equivalent to 1.0 Torr.

[c.] Indicates whether the parameter is considered volatile or nonvolatile under MECP-specified criteria (that is, chemicals with a vapour pressure greater than 1.0 Torr or an H greater than 1×10^{-5} atm-m^3/mol are considered volatile).

[d.] PHC F3 and F4 are not considered volatile based on CCME (2008) guidance.

Notes:

-- = no value

atm-m^3/mol = atmospheres per cubic metre per mol

CCME = Canadian Council of Ministers of the Environment

H = Henry's Law Constant

MECP = Ministry of Environment, Conservation and Parks

mm Hg = millimetres of mercury

PHC = petroleum hydrocarbon

Torr = Torricelli

NV = no value

Table F2-2. Volatility Assessment - Step 2

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Max Soil Concentration [a] (µg/g)	Max Groundwater Concentration [a] (µg/L)	Henry's Law Constant H_L [b] (atm-m^3/mol)	H_L Reference	Adjusted Organic Carbon Partitioning Coefficient K_{oc} [c] (mL/g)	K_{oc} Reference	Soil Gas Concentration at Soil Source $C_{sg\text{-}s}$ [d] (µg/m^3)	Soil Gas Concentration at Water Table $C_{sg\text{-}w}$ [e] (µg/m^3)	Default Attenuation Factor α [f]	Indoor Air EPC in Building Based on Soil $C_{building}$ [g] (µg/m^3)	Indoor Air EPC in Building Based on Groundwater $C_{building}$ [g] (µg/m^3)	Residential HBIAC [h] (µg/m^3)	Odour Threshold in Air [h] (µg/m^3)	S-IA Component (µg/g)	S-IA Odour Component (µg/g)	GW2 Component (µg/L)	GW2 Odour Component (µg/L)	Retained as COC for Vapour in Soil?	Retained as COC for Vapour in GW?
Acenaphthene	110	48	7.11E-05	MECP, 2011b	1.22E+04	MECP, 2011	5.39E+03	1.44E+02	2.00E-02	1.08E+02	2.88E+00	1.01E+00	5.00E+02	7.90E+00	3.90E+03	1.70E+01	3.00E+05	Yes	Yes
Acenaphthylene	2	--	4.96E-05	MECP, 2011b	1.22E+04	MECP, 2011b	6.85E+01	--	2.00E-02	1.37E+00	--	1.01E-01	--	4.50E-01	--	9.60E-01	--	Yes	No
Anthracene	190	37	1.90E-05	MECP, 2011b	4.08E+04	MECP, 2011b	7.49E+02	2.98E+01	2.00E-02	1.50E+01	5.96E-01	--	--	--	--	--	--	Yes, missing screening values	Yes, missing screening values
Benzene	0.31	80	3.46E-03	MECP, 2011b	3.31E+02	MECP, 2011b	2.60E+04	1.17E+04	2.00E-02	5.20E+02	2.34E+02	5.06E-01	1.95E+05	2.10E-01	8.20E+02	1.70E-01	1.70E+07	Yes	Yes
Benzo(a)anthracene	240	25	3.15E-06	MECP, 2011b	4.62E+05	MECP, 2011b	1.38E+01	3.33E+00	2.00E-02	2.76E-01	6.65E-02	1.01E-02	--	6.50E+01	--	3.80E+00	--	Yes	Yes
Dichloroethane, 1,1-	--	35	3.65E-03	MECP, 2011b	7.01E+01	MECP, 2011b	--	5.40E+03	2.00E-02	--	1.08E+02	3.44E+01	1.25E+05	3.50E+00	1.30E+02	1.10E+01	1.20E+06	No	Yes
Dichloroethene, 1,1-	--	76	1.80E-02	MECP, 2011b	7.01E+01	MECP, 2011b	--	5.80E+04	2.00E-02	--	1.16E+03	1.46E+01	7.60E+05	4.00E-03	1.80E+02	7.20E-02	1.30E+06	No	Yes
Dichloroethene, 1,2-cis-	--	1100	2.60E-03	MECP, 2011b	8.76E+01	MECP, 2011b	--	1.21E+05	2.00E-02	--	2.42E+03	3.13E+01	--	3.40E+00	--	7.20E-02	--	No	Yes
Dichloroethene, 1,2-trans-	--	97	6.11E-03	MECP, 2011b	8.76E+01	MECP, 2011b	--	2.51E+04	2.00E-02	--	5.01E+02	1.25E+01	6.70E+04	8.40E-02	3.40E+01	7.20E-02	2.60E+05	No	Yes
Ethylbenzene	4.9	10	4.36E-03	MECP, 2011b	1.04E+03	MECP, 2011b	1.71E+05	1.84E+03	2.00E-02	3.43E+03	3.69E+01	2.09E+02	1.00E+04	2.10E+00	1.00E+02	5.70E+01	7.80E+05	Yes	No
Fluorene	180	--	3.73E-05	MECP, 2011b	2.26E+04	MECP, 2011b	2.51E+03	--	2.00E-02	5.02E+01	--	--	--	--	--	--	--	Yes, missing screening values	No
n-Hexane	--	8.9	1.15E+00	MECP, 2011b	2.98E+02	MECP, 2011b	--	4.33E+05	2.00E-02	--	8.66E+03	5.21E+02	--	2.80E+00	--	3.40E-01	--	No	Yes
Mercury	0.38	--	4.69E-03	MECP, 2011b	1.32E+06	MECP, 2011b	1.14E+01	--	2.00E-02	2.29E-01	--	1.88E-02	--	2.50E-01	--	4.70E-03	--	Yes	No
Methylnaphthalenes, 2-(1-)	5.9	330	2.29E-04	MECP, 2011b	5.95E+03	MECP, 2011b	1.92E+03	3.20E+03	2.00E-02	3.83E+01	6.39E+01	--	6.80E+01	--	3.40E+01	--	6.20E+03	Yes, missing screening values	Yes, missing screening values
Naphthalene	260	32	2.07E-04	MECP, 2011b	3.67E+03	MECP, 2011b	1.24E+05	2.81E+02	2.00E-02	2.47E+03	5.61E+00	7.72E-01	2.00E+02	6.50E-01	1.50E+02	4.40E+00	3.70E+05	Yes	Yes
PHC F1 (C6-C10)	--	660	--	--	--	--	--	--	2.00E-02	--	9.61E+04	2.49E+03	--	1.30E+02	--	3.40E+00	--	No	Yes
Aliphatic C6-C8	--	399.3	7.59E-01	MECP, 2011b	7.96E+03	MECP, 2011b	--	1.28E+07	2.00E-02	--	2.56E+05	9.59E+03	--	3.20E+02	--	9.30E+00	--	No	Yes
Aliphatic C>8-C10	--	41.58	1.08E+00	MECP, 2011b	6.32E+04	MECP, 2011b	--	1.90E+06	2.00E-02	--	3.81E+04	5.21E+02	--	7.60E+01	--	3.10E-01	--	No	Yes
Aromatic C>8-C10	--	219.12	6.49E-03	MECP, 2011b	3.17E+03	MECP, 2011b	--	6.02E+04	2.00E-02	--	1.20E+03	1.04E+02	--	6.10E+01	--	1.00E+01	--	No	Yes
PHC F2 (C10-C16)	4300	250000	--	--	--	--	--	--	2.00E-02	2.45E+05	2.59E+06	4.71E+02	--	9.80E+01	--	5.70E+00	--	Yes	Yes
Aliphatic C>10-C12	1548	6000	1.48E+00	MECP, 2011b	5.02E+05	MECP, 2011b	3.85E+07	3.76E+08	2.00E-02	7.69E+05	7.51E+06	5.21E+02	--	3.90E+02	--	2.10E-01	--	Yes	Yes
Aliphatic C>12-C16	1892	500	6.02E+00	MECP, 2011b	1.00E+07	MECP, 2011b	9.60E+06	1.27E+08	2.00E-02	1.92E+05	2.54E+06	5.21E+02	--	1.70E+02	--	4.80E-02	--	Yes	Yes
Aromatic C>10-C12	387	150750	1.73E-03	MECP, 2011b	5.02E+03	MECP, 2011b	1.12E+06	1.10E+07	2.00E-02	2.24E+04	2.20E+05	1.04E+02	--	2.20E+01	--	3.60E+01	--	Yes	Yes
Aromatic C>12-C16	473	92750	6.13E-04	MECP, 2011b	1.00E+04	MECP, 2011b	2.44E+05	2.41E+06	2.00E-02	4.89E+03	4.81E+04	1.04E+02	--	4.40E+01	--	9.50E+01	--	Yes	Yes
Phenanthrene	1000	130	1.47E-05	MECP, 2011b	4.16E+04	MECP, 2011b	2.99E+03	8.10E+01	2.00E-02	5.99E+01	1.62E+00	--	--	--	--	--	--	Yes, missing screening values	Yes, missing screening values
Total PCBs	1.9	--	--	--	6.18E+05	MECP, 2011b	--	--	2.00E-02	--	--	1.11E-02	--	3.10E+00	--	1.10E-01	--	No	No
Pyrene	560	70	3.56E-06	MECP, 2011b	1.39E+05	MECP, 2011b	1.21E+02	1.05E+01	2.00E-02	2.43E+00	2.11E-01	1.01E+00	--	1.90E+03	--	3.40E+02	--	No	No
Tetrachloroethene	--	1.3	1.02E-02	MECP, 2011b	2.14E+02	MECP, 2011b	--	5.58E+02	2.00E-02	--	1.12E+01	4.28E+00	3.20E+05	2.80E-01	3.20E+02	7.20E-02	1.10E+06	No	Yes
Trichloroethane, 1,1,1-	--	44	1.09E-02	MECP, 2011b	9.73E+01	MECP, 2011b	--	2.02E+04	2.00E-02	--	4.05E+02	2.09E+02	2.10E+06	3.80E-01	1.00E+03	2.30E+01	6.40E+06	No	Yes
Trichloroethylene	42	9400	6.00E-03	MECP, 2011b	1.35E+02	MECP, 2011b	1.36E+07	2.38E+06	2.00E-02	2.72E+05	4.77E+04	2.71E-01	4.40E+05	4.40E-04	4.80E+02	5.30E-02	2.40E+06	Yes	Yes
Vinyl Chloride	--	990	2.09E-02	MECP, 2011b	4.75E+01	MECP, 2011b	--	8.74E+05	2.00E-02	--	1.75E+04	1.26E-01	6.00E+06	2.10E-03	1.00E+03	7.20E-03	7.60E+06	No	Yes
Xylenes, total	4.6	--	3.64E-03	MECP, 2011b	8.86E+02	MECP, 2011b	1.57E+05	--	2.00E-02	3.13E+03	--	1.46E+02	1.00E+05	3.10E+00	5.80E+02	2.60E+01	5.30E+06	Yes	No

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. Modified Generic Risk Assessment Model. Microsoft Excel spreadsheet. November 1.

U.S. Environmental Protection Agency (EPA). 2001. Fact Sheet for Correcting the Henry's Law Constant for Temperature. https://www.epa.gov/vaporintrusion/fact-sheet-correcting-henrys-law-constant-temperature

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

Grey shading indicates the screening value that is exceeded by one or more of the estimated Indoor Air EPCs, the maximum soil concentration, or maximum groundwater concentration.

a. Obtained from Tables F1-1 and F1-2 (Appendix F1) for soil and groundwater, respectively.

b. The Henry's Law constants were corrected for an average vadose zone temperature of 15°C (EPA, 2001), with the exception of Total PCBs, which uses the Henry's Law constant at 25°C .

c. Represents the K_{oc} value multiplied by a factor of two.

d. Soil gas concentration at the soil source determined from the C_{soil} using phase relationships and partitioning from EPA (2004) as follows, $C_{sg} = C_{soil} * \rho_{db} * H * CF/(k_d * \rho_{db} + \epsilon_m + H * \epsilon_v)$, where the Henry's Law Constant is $H=H_L/(T*R)$, CF is a conversion factor of 10^6 mL/m^3, T is the vadose zone temperature in Kelvin, and the universal gas constant R is 8.206E-05 atm-m^3/ mol K, $k_d = K_{oc}*f_{oc}$.
The following vadose zone soil properties were applied:

	Coarse	
Total Porosity, ϵ_T (%)	36.0	Default total porosity for a Coarse soil texture, as implemented in MECP MGRA (2016).
Moisture-filled Porosity, ϵ_m	0.12	Default moisture-filled porosity for a Coarse soil texture, as implemented in MECP MGRA (2016).
Vapour-filled Porosity, ϵ_v	0.24	Calculated as $\epsilon_T/100-\epsilon_m$
ıry Bulk Soil Density, ρ_{db} (g/cm^3)	1.7	Default dry bulk density for a Coarse soil texture, as implemented in MECP MGRA (2016).
Soil Temperature (°C)	15	Default temperature for a Coarse soil texture, as implemented in MECP MGRA (2016).
ı of Organic Carbon Content, f_{oc}	0.005	Default fraction of organic carbon for a Coarse soil texture, as implemented in MECP MGRA (2016).

e. Soil gas concentration at the water table determined from C_{qw} using Henry's law as follows, $C_{sq} = C_{qw} * CF * H_L / (T*R)$, where CF is a conversion factor of 1,000 L/m^3, T is the vadose zone temperature in Kelvin, the universal gas constant R is 8.206E-05 atm m^3/ mol K, and the following vadose zone soil properties were applied:

Groundwater Temperature (°C)	15	Default temperature for a Coarse soil texture, as implemented in MECP MGRA (2016).

f. Default attenuation factor for a residential/parkland/institutional land use applied (MECP, 2011b).

g. The EPC in building is calculated from $C_{building} = C_{sg} , \alpha$.

h. Obtained from the MECP (2016) MGRA model.

i. Obtained from MECP (2011), GW2 component associated with the Table 6 SCS for a residential/parkland/institutional land use and a Coarse soil texture.

Notes:

-- = no value
µg/g = microgram(s) per gram
µg/L = microgram(s) per litre
µg/m^3 = microgram(s) per cubic metre
atm-m^3/mol = atmospheres per cubic metre per mol
EPA = United States Environmental Protection Agency
EPC = exposure point concentration
HBIAC = health based indoor air criteria
Max = maximum
MECP = Ministry of Environment, Conservation and Parks
mg/L = milligram(s) per litre
PHC = petroleum hydrocarbon
SCS = site condition standard
S-IA = soil-to-indoor air

Appendix G
Supporting Information and Calculations

Appendix G1
Sample Calculations

APPENDIX G1

Sample Calculations

The exposure parameters for the dermal uptake, ingestion, and inhalation route calculations presented in this appendix were obtained from Tables 4-1, 4-2, 4-9 to 4-12, 4-14, 4-20, 4-23, and 4-26 of the main report.

Dermal Uptake

Soil

The receptor's average uptake of contaminants of concern (COCs) through dermal contact with soil, or daily absorbed dose (DAD), is estimated using the following equation (based on MECP, 2011):

$$DAD = \frac{C*DAF*SAF*ESSA*CF*EF1*EF2*ED}{BW*AT} \quad (1)$$

where:

DAD = Daily absorbed dose via dermal contact (milligrams per kilograms per day [mg/kg-day])

C = Chemical concentration in soil (mg/kg)

SAF = Soil adherence factor (milligrams per square centimetre per day [mg/cm^2-day])

DAF = Dermal absorption factor (unitless)

ESSA = Exposed skin surface area (cm^2)

CF = Conversion factor (10^{-6} kg/mg)

EF1 = Exposure frequency (weeks/year)

EF2 = Exposure frequency (days/week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

This calculation of DAD via dermal contact assumes one soil contact event per day. Exposure assumptions related to the Construction Worker receptor are applied to demonstrate this calculation. The COC selected for demonstration is phenanthrene. As phenanthrene is noncarcinogenic, an averaging time representative of noncarcinogenic exposure is applied. As such, the exposure parameters are as follows:

C = 1000 mg/kg

SAF = 0.2 mg/cm^2/day

DAF = 0.13

ESSA = 3,400 cm^2

CF = 1E-06 kg/mg

EF1 = 39 weeks/year

EF2 = 5 days/week

ED = 1.5 years

BW = 70.7 kg

AT = 1.5 years x 365 days/year = 547.5 days

Therefore:

$$DAD = \frac{1000*0.2*0.13*3400*0.000001*39*5*1.5}{70.7*547.5}$$

$$DAD = 7.E-04\frac{mg}{kg}-day$$

Risk from noncarcinogenic exposures are estimated as:

$$HQ = \frac{DAD}{RfD} \quad (2)$$

Where:

HQ = hazard quotient (unitless)

DAD = daily absorbed dose (mg/kg/day)

RfD = Reference Dose (mg/kg/day)

The inputs to calculate noncarcinogenic risk associated with phenanthrene for Construction Worker dermal contact in soil are as follows:

DAD = 7.E-04 mg/kg/day

RfD = 0.04 mg/kg/day

Therefore:

$$HQ = \frac{7.E-04}{0.04}$$

$$HQ = 2E-02$$

Groundwater

A receptor's average uptake of COCs through dermal contact with groundwater is estimated using the following equation (based on EPA, 2004):

$$DAD = \frac{DA_{event}*FE*ESSA*EF1*EF2*ED}{BW*AT} \quad (3)$$

Where:

DAD = Daily absorbed/administered dose (mg/kg-day)

DA_{event} = Absorbed dose per event (mg/cm^2-event)

FE = Frequency of events (event/day)

ESSA = Exposed skin surface area (cm^2)

*EF*1 = Exposure frequency (days/week)

*EF*2 = Exposure frequency (weeks/year)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

The dose absorbed per unit area per event (DA_{event}) equation for calculating dermal exposure to water is estimated using the following equations (based on EPA, 2004):

For organic COCs:

$$If\ t_{event} \leq \mathrm{t}^{*}, \text{then}\ DA_{event} = 2 \times \mathrm{FA} \times Kp \times \mathrm{C} \times \sqrt{\frac{6 \times \tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > \mathrm{t}^{*}, \text{then}\ DA_{event} = \mathrm{FA} \times Kp \times \mathrm{C} \times \left[\frac{t_{event}}{1+B} + 2 \times \tau_{event} \times \left(\frac{1+3\times B+3\times B^{2}}{(1+B^{2})}\right)\right] \quad (4)$$

For inorganic COCs:

$$DA_{event} = Kp \times \mathrm{C} \times t_{event} \quad (5)$$

where:

C = Chemical concentration in groundwater (mg/cm^3)

FA = Fraction absorbed water (dimensionless)

K_p = Dermal permeability coefficient of compound in water (cm/hr)

t_{event} = Event duration (hr/event)

τ_{event} = Lag time per event (hr/event)

t* = Time to reach steady state (hr) = 2.4 x τ_{event}

B = Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless)

Exposure assumptions related to the Construction Worker receptor are applied to demonstrate this calculation. The COC selected for demonstration is benzo(a)pyrene. As benzo(a)pyrene is carcinogenic, an averaging time representative of carcinogenic exposure is applied. The exposure parameters are as follows:

C = 0.0000028 mg/cm^3

FA = 1.0

K_p = 7.13E-01 cm/hr

t_{event} = 0.083 hr/event

t* = 12.1 hr

τ_{event} = 2.77 hr/event

DA_{event} = 2.65E-06 mg/cm^2-event

FE = 1 event/day

ESSA = 3400 cm^2

EF1 = 5 days/week

EF2 = 39 weeks/year

ED = 1.5 years

BW = 70.7 kg

AT = 56 years x 365 days/year = 20,440 days

For inorganic COCs, the variables to caclulate DA_{event} are provided in equation (5).

For organic COCs, the variables to calculate DA_{event} associated with benzo(a)pyrene for Construction Workers dermal contact with groundwater depend on if $t_{event} \leq$ or $> t^*$

If the parameter is organic and $t_{event} \leq t^*$, the first part of equation (4) is used to calculate DA_{event} and the following statements are true:

If $B \leq 0.6$, then t^* is calculated as:

$$t^* = 2.4 \times \tau_{event} \quad (6)$$

If $B > 0.6$, then t^* is calculated as:

$$t^* = 6\tau_{event}\ (b - \sqrt{b^2 - c^2}) \quad (7)$$

Where b and c are calculated as:

$$b = \frac{2(1+B)^2}{\pi} - c \quad (8)$$

$$c = \frac{1+3B+3B^2}{3(1+B)} \quad (9)$$

τ_{event} is calculated as:

$$\tau_{event} = \frac{isc^2}{6\times\{[10^{(-2.805063-0.0056118\times MW)}]\times isc\}} \quad (10)$$

Where:

isc = thickness of the skin stratum (cm)

MW = molecular weight (g/mol)

If the parameter is organic and $t_{event} \geq t^*$, equation (5) is used to calculate DA_{event} and the following statements are true:

t^* is calculated per equations (6) and (7).

τ_{event} is calculated per equation (10).

B is calculated as:

$$B = \frac{K_p\sqrt{MW}}{2.6} \quad (11)$$

The inputs to calculate τ_{event} and t^* associated with benzo(a)pyrene for Construction Workers dermal contact with groundwater are as follows:

isc =0.001 cm

MW = 252.32 g/mol

Therefore, τ_{event} is calculated as:

$$\tau_{event} = \frac{0.001^{\,2}}{6 \times \{[10^{(-2.805063-0.0056118\times 252.32)}] \times 0.001\}}$$

$$\tau_{event} = 2.77\ hr/event$$

Therefore, B is calculated as:

$$B = \frac{7.13\mathrm{E}-01\sqrt{252.32}}{2.6}$$

$$B = 4.35$$

Therefore, t^* is calculated as:

$$t^* = 6 * 2.77\ (1.38E+01 - \sqrt{1.38E+01^2 - 4.42^2})t^* = 1.21E+01\ hr/event$$

Where b and c are:

$$b = \frac{2(1+4.35)^2}{\pi} - 4.42$$

$$b = 1.38E+01$$

$$c = \frac{1 + 3 * 4.35 + 3(4.35)^2}{3(1+4.35)}$$

$$c = 4.42$$

Benzo(a)pyrene is an organic parameter; $t_{event} \leq t^*$; therefore, using equation (4), DA_{event} is calculated as follows:

$$DA_{event} = 2 * 1.0 * 7.13E-01 * 0.0000028 * \sqrt{\frac{6 * 0.083 * 2.77}{\pi}}$$

$$DA_{event} = 2.65E-06$$

Therefore:

$$DAD = \frac{2.65E-06*1*3400*5*39*1.5}{70.7*20440} \quad (12)$$

$$DAD = 2.E-06\frac{mg}{kg}-day$$

Risk from carcinogenic exposures are estimated as:

$$ILCR = DAD * SF \quad (13)$$

Where:

ILCR = incremental lifetime cancer risk (unitless)

DAD = daily absorbed dose (mg/kg/day)

SF = slope factor [mg/kg/day]$^{-1}$)

The inputs to calculate carcinogenic risk associated with benzo(a)pyrene for Construction Workers dermal contact with groundwater are as follows:

DAD = 2.E-06 mg/kg/day

SF = 1.0 $(mg/kg/day)^{-1}$

Therefore:

$$ILCR = 2.E-06 * 1.0$$

$$ILCR = 2.\mathrm{E}-06$$

Ingestion

Soil

The receptor's average uptake of COCs through incidental ingestion of soil is estimated using the following equation (based on EPA, 1989):

$$DAD = \frac{C*IRs*GIAF*CF*EF1*EF2*ED}{BW*AT} \quad (14)$$

Where:

DAD = Daily absorbed dose via incidental ingestion (mg/kg-day)

C = Chemical concentration in soil (mg/kg)

IR_S = Quantity of soil ingested daily (mg/day)

GIAF = Gastrointestinal absorption factor (unitless)

CF = Conversion factor (10^{-6} kg/mg)

EF1 = Exposure frequency (weeks/year)

EF2 = Exposure frequency (days/week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Exposure assumptions related to the Utility Worker receptor are applied to demonstrate this calculation. The COC selected for demonstration is arsenic. As arsenic is carcinogenic, an averaging time representative of carcinogenic exposure is applied. The exposure parameters are as follows:

C = 27 mg/kg

IR_S = 100 mg/day

GIAF = 0.5

CF = 1E-06 kg/mg

EF1 = 2 weeks/year

EF2 = 5 days/week

ED = 56 years

BW = 70.7 kg

AT = 56 years x 365 days/year = 20,440 days

Therefore:

$$DAD = \frac{27*100*0.5*0.000001*2*5*56}{70.7*20440}$$

$$DAD = 5.E-07 \frac{mg}{kg} - day$$

Risk from carcinogenic exposures are estimated as:

$$ILCR = DAD * SF \quad (12)$$

Where:

ILCR = incremental lifetime cancer risk (unitless)

DAD = daily absorbed dose (mg/kg/day)

SF = slope factor [mg/kg/day]$^{-1}$)

The inputs to calculate carcinogenic risk associated with arsenic for Utility Workers incidental ingestion of soil are as follows:

DAD = 5.E-07 mg/kg/day

SF = 9.5 (mg/kg/day)$^{-1}$

Therefore:

$$ILCR = 5.E-07 * 9.5$$

$$ILCR = 5.\mathrm{E}-06$$

Groundwater

The receptor's average uptake of COCs through incidental ingestion of groundwater is estimated using the following equation (MECP, 2011; USEPA, 1989):

$$DAD = \frac{C*IR_W*GIAF*FE*CF*EF1*EF2*ED}{BW*AT} \quad (13)$$

where:

DAD = Daily absorbed/administered dose (mg/kg-days)

C = Chemical concentration in groundwater (micrograms per litre [µg/L])

IR_W = Quantity of groundwater ingested daily (L/event)

GIAF = Gastrointestinal absorption factor (unitless)

FE = Frequency of events (events/day)

CF = Conversion factor (0.001 mg/µg)

EF1 = Exposure frequency (weeks/year)

EF2 = Exposure frequency (days/week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Exposure assumptions related to the Construction Worker receptor are applied to demonstrate this calculation. The COC selected for demonstration is benzo(a)pyrene. As benzo(a)pyrene is carcinogenic, an averaging time representative of carcinogenic exposure is applied. The exposure parameters are as follows:

C = 2.8 µg/L

IR_W = 0.05 L/event

GIAF = 1.00

FE = 1 event/day

CF = 0.001 mg/µg

*EF*1 = 39 weeks/year

*EF*2 = 5 days/week

ED = 1.5 years

BW = 70.7 kg

AT = 1.5 years x 365 days/year = 547.5 days

Therefore:

$$DAD = \frac{2.8*0.05*1*1*0.001*39*5*1.5}{70.7*547.5}$$

$$DAD = 1.E-06 \frac{mg}{kg}/day$$

Risk from noncarcinogenic exposures are estimated as:

$$HQ = \frac{DAD}{RfD} \quad (14)$$

Where:

HQ = hazard quotient (unitless)

DAD = daily absorbed dose (mg/kg/day)

RfD = Reference Dose (mg/kg/day)

The inputs to calculate noncarcinogenic risk associated with benzo(a)pyrene for Construction Worker dermal contact in soil are as follows:

DAD = 1.E-06 mg/kg/day

RfD = 0.005 mg/kg/day

Therefore:

$$HQ = \frac{1.E-06}{0.005}$$

$$HQ = 2E-04$$

Inhalation

Particulates

The receptor's average uptake of COCs through the inhalation of soil particulate is estimated using the following equation (based on MECP, 2011; Health Canada, 2010):

$$DAD = \frac{C*PM_{10}*CF*IR_A*FPM_{inh}*EF1*EF2*EF3*ED}{BW*AT} \quad (15)$$

Where:

DAD = Daily administered dose (mg/kg-day)

C = Chemical concentration in soil (mg/kg)

PM_{10} = Particulate concentration in air (micrograms of soil per cubic metre [µg-soil/m^3])

CF = Conversion factor, 1 kg/10^9 µg

IR_A = Inhalation rate (m^3/hour)

FPM_{inh} = Fraction of PM10 (unitless); MECP default value of 0.6 is applied herein

*EF*1 = Exposure frequency (days/week)

*EF*2 = Exposure frequency (weeks/year)

*EF*3 = Exposure frequency (hours/day)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Exposure assumptions related to the Construction Worker receptor are applied to demonstrate this calculation. The COC selected for demonstration is phenanthrene. As phenanthrene is noncarcinogenic, an averaging time representative of noncarcinogenic exposure is applied. The exposure parameters are as follows:

C = 1000 mg/kg

PM_{10} = 100 µg-soil/m^3

CF = 1 kg/10^9 µg

IR_A = 1.5 m^3/hour

FPM_{inh} = 0.6

*EF*1 = 5 days/week

*EF*2 = 39 weeks/year

*EF*3 = 9.8 hours/day

ED = 1.5 years

BW = 70.7 kg

AT = 1.5 x 365 = 547.5 days

Therefore:

$$DAD = \frac{1000*100*1E-09*1.5*0.6*5*39*9.8*1.5}{70.7*547.5}$$

$$DAD = 7.E-06\ mg/kg\ -day$$

Risk from noncarcinogenic exposures are estimated as:

$$HQ = \frac{DAD}{RfD_i} \quad (16)$$

Where:

HQ = hazard quotient (unitless)

DAD = daily absorbed dose (mg/kg/day)

RfD$_i$ = Inhalation Reference Dose (mg/kg/day)

Toxicity values that correspond to exposure doses (as opposed to concentrations) are required for evaluation of risk from particulates. Therefore, reference concentrations (RfCs) and unit risk factors (URFs) require conversion to RfD$_i$ and SF$_i$ values. The conversion factor for adults involves the EPA defaults of a daily inhalation rate of 20 cubic metres per day (m^3/day) and a body weight of 70 kg (University of Tennessee, 2013). The conversion is as follows:

$$RfD_i(mg/kg/day) = \frac{RfC(mg/m^3)*20(m^3/day)}{70(kg)} \quad (17)$$

and

$$SF_i([mg/kg/day]^{-1}) = \frac{URF([mg/m^3]^{-1})*10^3(\mu g/mg)*70(kg)}{20(m^3/day)} \quad (18)$$

The conversion of the noncarcinogenic RfC for phenanthrene of 5.0E-02 mg/m^3, to an RfD$_i$ for evaluation of particulates, is conducted as follows:

$$RfD_i = \frac{5.0E-02*20}{70} \quad (19)$$

$$RfD_i = 1.43E-02$$

Therefore:

$$HQ = \frac{7.E-06}{1.43E-02}$$

$$HQ = 5.E-04$$

Volatiles

The receptor's average uptake of COCs through the inhalation of volatiles in air is estimated using the following equation (based on EPA, 2009):

$$EC = \frac{(C_{air}*EF1*EF2*EF3*ED)}{AT} \quad (20)$$

Where:

EC = Exposure concentration (mg/m^3)

C_{air} = Volatile contaminant concentration in indoor or outdoor air (mg/m^3); these concentrations are obtained through modelling, as described in Appendices G3 and G4

EF1 = Exposure frequency (days/week)

EF2 = Exposure frequency to either indoor or outdoor air (weeks/year)

EF3 = Exposure frequency to either indoor or outdoor air (hours/day)

ED = Exposure duration (years)

AT = Averaging time (hours)

Exposure assumptions related to the Construction Worker receptor for outdoor air exposure to volatiles originating in the subsurface are applied to demonstrate this calculation. The COC selected for demonstration is benzene for a Construction Worker within a trench. As benzene is carcinogenic, an averaging time representative of carcinogenic exposure is applied. The exposure parameters are as follows:

C_{air} = 1.23E-04 mg/m^3

EF1 = 5 days/week

EF2 = 39 weeks/year

EF3 = 9.8 hours/day

ED = 1.5 years

AT = 56 x 365 x 24 = 490,560 hours

Therefore:

$$EC = \frac{1.23E{-}04{*}5{*}39{*}9.8{*}1.5}{490{,}560}$$

$$EC = 7.E-07\ mg/m^3$$

Risk from carcinogenic exposures are estimated as:

$$ILCR = EC * UR \quad (21)$$

Where:

ILCR = incremental lifetime cancer risk (unitless)

EC = daily absorbed dose (mg/m^3)

UR = unit risk ([mg/m^3]$^{-1}$)

The inputs to calculate carcinogenic risk associated with inhalation of benzene for Construction Workers in a trench are as follows:

EC = 7.E-07 mg/m^3

UR = 2.2E-03 (mg/m^3)$^{-1}$

Therefore:

$$ILCR = 7.E-07 * 2.2E-03$$

$$ILCR = 2.\mathrm{E}-9$$

Composite Receptor

For the composite receptor, exposure is expressed as the Lifetime Average Daily Dose (LADD) or Lifetime Average Exposure Concentration (LAEC). To calculate LADD or LAEC, the averaging time for each life stage is set equal to the lifetime exposure duration (that is, 76 years), and the individual contributions of each life stage are then summed. Thus, the composite receptor's LADD for any COC through either the ingestion of soil, dermal contact with soil, or the inhalation of dust pathway is estimated using the following equation:

$$LADD = DAD_{\text{inf}\,ant} + DAD_{toddler} + DAD_{child} + DAD_{teem} + DAD_{adult} \qquad (22)$$

Where:

LADD = LADD of the composite receptor for the specified pathway (mg/kg-days)

DAD_{infant} = DAD of infant for the specified pathway with averaging time set to 27,740 days (that is, 76 years) (mg/kg-days)

$DAD_{toddler}$ = DAD of toddler for the specified pathway with averaging time set to 27,740 days (mg/kg-days)

DAD_{child} = DAD of child for the specified pathway with averaging time set to 27,740 days (mg/kg-days)

DAD_{teen} = DAD of teen for the specified pathway with averaging time set to 27,740 days (mg/kg-days)

$DAD_{adul\ t}$ = DAD of adult for the specified pathway with averaging time set to 27,740 days (mg/kg-days)

For example, for the evaluation of the composite receptor's LADD from dermal exposure to soil:

$$DAD_{\text{inf}\,ant} = \frac{C * DAF * SAF_{\text{inf}\,ant} * ESSA_{\text{inf}\,ant} * CF * EF1 * EF2 * ED_{\text{inf}\,ant}}{BW_{\text{inf}\,ant} * 27740} \qquad (23)$$

$$DAD_{toddler} = \frac{C * DAF * SAF_{toddler} * ESSA_{toddler} * CF * EF1 * EF2 * ED_{toddler}}{BW_{toddler} * 27740} \qquad (24)$$

$$DAD_{child} = \frac{C * DAF * SAF_{child} * ESSA_{child} * CF * EF1 * EF2 * ED_{child}}{BW_{child} * 27740} \qquad (25)$$

$$DAD_{teen} = \frac{C * DAF * SAF_{teen} * ESSA_{teen} * CF * EF1 * EF2 * ED_{teen}}{BW_{teen} * 27740} \qquad (26)$$

$$DAD_{adult} = \frac{C * DAF * SAF_{adult} * ESSA_{adult} * CF * EF1 * EF2 * ED_{adult}}{BW_{adult} * 27740} \qquad (27)$$

And subsequently:

$$LADD = DAD_{\text{inf}\,ant} + DAD_{toddler} + DAD_{child} + DAD_{teem} + DAD_{adult}$$

The composite receptor's LAEC for the inhalation of volatile COCs in indoor or outdoor air is estimated in a similar manner, using the following equation:

$$LAEC = EC_{\text{inf ant}} + EC_{toddler} + EC_{child} + EC_{teem} + EC_{adult} \quad (28)$$

Where:

LAEC = LAEC of the composite receptor for the specified pathway (mg/m^3)

EC_{infant} = EC of infant for the specified pathway with averaging time set to 27,740 days (mg/m^3)

$EC_{toddler}$ = EC of toddler for the specified pathway with averaging time set to 27,740 days (mg/m^3)

EC_{child} = EC of child for the specified pathway with averaging time set to 27,740 days (mg/m^3)

EC_{teen} = EC of teen for the specified pathway with averaging time set to 27,740 days (mg/m^3)

EC_{adult} = EC of adult for the specified pathway with averaging time set to 27,740 days (mg/m^3)

Pregnant Female Receptor

The MECP Rationale Document (2011) advises that:

> *"Pro-rating for exposure frequency is not applied in the derivation of human health based component values based on developmental effects because the relevant duration of exposure is assumed to be short-term. This is because a single exposure to a chemical with developmental toxicity, rather than repeated or extended exposure, may be sufficient to elicit an adverse developmental effect."*

As such, Pregnant Female receptors have been assessed, and are assumed to be onsite (within buildings or outdoors) for 24 hours per day, 7 days per week, 52 weeks per year, for 56 years. These calculations only apply to noncarcinogenic COCs with developmental effects (listed in Section 4.3.2.1 of the main text) for inhalation pathways (refer to Section 4.2.1 of the main text).

The inhalation of dust pathway (refer to Equation 13) has been selected to demonstrate the calculations for Pregnant Female receptors. Exposure assumptions related to the Pregnant Female Resident receptor are applied. The COC selected for demonstration is benzo(a)pyrene, which has been identified as a COC with noncarcinogenic developmental effects. The exposure parameters are as follows:

C = 150 mg/kg

PM_{10} = 0.76 µg-soil/m^3

CF = 1 kg/10^9 µg

IR_A = 0.692 m^3/hour

FPM_{inh} = 0.6

EF1 = 7 days/week

EF2 = 52 weeks/year

EF3 = 24 hours/day

ED = 56 years

BW = 63.1 kg

AT = 56 years x 365 days/year = 20,440 days

Therefore:

$$DAD = \frac{150*0.76*1E-09*0.692*0.6*7*52*24*56}{63.1*20440}$$

$$DAD = 2.E-8\ mg/kg-day$$

Risk from noncarcinogenic exposures are estimated as:

$$HQ = \frac{DAD}{RfD_i} \quad (29)$$

Where:

HQ = hazard quotient (unitless)

DAD = daily absorbed dose (mg/kg/day)

RfD_i = Inhalation Reference Dose (mg/kg/day)

Refer to Equation 13 for the procedure for converting the RfC to an RfD_i. The RfD_i for benzo(a)pyrene is 5.7E-07 mg/kg/day, calculated from an RfC of 2.E-06 mg/m^3.

Therefore:

$$HQ = \frac{2.E-8}{5.7E-07}$$

$$HQ = 3.E-02\ mg/kg-day$$

References

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*, Ontario Ministry of the Environment, April 15.

U.S. Environmental Protection Agency (EPA). 1989. *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A).* EPA/540/1-89/002. December.

U.S. Environmental Protection Agency (EPA). 2004. *USEPA Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).* Final. July.

U.S. Environmental Protection Agency (EPA). 2009. *USEPA Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment).* Final. EPA-540-R-070-002, OSWER 9285.7-82. January.

University of Tennessee. 2013. *The Risk Assessment Information System, Derivation of Inhalation RfDs and Slope Factors from RfCs and Unit Risks*. Accessed November 11, 2015: http://rais.ornl.gov/tutorials/toxvals.html#2.4 Derivation of Inhalation RfDs and Slope Factors.

Appendix G2
Soil- and Groundwater-to-Indoor-Air Modelling

APPENDIX G2

Soil and Groundwater to Indoor Air Modelling

Approach

In September 1998, the U.S. Environmental Protection Agency (EPA) developed a series of models to estimate indoor air concentrations and associated health risks from subsurface vapour intrusion into buildings. These models were based on the analytical solutions of Johnson and Ettinger (J&E) (J&E 1991) for contaminant partitioning and subsurface vapour transport into buildings.

This appendix presents the J&E Model input parameters used for soil-to-indoor-air and groundwater-to-indoor-air modelling at the Risk Assessment (RA) Property. Specifically, the J&E Model Version 3.1 (EPA 2004) was used to develop attenuation factors for a generic residential building and generic commercial building. The building type included in the modelling was intended to conservatively represent potential future conditions at the RA Property. Once the attenuation factors were determined, they were applied to the estimated soil gas concentrations to estimate indoor air concentrations. Volatile partitioning relationships, discussed herein, were applied to soil and groundwater data to produce estimated soil gas concentrations at the source.

Depth to Groundwater

The presence of contaminated groundwater near a building foundation may preclude the use of the J&E Model for modelling vapour intrusion from groundwater. If the groundwater elevation is within 1.0 metres (m) of a building foundation, the J&E model is not considered applicable, and the Ontario Ministry of the Environment, Conservation and Parks (MECP) default attenuation factors of 0.02 for a residential building and 0.004 for a commercial building are used. Because groundwater elevations can fluctuate from spring to winter, the minimum depth to groundwater was used to account for seasonal variations in the water table, to determine whether the MECP default attenuation factor or the J&E Model would be used to estimate the indoor air exposure point concentrations from groundwater. Table G2-1 summarizes the minimum, average, and maximum depths to groundwater using data from 27 water level events from 2010 to 2020 (Jacobs 2020 – in progress). Overall, the minimum, maximum, and average groundwater depths are 0.93, 4.97, and 2.70 metres below ground surface (mbgs), respectively. The minimum groundwater depth selected for this assessment is 0.93 mbgs, based on a measurement collected in December 2011.

Table G2-2 summarizes the overall groundwater depths relative to the foundation depths of the generic residential and generic commercial building scenarios. Considering the minimum depth to groundwater at the RA Property, a separation distance of less than 1.0 m is present for both scenarios. As such, J&E-modelled attenuation factors were applied for the estimation of indoor air concentrations for the soil-to-indoor air pathway and MECP default attenuation factors were applied for the estimation of indoor air concentrations for the groundwater-to-indoor air pathway for the generic residential and commercial building scenarios.

Johnson and Ettinger Model Input Parameters

The J&E Model is a one-dimensional analytical solution for convective and diffusive vapour transport into indoor spaces, and provides an estimated attenuation coefficient that relates the vapour concentration in the indoor air space to the vapour concentration at the source of contamination. Inputs to the J&E Model include chemical parameters of the volatile compounds, saturated and unsaturated zone soil properties, and structural properties of the building. Default model input parameters are available from the MECP Rationale Document (MECP 2011). Site-specific model inputs are based on information gathered during

previous investigations (for example, depth to groundwater and structural properties of existing buildings, if applicable). Table G2-3 lists the J&E Model input parameters. The following is a brief discussion of select input parameters used to develop attenuation factors for the RA Property:

- Depth of Contamination (Source—Building Separation or L_T) – Depth of contamination represents separation between the contaminant and the structure. For all modelled building scenarios, this value is represented by the default value for the depth below grade to bottom of enclosed space floor, adjusted by 30 centimetres (cm) to account for a gravel crush layer that is required beneath the basement/foundation slab by the Ontario Building Code.
- Depth Below Grade to Water Table (L_{WT}) – Represented by the minimum depth to groundwater measured at the RA Property.
- Soil Type – The EPA (2004) version of the J&E model contains default soils characteristic information for the 12 Soil Conservation Survey soil texture classifications. Soil texture for the RA Property was identified as coarse-textured soil (fill). Because the maximum depth of fill is below the depth of a typical commercial slab-on-grade foundation, it is expected to remain beneath commercial buildings in the future. As such, the Soil Conservation Survey texture classification for sand was selected to best describe the site soil conditions. Strata A and C were based on the sand Soil Conservation Survey classification. Stratum B was applied to represent the 30-cm gravel crush layer required beneath the basement/foundation slab by Ontario Building Code.
- Fraction of Organic Carbon (f_{oc}) – Represented by MECP default (0.005).
- Enclosed Space Volume (Floor Length, Width, and Height) – The indoor air mixing volume is based on the length, width, and height of a building, assuming air in the structure is evenly distributed. The generic residential building dimensions were based on the MECP default values for a residential building, while the generic commercial building dimensions were based on the MECP default values for a commercial building.
- Average Vapour Flow Rate into Building – The MECP default vapour flow rate was applied. Table G2-3 provides the MECP default values for coarse-textured soil for a generic residential building and a generic commercial building.
- Soil Vapour Permeability – The MECP default soil vapour permeability was applied. Table G2-3 provides the MECP default values for coarse-textured soil for a generic residential building and generic commercial building.

To calculate the attenuation factors from impacted soil, the infinite source model function of the J&E Model was used. However, the infinite source model may not be representative of site conditions at the RA Property. Section 4 of the RA report discusses uncertainty associated with use of the infinite source model.

As the calculation of attenuation factors in the J&E Model is independent of soil and groundwater concentrations, chemical concentrations were entered into the J&E Model as 1 microgram per kilogram and 1 microgram per litre for soil and groundwater, respectively.

The DATAENTER and INTERCALCS spreadsheets from the J&E Model for soil are provided at the end of this appendix.

Calculation of Indoor Air Concentrations

Indoor air concentrations are estimated by applying the attenuation factors (developed, for this RA, using the J&E Model and MECP defaults) to estimated soil gas concentrations. Soil gas concentrations at the source are estimated by applying volatile partitioning relationships to soil and groundwater data, as demonstrated in Tables G2-4a, G2-4b, G2-5a, and G2-5b.

Tables G2-4a and G2-4b also present the equations used to calculate the soil gas concentrations from soil data for the generic commercial and generic residential building scenarios, respectively. Tables G2-5a and G2-5b present the equations used to calculate the soil gas concentrations from groundwater data for the generic commercial and generic residential building scenarios, respectively.

References

Johnson, P.C., and R.A. Ettinger (J&E). 1991. "Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapours into Buildings." *Environmental Science and Technology*. Vol. 25, No. 8. pp. 1,445-1,452.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*, Ontario Ministry of the Environment and Climate Change. April 15.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. Office of Emergency and Remedial Response, Washington, D.C. February 22.

Tables

Table G2-1. Depth to Groundwater Summary Table

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Water Level Event Year	Water Level Event Month	Number of Wells Included in Event	Minimum Depth (mbgs)	Maximum Depth (mbgs)	Average Depth (mbgs)	Source of Data
2010	March	28	1.27	3.59	2.54	Jacobs, 2020 - in draft
2010	June	27	1.49	4.97	3.00	Jacobs, 2020 - in draft
2010	October	30	1.41	3.86	2.76	Jacobs, 2020 - in draft
2010	December	28	1.17	3.60	2.59	Jacobs, 2020 - in draft
2011	June	30	1.39	4.54	2.49	Jacobs, 2020 - in draft
2011	September	30	2.02	3.83	2.92	Jacobs, 2020 - in draft
2011	December	30	0.93	3.30	2.24	Jacobs, 2020 - in draft
2012	June	31	1.68	3.82	2.84	Jacobs, 2020 - in draft
2012	December	31	1.21	3.54	2.48	Jacobs, 2020 - in draft
2013	August	30	1.45	3.88	2.84	Jacobs, 2020 - in draft
2013	October	30	1.22	3.47	2.43	Jacobs, 2020 - in draft
2014	July	27	1.23	3.85	2.41	Jacobs, 2020 - in draft
2014	October	32	1.29	3.46	2.51	Jacobs, 2020 - in draft
2015	September	30	1.66	3.69	2.75	Jacobs, 2020 - in draft
2015	September	3	2.50	3.46	3.11	Jacobs, 2020 - in draft
2015	November	32	1.32	3.54	2.60	Jacobs, 2020 - in draft
2016	August	28	1.80	3.84	2.89	Jacobs, 2020 - in draft
2016	October	31	2.00	3.98	3.05	Jacobs, 2020 - in draft
2017	August	31	1.91	3.92	2.99	Jacobs, 2020 - in draft
2017	December	46	1.47	3.88	2.79	Jacobs, 2020 - in draft
2018	August	62	1.92	3.98	2.92	Jacobs, 2020 - in draft
2018	December	66	1.36	3.77	2.63	Jacobs, 2020 - in draft
2019	March	67	1.12	3.53	2.41	Jacobs, 2020 - in draft
2019	July	67	1.49	4.54	2.64	Jacobs, 2020 - in draft
2019	October	64	2.17	3.97	2.93	Jacobs, 2020 - in draft
2019	December	66	1.32	3.63	2.49	Jacobs, 2020 - in draft
2020	February	65	1.41	3.73	2.64	Jacobs, 2020 - in draft
Overall:			**0.93**	**4.97**	**2.70**	

Jacobs Engineering Group, Inc. (Jacobs). 2020. *200 Beverley Street, Guelph, Ontario, Phase Two Environmental Site Assessment.* In progress.

Notes:

mbgs = metre below ground surface

Table G3-2. Depth to Groundwater Summary Table and Separation Distance Between Water Table and Building Foundations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Minimum Depth [a] (mbgs)	Maximum Depth [a] (mbgs)	Average Depth (mbgs) [a]	Building Setting			
			Generic Commercial		Generic Residential	
			Depth to Building Foundation (mbgs) (slab-on-grade) [b]	Separation Distance Between Foundation and Groundwater (m)	Depth to Building Foundation (mbgs) (slab-on-grade) [b]	Separation Distance Between Foundation and Groundwater (m)
0.93	4.54	2.54	0.1125	**< 1.0 m**	1.58	**< 1.0 m**

[a.] Based on data from 2010 to 2020

[b.] Default values from MECP Rationale Document (MECP, 2011) based on land use.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario* . April 1

Notes:

Bolded values indicate separation distance between building foundation and minimum depth to groundwater table is less than 1 m;
therefore, default attenuation factor from MECP Rationale Document (MECP, 2011) will be used to calculate indoor air concentrations from groundwater concentrations.

m = metre

mbgs = metre below ground surface

MECP = Ontario Ministry of the Environment, Conservation and Parks

Table G2-3. J&E Model Inputs

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Input	Generic Residential Building	Generic Commercial Building	Source/Reference
Average Soil/Groundwater Temperature, T_S (°C)	15	15	The default value applied in the Rationale Document (MECP 2011).
Depth below grade to bottom of enclosed space floor, L_F (cm)	158	11.25	The default value applied in the Rationale Document (MECP 2011).
Depth below grade to water table, L_{WT} (cm)	93	93	The minimum depth to groundwater at the RA Property.
Depth below grade to top of contamination, L_t (cm)	188	41.25	A separation distance of 30 cm for crushed gravel layer is applied between the slab and volatile soil impacts.
Depth below grade to bottom of contamination, L_b (cm)	0	0	A value of zero invokes the infinite or nondiminishing source model.
Thickness of soil stratum A, h_A (cm)	See L_F	See L_F	Stratum A must be at least as thick as the depth below grade to the bottom of the enclosed space floor. See L_F.
Thickness of soil stratum B, h_B (cm)	29.9	29.9	Default value applied in MGRA Model (MECP 2016).
Thickness of soil stratum C, h_C (cm)	Soil Model: $h_C = L_t - L_F - h_B$ Groundwater Model: $h_C = L_{WT} - L_F - h_B$	Soil Model: $h_C = L_t - L_F - h_B$ Groundwater Model: $h_C = L_{WT} - L_F - h_B$	Totals of h_A, h_B, and h_C must add up to L_t in soil model and L_{WT} in J&E groundwater model.
Enclosed Space Floor Thickness, L_{crack} (cm)	8	11.25	The default value applied in the Rationale Document (MECP 2011).
Soil Building Pressure Differential, ΔP (g/cm-s^2)	40	20	The default value applied in the Rationale Document (MECP 2011).
Enclosed space floor length, L_B (cm)	1225	2000	The default value applied in the Rationale Document (MECP 2011).
Enclosed space floor width, W_B (cm)	1225	1500	The default value applied in the Rationale Document (MECP 2011).
Enclosed space height, H_B (cm)	366	300	The default value applied in the Rationale Document (MECP 2011).
Floor-wall seam crack width (cm)	0.1	0.1	The default value applied in the Rationale Document (MECP 2011).
Indoor Air Exchange Rate, ER (1/h)	0.3	1	The default value applied in the Rationale Document (MECP 2011).
Average Vapour Flow Rate into Building, Q_{soil} (L/min)	8.45	9.8	The default value applied in the Rationale Document (MECP 2011) for coarse-textured soil by building type.
Soil Vapour Permeability (cm^2)	1.63E-07	1.78E-07	The default value applied in the Rationale Document (MECP 2011) for coarse-textured soil by building type.
Stratum A and C SCS soil type	S	S	Sand – based on observations at the RA Property.

Table G2-3. J&E Model Inputs

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Input	Generic Residential Building	Generic Commercial Building	Source/Reference
Total Porosity	0.375	0.375	The default value applied in the J&E Model (EPA 2004) for Sand.
Moisture-filled porosity	0.054	0.054	The default value applied in the J&E Model (EPA 2004) for sand.
Fraction of Organic Carbon	0.005	0.005	The default value applied in the J&E Model (EPA 2004) for sand.
Dry Bulk Density (g/cm^3)	1.66	1.66	The default value applied in the J&E Model (EPA 2004) for sand.
Stratum B SCS soil type	NA – Gravel Crush Layer	NA – Gravel Crush Layer	NA
Total Porosity	0.4	0.4	Default value for gravel crush applied in MGRA Model (MECP 2016).
Moisture-filled porosity	0.01	0.01	Default value for gravel crush applied in MGRA Model (MECP 2016).
Fraction of Organic Carbon	0	0	Default value for gravel crush applied in MGRA Model (MECP 2016).
Dry Bulk Density (g/cm^3)	1.6	1.6	Default value for gravel crush applied in MGRA Model (MECP 2016).

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*, Ontario Ministry of the Environment and Climate Change. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2016. *Modified Generic Risk Assessment Model*. Excel Spreadsheet. Ministry of the Environment. November 1. http://www.ene.gov.on.ca/environment/en/resources/STDPROD_086520.html. Revised version April 15, 2011, effective July 1, 2011.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings*. Office of Emergency and Remedial Response, Washington, D.C. February 22.

Notes:

°C = degree Celsius
cm = centimetre
cm^2 = cubic centimetre
EPA = U.S. Environmental Protection Agency
foc = fraction of organic carbon
g/cm^3 = gram per cubic centimetre
$g/cm\text{-}s^2$ = gram per centimetre per second squared
h = hour
J&E = Johnson and Ettinger
L/min = litre per minute
m = metre
S = sand
MECP = Ontario Ministry of the Environment, Conservation and Parks
MGRA = Modified Generic Risk Assessment
NA = not applicable
RA = risk assessment
SCS = Site Condition Standards

Table G2-4a. Partitioning and Indoor Air Exposure Point Concentrations from Soil (Generic Commercial Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Chemical Properties [a]		Soil Concentration C_{soil} [b] (µg/g)	Soil Gas Concentration at Soil Source C_{sg} [c] (µg/m³)	J&E Calculated Attenuation Factor α [d] Commercial	Indoor Air EPC in Building $C_{building}$ [e]	
	Henry's Law Constant, H_L (atm-m³/mol)	Adjusted Organic Carbon Partitioning Coefficient, K_{oc} (mL/g)				Commercial (µg/m³)	Commercial (mg/m³)
Acenaphthene	7.11E-05	1.22E+04	1.10E+02	5.40E+03	5.72E-04	3.08E+00	3.08E-03
Acenaphthylene	4.96E-05	1.22E+04	2.00E+00	6.85E+01	5.74E-04	3.94E-02	3.94E-05
Anthracene	1.90E-05	4.08E+04	1.90E+02	7.49E+02	5.51E-04	4.13E-01	4.13E-04
Benzene	3.46E-03	3.31E+02	3.10E-01	2.65E+04	6.11E-04	1.62E+01	1.62E-02
Benzo(a)anthracene	3.15E-06	4.62E+05	2.40E+02	1.38E+01	5.84E-04	8.08E-03	8.08E-06
Ethylbenzene	4.36E-03	1.04E+03	4.90E+00	1.72E+05	6.05E-04	1.04E+02	1.04E-01
Fluorene	3.73E-05	2.26E+04	1.80E+02	2.51E+03	5.60E-04	1.41E+00	1.41E-03
Mercury	4.69E-03	1.32E+06	3.80E-01	1.14E+01	5.46E-04	6.24E-03	6.24E-06
Methylnaphthalenes, 2-(1-)	2.29E-04	5.95E+03	5.90E+00	1.92E+03	5.80E-04	1.11E+00	1.11E-03
Naphthalene	2.07E-04	3.67E+03	2.60E+02	1.24E+05	5.93E-04	7.34E+01	7.34E-02
Phenanthrene	1.47E-05	4.16E+04	1.00E+03	3.00E+03	5.56E-04	1.67E+00	1.67E-03
Trichloroethylene	6.00E-03	1.35E+02	4.20E+01	1.40E+07	6.07E-04	8.52E+03	8.52E+00
Xylenes, total	3.64E-03	8.86E+02	4.60E+00	1.58E+05	6.02E-04	9.50E+01	9.50E-02
PHC F2							
Aliphatic C>10-C12	1.48E+00	5.02E+05	1.55E+03	3.84E+07	5.83E-04	2.24E+04	2.24E+01
Aliphatic C>12-C16	6.02E+00	1.00E+07	1.89E+03	9.60E+06	5.83E-04	5.60E+03	5.60E+00
Aromatic C>10-C12	1.73E-03	5.02E+03	3.87E+02	1.12E+06	5.83E-04	6.55E+02	6.55E-01
Aromatic C>12-C16	6.13E-04	1.00E+04	4.73E+02	2.45E+05	5.83E-04	1.43E+02	1.43E-01

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. "Modified Generic Risk Assessment Model." Excel Spreadsheet. April 15.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

a. The applied chemical properties were obtained from MECP (2011a). The Henry's Law constants were corrected for an average vadose zone temperature of 15°C.

b. Soil exposure point concentrations applied.

c. Soil gas concentration at the soil source determined from the C_{soil} using phase relationships and partitioning from EPA (2004) as follows, $C_{sg} = C_{soil} * \rho_{db} * H * CF/(k_d * \rho_{db} + \varepsilon_m + H * \varepsilon_v)$, where the Henry's Law Constant is $H=H_L/(T*R)$, CF is a conversion factor of 10^6 mL/m³, T is the vadose zone temperature in Kelvin, and the universal gas constant R is 8.206E-05 atm-m³/ mol K, $k_d = K_{oc}*f_{oc}$.
The following vadose zone soil properties were applied:

Total Porosity, ε_T (%)	37.5	Default total porosity for a sand soil type, as implemented in EPA (2004).
Moisture-filled Porosity, ε_m	0.054	Default moisture-filled porosity for a sand soil type, as implemented in EPA (2004).
Vapour-filled Porosity, ε_v	0.321	Calculated as $\varepsilon_T/100-\varepsilon_m$
Dry Bulk Soil Density, ρ_{db} (g/cm³)	1.66	Default dry bulk density for a sand soil type, as implemented in EPA (2004).
Soil and Groundwater Temperature (°C)	15	Default temperature, as indicated in MECP (2011a).
Fraction of Organic Carbon Content, f_{oc}	0.005	Default fraction of organic carbon, as implemented in MECP MGRA (2011b).

d. The calculation of the soil gas attenuation factor was conducted using the Microsoft Excel spreadsheet "SL-ADV-Feb04.xls" developed by USEPA (2004).

e. The EPC in the building is calculated from $C_{building} = C_{sg} * \alpha$.

Notes:

% = percent
°C = degree Celsius
µg/g = microgram per gram
µg/m³ = microgram per cubic metre
atm-m³/mol = atmosphere per cubic metre per mole
COC = contaminant of concern
EPC = exposure point concentration
EPA = U.S. Environmental Protection Agency
F = fraction
g/cm³ = gram per cubic centimetre
J&E = Johnson and Ettinger
K = degree Kelvin
max = maximum
MGRA = Modified Generic Risk Assessment
mL/g = millilitre per gram
mL/m³ = millilitre per cubic metre
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
RA = risk assessment

Table G2-4b. Partitioning and Indoor Air Exposure Point Concentrations from Soil (Generic Residential Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COCs	Chemical Properties [a]		Soil Concentration C_{soil} [b] (µg/g)	Soil Gas Concentration at Soil Source C_{sg} [c] (µg/m³)	J&E Calculated Attenuation Factor α [d] Residential	Indoor Air EPC in Building $C_{building}$ [e]	
	Henry's Law Constant, H_L (atm-m³/mol)	Adjusted Organic Carbon Partitioning Coefficient, K_{oc} (mL/g)				Residential (µg/m³)	Residential (mg/m³)
Acenaphthene	7.11E-05	1.22E+04	1.10E+02	5.40E+03	2.65E-03	1.43E+01	1.43E-02
Acenaphthylene	4.96E-05	1.22E+04	2.00E+00	6.85E+01	2.66E-03	1.82E-01	1.82E-04
Anthracene	1.90E-05	4.08E+04	1.90E+02	7.49E+02	2.54E-03	1.90E+00	1.90E-03
Benzene	3.46E-03	3.31E+02	3.10E-01	2.65E+04	2.85E-03	7.55E+01	7.55E-02
Benzo(a)anthracene	3.15E-06	4.62E+05	2.40E+02	1.38E+01	2.71E-03	3.75E-02	3.75E-05
Ethylbenzene	4.36E-03	1.04E+03	4.90E+00	1.72E+05	2.82E-03	4.86E+02	4.86E-01
Fluorene	3.73E-05	2.26E+04	1.80E+02	2.51E+03	2.59E-03	6.50E+00	6.50E-03
Mercury	4.69E-03	1.32E+06	3.80E-01	1.14E+01	2.52E-03	2.87E-02	2.87E-05
Methylnaphthalenes, 2-(1-)	2.29E-04	5.95E+03	5.90E+00	1.92E+03	2.69E-03	5.16E+00	5.16E-03
Naphthalene	2.07E-04	3.67E+03	2.60E+02	1.24E+05	2.76E-03	3.42E+02	3.42E-01
Phenanthrene	1.47E-05	4.16E+04	1.00E+03	3.00E+03	2.57E-03	7.69E+00	7.69E-03
Trichloroethylene	6.00E-03	1.35E+02	4.20E+01	1.40E+07	2.83E-03	3.98E+04	3.98E+01
Xylenes, total	3.64E-03	8.86E+02	4.60E+00	1.58E+05	2.81E-03	4.43E+02	4.43E-01
PHC F2							
Aliphatic C>10-C12	1.48E+00	5.02E+05	1.55E+03	3.84E+07	2.71E-03	1.04E+05	1.04E+02
Aliphatic C>12-C16	6.02E+00	1.00E+07	1.89E+03	9.60E+06	2.71E-03	2.60E+04	2.60E+01
Aromatic C>10-C12	1.73E-03	5.02E+03	3.87E+02	1.12E+06	2.71E-03	3.04E+03	3.04E+00
Aromatic C>12-C16	6.13E-04	1.00E+04	4.73E+02	2.45E+05	2.71E-03	6.62E+02	6.62E-01

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011a. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011b. "Modified Generic Risk Assessment Model." Excel Spreadsheet. April 15.
U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

a. The applied chemical properties were obtained from MECP (2011a). The Henry's Law constants were corrected for an average vadose zone temperature of 15°C.

b. Soil exposure point concentrations applied.

c. Soil gas concentration at the soil source determined from the C_{soil} using phase relationships and partitioning from EPA (2004) as follows, $C_{sg} = C_{soil} * \rho_{db} * H * CF/(k_d * \rho_{db} + \varepsilon_m + H * \varepsilon_v)$, where the Henry's Law Constant is $H=H_L/(T*R)$, CF is a conversion factor of 10^6 mL/m³, T is the vadose zone temperature in Kelvin, and the universal gas constant R is 8.206E-05 atm-m³/ mol K, $k_d = K_{oc}*f_{oc}$.
The following vadose zone soil properties were applied:

Total Porosity, ε_T (%)	37.5	Default total porosity for a sand soil type, as implemented in EPA (2004).
Moisture-filled Porosity, ε_m	0.054	Default moisture-filled porosity for a sand soil type, as implemented in EPA (2004).
Vapour-filled Porosity, ε_v	0.321	Calculated as $\varepsilon_T/100-\varepsilon_m$
Dry Bulk Soil Density, ρ_{db} (g/cm³)	1.66	Default dry bulk density for a sand soil type, as implemented in EPA (2004).
Soil and Groundwater Temperature (°C)	15	Default temperature, as indicated in MECP (2011a).
Fraction of Organic Carbon Content, f_{oc}	0.005	Default fraction of organic carbon, as implemented in MECP MGRA (2011b).

d. The calculation of the soil gas attenuation factor was conducted using the Microsoft Excel spreadsheet "SL-ADV-Feb04.xls" developed by USEPA (2004).

e. The EPC in the building is calculated from $C_{building} = C_{sg} * \alpha$.

Notes:

% = percent
°C = degree Celsius
µg/g = microgram per gram
µg/m³ = microgram per cubic metre
atm-m³/mol = atmosphere per cubic metre per mole
COC = contaminant of concern
EPC = exposure point concentration
EPA = U.S. Environmental Protection Agency
F = fraction
g/cm³ = gram per cubic centimetre
J&E = Johnson and Ettinger
K = degree Kelvin
max = maximum
MGRA = Modified Generic Risk Assessment
mL/g = millilitre per gram
mL/m³ = millilitre per cubic metre
MECP = Ontario Ministry of the Environment, Conservation and Parks
PHC = petroleum hydrocarbon
RA = risk assessment

Table G2-5a. Indoor Air Exposure Point Concentrations from Groundwater (Generic Commercial Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Henry's Law Constant H_L [a] (atm m^3/mol)	Groundwater Concentration C_{gw} [b] (µg/L)	Soil Gas Concentration at Water Table C_{sg} [c] (µg/m^3)	MECP Default Attenuation Factor α [d] Commercial	Indoor Air EPC in Building $C_{building}$ [e]	
					Commercial (µg/m^3)	Commercial (mg/m^3)
Acenaphthene	7.11E-05	4.80E+01	1.44E+02	4.00E-03	5.77E-01	5.77E-04
Anthracene	1.90E-05	3.70E+01	2.98E+01	4.00E-03	1.19E-01	1.19E-04
Benzene	3.46E-03	8.00E+01	1.17E+04	4.00E-03	4.69E+01	4.69E-02
Benzo(a)anthracene	3.15E-06	2.50E+01	3.33E+00	4.00E-03	1.33E-02	1.33E-05
Dichloroethane, 1,1-	3.65E-03	3.50E+01	5.40E+03	4.00E-03	2.16E+01	2.16E-02
Dichloroethene, 1,1-	1.80E-02	7.60E+01	5.80E+04	4.00E-03	2.32E+02	2.32E-01
Dichloroethene, 1,2-cis-	2.60E-03	1.10E+03	1.21E+05	4.00E-03	4.83E+02	4.83E-01
Dichloroethene, 1,2-trans-	6.11E-03	9.70E+01	2.51E+04	4.00E-03	1.00E+02	1.00E-01
n-Hexane	1.15E+00	8.90E+00	4.33E+05	4.00E-03	1.73E+03	1.73E+00
Methylnaphthalenes, 2-(1-)	2.29E-04	3.30E+02	3.20E+03	4.00E-03	1.28E+01	1.28E-02
Naphthalene	2.07E-04	3.20E+01	2.81E+02	4.00E-03	1.12E+00	1.12E-03
Phenanthrene	1.47E-05	1.30E+02	8.10E+01	4.00E-03	3.24E-01	3.24E-04
Tetrachloroethene	1.02E-02	1.30E+00	5.58E+02	4.00E-03	2.23E+00	2.23E-03
Trichloroethane, 1,1,1-	1.09E-02	4.40E+01	2.02E+04	4.00E-03	8.09E+01	8.09E-02
Trichloroethylene	6.00E-03	9.40E+03	2.38E+06	4.00E-03	9.53E+03	9.53E+00
Vinyl Chloride	2.09E-02	9.90E+02	8.74E+05	4.00E-03	3.50E+03	3.50E+00
PHC F1						
Aliphatic C6-C8	7.59E-01	3.99E+02	1.28E+07	4.00E-03	5.13E+04	5.13E+01
Aliphatic C>8-C10	1.08E+00	4.16E+01	1.90E+06	4.00E-03	7.61E+03	7.61E+00
Aromatic C>8-C10	6.49E-03	2.19E+02	6.02E+04	4.00E-03	2.41E+02	2.41E-01
PHC F2						
Aliphatic C>10-C12	1.48E+00	6.00E+03	3.76E+08	4.00E-03	1.50E+06	1.50E+03
Aliphatic C>12-C16	6.02E+00	5.00E+02	1.27E+08	4.00E-03	5.09E+05	5.09E+02
Aromatic C>10-C12	1.73E-03	1.51E+05	1.10E+07	4.00E-03	4.41E+04	4.41E+01
Aromatic C>12-C16	6.13E-04	9.28E+04	2.41E+06	4.00E-03	9.62E+03	9.62E+00

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

a. The applied chemical properties were obtained from MECP (2011).

b. Groundwater Estimated Maximum Concentrations applied.

c. Soil gas concentration at the water table determined from C_{gw} using Henry's law as follows, $C_{sg} = C_{gw} * CF * H_L / (T*R)$, where CF is a conversion factor of 1,000 L/m^3, T is the vadose zone temperature in Kelvin, the universal gas constant R is 8.206E-05 atm m^3/ mol K, and the following vadose zone soil properties were applied:

Soil/Groundwater Temperature (°C)	15	Default temperature, as indicated in MECP (2011).

d. The calculation of the soil gas attenuation factor was conducted using the MECP default attenuation factor for commercial buildings (2011).

e. The EPC in building is calculated from $C_{building} = C_{sg} * \alpha$.

Notes:

µg/L = microgram per litre
µg/m^3 = microgram per cubic metre
atm m^3/mol = atmosphere per cubic metre per mole
COC = contaminant of concern
EPC = exposure point concentration
g/cm^3 = gram per cubic centimetre
J&E = Johnson and Ettinger
L/m^3 = litre per cubic metre
MECP = Ontario Ministry of the Environment, Conservation and Parks
mg/m_3 = milligram per cubic metre
PHC = petroleum hydrocarbon
EPA = U.S. Environmental Protection Agency

Table G2-5b. Indoor Air Exposure Point Concentrations from Groundwater (Generic Residential Building)

Risk Assessment, 200 Beverley Street, Guelph, Ontario

COC	Henry's Law Constant H_L [a] (atm m^3/mol)	Groundwater Concentration C_{gw} [b] (µg/L)	Soil Gas Concentration at Water Table C_{sg} [c] (µg/m^3)	MECP Default Attenuation Factor α [d] Residential	Indoor Air EPC in Building $C_{building}$ [e]	
					Residential (µg/m^3)	Residential (mg/m^3)
Acenaphthene	7.11E-05	4.80E+01	1.44E+02	2.00E-02	2.88E+00	2.88E-03
Anthracene	1.90E-05	3.70E+01	2.98E+01	2.00E-02	5.96E-01	5.96E-04
Benzene	3.46E-03	8.00E+01	1.17E+04	2.00E-02	2.34E+02	2.34E-01
Benzo(a)anthracene	3.15E-06	2.50E+01	3.33E+00	2.00E-02	6.65E-02	6.65E-05
Dichloroethane, 1,1-	3.65E-03	3.50E+01	5.40E+03	2.00E-02	1.08E+02	1.08E-01
Dichloroethene, 1,1-	1.80E-02	7.60E+01	5.80E+04	2.00E-02	1.16E+03	1.16E+00
Dichloroethene, 1,2-cis-	2.60E-03	1.10E+03	1.21E+05	2.00E-02	2.42E+03	2.42E+00
Dichloroethene, 1,2-trans-	6.11E-03	9.70E+01	2.51E+04	2.00E-02	5.01E+02	5.01E-01
n-Hexane	1.15E+00	8.90E+00	4.33E+05	2.00E-02	8.66E+03	8.66E+00
Methylnaphthalenes, 2-(1-)	2.29E-04	3.30E+02	3.20E+03	2.00E-02	6.39E+01	6.39E-02
Naphthalene	2.07E-04	3.20E+01	2.81E+02	2.00E-02	5.61E+00	5.61E-03
Phenanthrene	1.47E-05	1.30E+02	8.10E+01	2.00E-02	1.62E+00	1.62E-03
Tetrachloroethene	1.02E-02	1.30E+00	5.58E+02	2.00E-02	1.12E+01	1.12E-02
Trichloroethane, 1,1,1-	1.09E-02	4.40E+01	2.02E+04	2.00E-02	4.05E+02	4.05E-01
Trichloroethylene	6.00E-03	9.40E+03	2.38E+06	2.00E-02	4.77E+04	4.77E+01
Vinyl Chloride	2.09E-02	9.90E+02	8.74E+05	2.00E-02	1.75E+04	1.75E+01
PHC F1						
Aliphatic C6-C8	7.59E-01	3.99E+02	1.28E+07	2.00E-02	2.56E+05	2.56E+02
Aliphatic C>8-C10	1.08E+00	4.16E+01	1.90E+06	2.00E-02	3.81E+04	3.81E+01
Aromatic C>8-C10	6.49E-03	2.19E+02	6.02E+04	2.00E-02	1.20E+03	1.20E+00
PHC F2						
Aliphatic C>10-C12	1.48E+00	6.00E+03	3.76E+08	2.00E-02	7.51E+06	7.51E+03
Aliphatic C>12-C16	6.02E+00	5.00E+02	1.27E+08	2.00E-02	2.54E+06	2.54E+03
Aromatic C>10-C12	1.73E-03	1.51E+05	1.10E+07	2.00E-02	2.20E+05	2.20E+02
Aromatic C>12-C16	6.13E-04	9.28E+04	2.41E+06	2.00E-02	4.81E+04	4.81E+01

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

a. The applied chemical properties were obtained from MECP (2011).

b. Groundwater Estimated Maximum Concentrations applied.

c. Soil gas concentration at the water table determined from C_{gw} using Henry's law as follows, $C_{sg} = C_{gw} * CF * H_L / (T*R)$, where CF is a conversion factor of 1,000 L/m^3, T is the vadose zone temperature in Kelvin, the universal gas constant R is 8.206E-05 atm m^3/ mol K, and the following vadose zone soil properties were applied:

Soil/Groundwater Temperature (°C)	15	Default temperature, as indicated in MECP (2011).

d. The calculation of the soil gas attenuation factor was conducted using the MECP default attenuation factor for residential buildings (2011).

e. The EPC in building is calculated from $C_{building} = C_{sg} * \alpha$.

Notes:

°C = degree Celsius

µg/L = microgram per litre

µg/m^3 = microgram per cubic metre

atm m^3/mol = atmosphere per cubic metre per mole

EPC = exposure point concentration

g/cm^3 = gram per cubic centimetre

J&E = Johnson and Ettinger

L/m^3 = litre per cubic metre

MECP = Ontario Ministry of the Environment, Conservation and Parks

mg/m^3 = milligram per cubic metre

PHC = petroleum hydrocarbon

EPA = U.S. Environmental Protection Agency

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
56553	1.00E+00	Benzo(a)anthracene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	11.25	41.25	0	11.25	29.9	0.1			1.78E-07

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
Lookup Soil Parameters: S	1.66	0.375	0.054	0.005	Lookup Soil Parameters:	1.6	0.4	0.01	0	Lookup Soil Parameters: S	1.66	0.375	0.054	0.005

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
11.25	20	2000	1500	300	0.1	1	9.8

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

INTERMEDIATE CALCULATIONS SHEET

Benzo(a)anthracene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	22,881	3.15E-06	1.33E-04	1.77E-04	8.27E-03	1.39E-02	8.27E-03	1.38E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.16E+03	1.15E-04	0.10	1.63E+02	8.27E-03	7.00E+02	6.19E+137	5.84E-04	6.73E-08	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Benzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	8,071	3.46E-03	1.46E-01	1.77E-04	1.42E-02	2.39E-02	1.42E-02	2.39E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
8.28E-01	1.65E+02	0.10	1.63E+02	1.42E-02	7.00E+02	1.37E+80	6.11E-04	1.01E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	7.8E-06	3.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Trichloroethylene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	8,495	6.00E-03	2.54E-01	1.77E-04	1.28E-02	2.15E-02	1.28E-02	2.14E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.39E-01	6.04E+02	0.10	1.63E+02	1.28E-02	7.00E+02	1.85E+89	6.07E-04	3.66E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	1.1E-04	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Acenaphthene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	16,062	7.11E-05	3.01E-03	1.77E-04	6.81E-03	1.14E-02	6.81E-03	1.14E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.06E+01	9.81E-02	0.10	1.63E+02	6.81E-03	7.00E+02	3.02E+167	5.72E-04	5.60E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.1E-01

END

INTERMEDIATE CALCULATIONS SHEET

Naphthalene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	12,861	2.07E-04	8.77E-03	1.77E-04	9.54E-03	1.60E-02	9.54E-03	1.60E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
9.19E+00	9.51E-01	0.10	1.63E+02	9.54E-03	7.00E+02	3.32E+119	5.93E-04	5.64E-04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	3.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Ethylbenzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	10,098	4.36E-03	1.84E-01	1.77E-04	1.21E-02	2.04E-02	1.21E-02	2.03E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.59E+00	6.94E+01	0.10	1.63E+02	1.21E-02	7.00E+02	1.06E+94	6.05E-04	4.20E-02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Acenaphthylene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	15,781	4.96E-05	2.10E-03	1.77E-04	7.09E-03	1.19E-02	7.09E-03	1.19E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.06E+01	6.85E-02	0.10	1.63E+02	7.09E-03	7.00E+02	5.31E+160	5.74E-04	3.93E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Xylenes, Total

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	10,228	3.64E-03	1.54E-01	1.77E-04	1.15E-02	1.94E-02	1.15E-02	1.94E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.22E+00	6.76E+01	0.10	1.63E+02	1.15E-02	7.00E+02	5.86E+98	6.02E-04	4.07E-02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Mercury (elemental)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	15,302	4.69E-03	1.98E-01	1.77E-04	4.96E-03	8.34E-03	4.96E-03	8.32E-03	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
6.60E+05	3.01E-04	0.10	1.63E+02	4.96E-03	7.00E+02	5.10E+229	5.46E-04	1.64E-07	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	3.0E-04

END

INTERMEDIATE CALCULATIONS SHEET

Aliphatic C10-C12 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	11,689	1.48E+00	6.26E+01	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.26E+03	4.94E+01	0.10	1.63E+02	8.08E-03	7.00E+02	1.10E+141	5.83E-04	2.88E-02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Aliphatic C12-C16 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	12,788	6.02E+00	2.54E+02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.51E+04	1.01E+01	0.10	1.63E+02	8.08E-03	7.00E+02	1.10E+141	5.83E-04	5.91E-03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Aromatic C10-C12 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	11,689	1.73E-03	7.31E-02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.26E+01	5.80E+00	0.10	1.63E+02	8.08E-03	7.00E+02	1.10E+141	5.83E-04	3.38E-03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Aromatic C12-C16 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	12,788	6.13E-04	2.59E-02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.51E+01	1.03E+00	0.10	1.63E+02	8.08E-03	7.00E+02	1.09E+141	5.83E-04	6.03E-04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

PHENANTHRENE

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	18,018	1.47E-05	6.23E-04	1.77E-04	5.58E-03	9.37E-03	5.58E-03	9.35E-03	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.04E+02	5.99E-03	0.10	1.63E+02	5.58E-03	7.00E+02	1.73E+204	5.56E-04	3.33E-06	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.1E+00

END

INTERMEDIATE CALCULATIONS SHEET

Methylnaphthalene, 1,2-

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	13,964	2.29E-04	9.68E-03	1.77E-04	7.76E-03	1.30E-02	7.76E-03	1.30E-02	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.49E+01	6.49E-01	0.10	1.63E+02	7.76E-03	7.00E+02	8.14E+146	5.80E-04	3.77E-04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Fluorene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	16,184	3.73E-05	1.58E-03	1.77E-04	5.87E-03	9.86E-03	5.87E-03	9.84E-03	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
5.65E+01	2.79E-02	0.10	1.63E+02	5.87E-03	7.00E+02	1.59E+194	5.60E-04	1.56E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.4E-01

END

INTERMEDIATE CALCULATIONS SHEET

Anthracene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.78E-07	7,000	1.00E+00	2.50E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
3.00E+06	2.33E-04	11.25	18,289	1.90E-05	8.05E-04	1.77E-04	5.24E-03	8.80E-03	5.24E-03	8.78E-03	30	11.25

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.02E+02	7.89E-03	0.10	1.63E+02	5.24E-03	7.00E+02	3.05E+217	5.51E-04	4.34E-06	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	5.0E-02

END

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
56553	1.00E+00	Benzo(a)anthracene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	158	188	0	158	29.9	0.1			1.63E-07

MORE ↓

ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
Lookup Soil Parameters: S	1.66	0.375	0.054	0.005		1.6	0.4	0.01	0	S	1.66	0.375	0.054	0.005

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
8	40	1225	1225	366	0.1	0.3	8.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

INTERMEDIATE CALCULATIONS SHEET

Benzo(a)anthracene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	22,881	3.15E-06	1.33E-04	1.77E-04	8.27E-03	1.39E-02	8.27E-03	1.38E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.16E+03	1.15E-04	0.10	1.41E+02	8.27E-03	4.90E+02	4.97E+120	2.71E-03	3.12E-07	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Benzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	8,071	3.46E-03	1.46E-01	1.77E-04	1.42E-02	2.39E-02	1.42E-02	2.39E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
8.28E-01	1.65E+02	0.10	1.41E+02	1.42E-02	4.90E+02	1.56E+70	2.85E-03	4.71E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	7.8E-06	3.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Trichloroethylene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	8,495	6.00E-03	2.54E-01	1.77E-04	1.28E-02	2.15E-02	1.28E-02	2.14E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.39E-01	6.04E+02	0.10	1.41E+02	1.28E-02	4.90E+02	1.55E+78	2.83E-03	1.71E+00	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	1.1E-04	4.0E-02

END

INTERMEDIATE CALCULATIONS SHEET

Acenaphthene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	16,062	7.11E-05	3.01E-03	1.77E-04	6.81E-03	1.14E-02	6.81E-03	1.14E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.06E+01	9.81E-02	0.10	1.41E+02	6.81E-03	4.90E+02	5.02E+146	2.65E-03	2.59E-04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.1E-01

END

INTERMEDIATE CALCULATIONS SHEET

Naphthalene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	12,861	2.07E-04	8.77E-03	1.77E-04	9.54E-03	1.60E-02	9.54E-03	1.60E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
9.19E+00	9.51E-01	0.10	1.41E+02	9.54E-03	4.90E+02	4.93E+104	2.76E-03	2.62E-03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	3.0E-03

END

INTERMEDIATE CALCULATIONS SHEET

Ethylbenzene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	10,098	4.36E-03	1.84E-01	1.77E-04	1.21E-02	2.04E-02	1.21E-02	2.03E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.59E+00	6.94E+01	0.10	1.41E+02	1.21E-02	4.90E+02	2.30E+82	2.82E-03	1.96E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Acenaphthylene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	15,781	4.96E-05	2.10E-03	1.77E-04	7.09E-03	1.19E-02	7.09E-03	1.19E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
3.06E+01	6.85E-02	0.10	1.41E+02	7.09E-03	4.90E+02	6.08E+140	2.66E-03	1.82E-04	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Xylenes, Total

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	10,228	3.64E-03	1.54E-01	1.77E-04	1.15E-02	1.94E-02	1.15E-02	1.94E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.22E+00	6.76E+01	0.10	1.41E+02	1.15E-02	4.90E+02	3.26E+86	2.81E-03	1.90E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Mercury (elemental)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	15,302	4.69E-03	1.98E-01	1.77E-04	4.96E-03	8.34E-03	4.96E-03	8.32E-03	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
6.60E+05	3.01E-04	0.10	1.41E+02	4.96E-03	4.90E+02	1.61E+201	2.52E-03	7.57E-07	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	3.0E-04

END

INTERMEDIATE CALCULATIONS SHEET

Aliphatic C10-C12 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	11,689	1.48E+00	6.26E+01	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.26E+03	4.94E+01	0.10	1.41E+02	8.08E-03	4.90E+02	3.48E+123	2.71E-03	1.34E-01	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Aliphatic C12-C16 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	12,788	6.02E+00	2.54E+02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.51E+04	1.01E+01	0.10	1.41E+02	8.08E-03	4.90E+02	3.48E+123	2.71E-03	2.74E-02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.0E+00

END

INTERMEDIATE CALCULATIONS SHEET

Aromatic C10-C12 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	11,689	1.73E-03	7.31E-02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.26E+01	5.80E+00	0.10	1.41E+02	8.08E-03	4.90E+02	3.48E+123	2.71E-03	1.57E-02	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

Aromatic C12-C16 (PHC F2)

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	12,788	6.13E-04	2.59E-02	1.77E-04	8.08E-03	1.36E-02	8.08E-03	1.36E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
2.51E+01	1.03E+00	0.10	1.41E+02	8.08E-03	4.90E+02	3.47E+123	2.71E-03	2.80E-03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	2.0E-01

END

INTERMEDIATE CALCULATIONS SHEET

PHENANTHRENE

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	18,018	1.47E-05	6.23E-04	1.77E-04	5.58E-03	9.37E-03	5.58E-03	9.35E-03	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.04E+02	5.99E-03	0.10	1.41E+02	5.58E-03	4.90E+02	7.93E+178	2.57E-03	1.54E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.1E+00

END

INTERMEDIATE CALCULATIONS SHEET

Methylnaphthalene, 1,2-

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	13,964	2.29E-04	9.68E-03	1.77E-04	7.76E-03	1.30E-02	7.76E-03	1.30E-02	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.49E+01	6.49E-01	0.10	1.41E+02	7.76E-03	4.90E+02	4.83E+128	2.69E-03	1.75E-03	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	NA

END

INTERMEDIATE CALCULATIONS SHEET

Fluorene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	16,184	3.73E-05	1.58E-03	1.77E-04	5.87E-03	9.86E-03	5.87E-03	9.84E-03	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
5.65E+01	2.79E-02	0.10	1.41E+02	5.87E-03	4.90E+02	1.28E+170	2.59E-03	7.22E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	1.4E-01

END

INTERMEDIATE CALCULATIONS SHEET

Anthracene

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R ($\mu g/kg$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	30	0.321	0.390	0.321	#N/A	#N/A	#N/A	1.63E-07	4,900	1.00E+00	4.58E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} ($atm\text{-}m^3/mol$)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.27E+06	2.15E-04	158	18,289	1.90E-05	8.05E-04	1.77E-04	5.24E-03	8.80E-03	5.24E-03	8.78E-03	30	158

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.02E+02	7.89E-03	0.10	1.41E+02	5.24E-03	4.90E+02	3.17E+190	2.54E-03	2.00E-05	NA	NA	NA	NA

Finite source indoor attenuation coefficient, <α> (unitless)	Mass limit bldg. conc., $C_{building}$ ($\mu g/m^3$)	Finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Final finite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	NA	NA	NA	NA	5.0E-02

END

Appendix G3
Soil- and Groundwater-to-Outdoor-Air Modelling

APPENDIX G3

Soil- and Groundwater-to-Outdoor-Air Modelling

Estimation of exposure via the soil- and groundwater-to-outdoor-air pathway involves calculating the predicted concentration of contaminant of concern (COC) vapours that result in outdoor air because of the migration of vapours from subsurface soil layers and from groundwater through unsaturated soil into receptor breathing spaces. While the Ontario Ministry of the Environment, Conservation and Parks (MECP) (2011) provides component values for the soil-to-outdoor air pathway (S-OA), the S-OA values are not specifically used in the RA for the following reasons:

- They were derived to be protective of a "cleaned up brownfield" (that is, following the implementation of risk management measures [RMMs]),
- The values only consider vapours from a source in soil, and
- There have been updates to human health inhalation toxicity reference values (TRVs) that may cause some S-OA components to be insufficiently conservative. As the management of vapours traveling to the ground surface and discharging to outdoor air is not typically proposed for redeveloped sites, the application of the most current science in assessing this pathway was preferred in order to provide an appropriately conservative assessment of the potential risk.

The approach for evaluating the outdoor air pathway, described in the following subsections, is intended to evaluate risks to receptors at the RA Property in the existing contaminated condition, not after RMMs have been implemented, from both soil and groundwater vapour sources.

Jury et al. (1990) derived an analytical model that describes the transport of organic compounds through the soil column, including volatilization from the soil surface. The MECP (2011) used the "reduced solution, finite source" version of the Jury model (presented as Equation B1 in Jury et al., 1990) for the derivation of the soil-odour and S-OA component values. Jury et al. (1990) also presents a modified version of this equation which specifically accounts for buried chemicals (presented as Equation B3 in Jury et al. 1990). The form of the equation which can account for buried chemicals is used herein and was adapted by Sanders and Stern (1994) to calculate the flux or emission rate of each individual COC at the boundary between the surface of the soil and ambient air. Both equations assume the following (per MECP 2011):

- No water evaporation or leaching
- Homogeneous soil
- Uniform initial contaminant concentration
- No nonaqueous phase liquid
- No biodegradation
- Instantaneous linear equilibrium adsorption and liquid vapour partitioning

Once the flux has been calculated, a box model (EPA 1989) was then employed as a conservative dispersion model to calculate air concentrations of each predicted COC emission from the soil surface. This model assumes steady-state conditions with instantaneous and complete mixing inside the 'box.' The box has a 13-metre (m) length, a unit width (that is, 1 m), and is bounded at the top by the mixing zone height of 2 m, and, hypothetically, is ventilated by a steady flow of wind across the box. This box size was established to correspond to that of the atmosphere mixing cell described by the MECP (2011). This box volume is considered to conservatively simulate the breathing zone for human receptors in outdoor conditions.

Site-specific wind speed was not available; therefore, for reference purposes, Environment Canada's Canadian Climate Normals (1981 to 2010) for Waterloo Wellington A (Environment Canada 2020) were used. The lowest reported averaged wind speed (August) was 8.5 kilometres per hour (km/hr) and the

annual average wind speed is 12.6 km/hr. For the purposes of this assessment, the conservatively selected wind speed was 8.5 km/hr. For Construction and Utility Workers, it was assumed that, beyond exposure to volatiles in outdoor air above ground surface, these receptors could additionally be exposed to volatiles in outdoor air in an excavated trench. As such, the box could, in fact, be an excavated trench located within the subsurface. The flux of volatiles from the subsurface into a trench would be expected to be greater than that occurring at the surface because the walls of the trench would provide more surface area from which volatiles could discharge. In addition, the enclosed nature of an excavated trench would lead to decreased air exchange and increased potential exposure to subsurface volatiles via inhalation. To account for this scenario, the wind speed applied to the model was reduced to 0.45 metre per second (m/s), which represents the average wind speed in an excavation over a year's time (EPA 1999, MECP Trench Model V.2 [Martinez, pers. comm. 2010]). Additionally, the surface area from which volatiles could flux was increased to 69 m^2 to account for the exposed trench walls, and applying a trench length of 13 m, width of 1 m, and depth of 2 m per the MECP Trench Model V.2 (CCME 2011, Martinez, pers. comm. 2010).

The Site may experience redevelopment in the future. The presence of paving and other surface materials may restrict the flow of soil gases and migration of vapours because the porosity of concrete materials is much less than that for soil. However, for this exposure modelling, and to be conservative, the presence of surface covers was ignored. A coarse-grained soil type was determined to be representative of soil conditions throughout the Site; as such, default "Sand" soil characteristics per EPA (2004) were used to assess the exposure and risk in the absence of RMMs.

The items in Table G3-1 identify the key Site characteristics used as input into the Sanders and Stern (1994) model.

Other conservative assumptions employed in this assessment included the following:

- Degradation of COCs in the soil vadose (unsaturated) zone was not considered to reduce the source concentrations along the transport pathway.
- Bulk water flow and infiltration of precipitation were ignored. Both of these would tend to retard the migration of vapours upward; therefore, they would lead to lower predicted concentrations.

To account for a vapour source in either soil or groundwater, the phase partitioning methods described in MECP (1996) were used to derive a 'total' concentration for COCs in groundwater, including the concentration of a substance in the soil gas phase (air), soil water phase (dissolved), and soil particle phase (absorbed).

For example, concentration on soil particles:

$$C_{SP} = C_{groundwater} \times K_{oc} * f_{oc} \times CF1 \quad (1)$$

Where:

C_{SP} = Concentration on soil particles (microgram per gram [µg/g])

$C_{groundwater}$ = Concentration in groundwater (microgram per litre [µg/L])

K_{oc} = Organic carbon partitioning coefficient (cubic centimetre per gram [cm^3/g])

f_{oc} = Soil organic carbon content (percent)

CF1 = Conversion factor (0.001 litre per cubic centimetre [L/cm^3])

For example, concentration in soil gas:

$$C_{SG} = C_{groundwater} \times K_H \times CF2 \quad (2)$$

Where:

C_{SG} = Concentration in soil gas (µg/m^3)

$C_{groundwater}$ = Concentration in groundwater (µg/L)

K_H = Unitless Henry's Law constant (that is, H/RT)

H = Henry's Law constant (atmospheres per cubic metre per mole [atm-m^3/mol])

R = Universal Gas constant (8.206E-05 atm-m^3/mol per Kelvin [K])

T = Temperature (K) of 288.15, based on a default temperature of 15°C

$CF2$ = Conversion factor (1,000 litre per cubic metre [L/m^3])

Total concentration in soil (µg/g):

$$C_{total} = \frac{C_{groundwater} \times \theta_m \times CF1 + C_{SP} \times \rho_s \times (1-\phi) + C_{SG} \times (\phi - \theta_m) \times CF3}{\rho_b} \quad (3)$$

Where:

ρ_s = Soil particle density (gram per cubic centimetre [g/cm^3])

$CF3$ = Conversion factor (0.000001 cubic metre per cubic centimetre [m^3/cm^3])

$(1 - \phi)$ = Fraction of soil that is solid

$(\phi - \vartheta_m)$ = Air-filled porosity

ϑ_m = Moisture-filled porosity

ρ_b = Dry soil bulk density (gram per cubic centimetre [g/cm^3])

For this assessment, the total predicted concentration in soil based on the estimated maximum groundwater concentration (that is, the observed maximum groundwater concentration plus 20 percent) was compared to the estimated maximum concentration in soil (that is, the observed maximum soil concentration plus 20 percent), and the greater of these two concentrations was applied to model volatilization for outdoor air. The estimated outdoor air concentrations from soil and groundwater above ground surface and in a trench are provided in Tables G3-2 and G3-3, respectively.

Jury et al. (1990) and Sanders and Stern (1994) published the following equation describing the volatilization of organic chemicals from the soil surface as a mass flux:

$$J(t) = C_0 e^{-\mu t}\left(\frac{D_E}{\pi\, t}\right)^{\frac{1}{2}}\left[e^{-\frac{L^2}{4D_E t}} - e^{-\frac{(L+W)^2}{4D_E t}}\right] \quad (4)$$

Where:

J(t) = Instantaneous mass flux rate at any time, t, from soil surface (microgram per square metre per second [µg/m^2/s])

C_0 = Initial contaminant concentration in soil between depth, L, and L+W, where W is the width (that is, the thickness) of the zone of contamination (microgram per cubic centimetre [µg/cm^3]), and $C_0 = C_{total} \times \rho_b$

μ = First-order degradation rate constant (day^{-1}) (calculated based on the half-life value ($t_{1/2}$) if available; where $\mu = \frac{0.693}{t_{1/2}}$; if no half-life was available, assumed no degradation occurs)

t = Time (seconds [s])

D_E = Effective diffusion coefficient (square metres per day [m^2/d])

L = Depth to top of contaminated layer (m)

W = Width of contaminant layer (m)

π = pi (3.14159…)

e = Exponential function

By ignoring bulk water flow and infiltration of precipitation, the model overestimates the vapour flux from the soil.

Effective diffusivity (D_E) (Jury et. al. 1990) was calculated from:

$$D_E = \frac{\left(\frac{a^{\frac{10}{3}} D_a K_H + \theta_m^{\frac{10}{3}} D_w}{\phi^2}\right)}{\rho_b f_{oc} K_{oc} + \theta_m + \theta_v K_H} \quad (5)$$

Where:

ϕ = Total soil porosity (unitless)

θ_m = Residual water content of soil (unitless)

θ_v = Volumetric air content (ϕ-*m*) (unitless)

D_a = Chemical-specific diffusivity in air (m^2/d)

D_w = Chemical-specific diffusivity in water (m^2/d)

K_H = Dimensionless form of Henry's Law constant (unitless)

ρ_b = Dry soil bulk density (g/cm^3)

f_{oc} = Fraction of organic carbon in soil (unitless)

K_{oc} = Chemical-specific organic carbon partitioning coefficient (cubic centimetre per gram [cm^3/g])

The total flux can be determined by integration of the aforementioned flux equation (that is, J(t) = …) and yields the following (Sanders and Stern 1994):

$$TF = \frac{C_0\sqrt{D_E}}{2a}\left\{\left[\exp(2ba)erf\left(ay+\frac{b}{y}\right)+\exp(-2ba)erf\left(ay-\frac{b}{y}\right)\right]_{\sqrt{t_1}}^{\sqrt{t_2}} - \left[\exp(2ca)erf\left(ay+\frac{c}{y}\right)+\exp(-2ca)erf\left(ay-\frac{c}{y}\right)\right]_{\sqrt{t_1}}^{\sqrt{t_2}}\right\} \quad (6)$$

Where:

TF = Total flux per unit area (gram per square metre [g/m^2])

t_1 = Time zero (that is, 0 s)

t_2 = Averaging time for flux, which is greatest early on and decreases rapidly; as such, the averaging time was conservatively set to 25 years to overestimate flux (25 years = 7.884×10^8s)

exp = Exponential function

erf = Error function

Other variables are as described in the previous equation, and as follows:

$$a = \sqrt{\mu} \quad (7)$$

$$b = \frac{L}{2\sqrt{D_E}} \quad (8)$$

$$c = \frac{L+W}{2\sqrt{D_E}} \text{ and} \quad (9)$$

$$y = \sqrt{t} \quad (10)$$

The average flux is determined from the total flux:

$$AF = \frac{TF}{TTxCF} \quad (11)$$

Where:

AF = Average flux from soil surface (µg/m^2/s)

TF = Total flux from soil over assessment period (µg/m^2)

TT = Time period of assessment (years [y])

CF = Conversion factor (31,536,000 seconds per year [s/y])

And the concentration in the receptor's breathing space is calculated by using the box model:

$$C_{air} = \frac{AF \cdot A_r}{W_b \cdot H_b \cdot v_{ws}} \quad (12)$$

Where:

C_{air} = Concentration in outdoor (microgram per cubic metre [µg/m^3])

AF = Average flux from soil surface (µg/m^2/s)

A_r = Area occupied by receptor's box (for surface receptors: 13 m^2; for subsurface receptors: 34.5 m^2, based on a total area of 69 m^2 and a fraction of contaminated area blocked from contributing vapour to the trench of 0.5, as applied in the MECP's Trench Model V.2 referenced in the MECP Rationale Document [2011])

W_b = Width perpendicular to air flow (default: 1 m)

H_b = Height of receptor box (mixing zone) (default: 2 m)

v_{ws} = Wind speed (Site-specific value of 2.36 m/s applied for surface receptors; wind speed in trench of 0.45 m/s applied for Subsurface Workers)

Receptors identified for quantitative assessment of exposure to outdoor air could be exposed to COCs volatilizing from soil and groundwater into outdoor air. Residents, and Outdoor, Construction, Utility, and Indoor Workers could be exposed at the surface; Construction and Utility Workers additionally could be exposed in an excavation. The estimated dose for each receptor was calculated based on receptor characteristics and compared to the reference dose or unit risk, which implies that exposure at that concentration would be continuous over the receptors' lifetime (that is, 24 hours a day, 7 days a week, 52 weeks a year for a lifetime).

Table G3-4 provides a comparison of the approach used to derive the MECP S-OA components and the approach employed in this RA to derive outdoor air concentrations for surface receptors (that is, not in a trench) along with a discussion of uncertainty.

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Tables

Table G3-1. Assumptions for Soil- and Groundwater-to-Outdoor-Air Pathway

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Symbol	Value	Reference
Soil Type	--	Sand	Based on grain-size results for the RA Property.
Total Porosity (unitless)	f	0.38	The default value applied in the J&E Model (EPA, 2004) for Sand.
Dry Bulk Density (g/cm^3)	rb	1.66	The default value applied in the J&E Model (EPA, 2004) for Sand.
Moisture Filled-Porosity (unitless)	θm	0.054	The default value applied in the J&E Model (EPA, 2004) for Sand.
Fraction of Organic Carbon (g/g)	f_{oc}	0.005	MECP default (MECP, 2011).
Soil and Groundwater Temperature	T	15	MECP default (MECP, 2011).
Depth to Top of Impacted Zone (m)	L	0.05	Nominal depth to volatile impacts applied.
Thickness of Impacted Zone – Ground Surface Assessment (m)	W	2.65	Based on average depth to groundwater of 2.7 mbgs minus the depth to the top of the contamination (i.e., 2.7 m - 0.05
Thickness of Impacted Zone – Trench Assessment (m)	W	6	Conservatively set to 6 m. This assumes an impact zone containing estimated maximum concentrations of volatiles extends away from the trench walls 6 m in all directions.
Windspeed - Ground Surface Assessment (m/s)	--	2.4	Environment Canada Canadian Climate Normals for Waterloo-Wellington Airport
Windspeed - Trench Assessment (m/s)	--	0.45	Ministry Trench Model Default

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

U.S. Environmental Protection Agency (EPA). 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Office of Emergency and Remedial Response, Washington, D.C. February 22.

Notes:

-- = not applicable

f_{oc} = fraction of organic carbon

g/cm^3 = gram per cubic centimetre

g/g = grams per gram

J&E = Johnson and Ettinger

m = metre

m/s = metres per second

mbgs = metre below ground surface

MECP = Ontario Ministry of the Environment, Conservation and Parks

RA = Risk Assessment

EPA = U.S. Environmental Protection Agency

Table G3-2. Ground Surface Air Concentrations

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Symbol	Value	Unit	Reference
Total Porosity	ϕ	0.38	unitless	The default value applied in the J&E Model (EPA, 2004) for Sand.
Dry Bulk Density	ρ_b	1.66	g/cm^3	The default value applied in the J&E Model (EPA, 2004) for Sand.
Moisture-filled Porosity	θm	0.054	unitless	The default value applied in the J&E Model (EPA, 2004) for Sand.
Fraction of Organic Carbon	foc	0.005	g/g	MECP default (MECP, 2011).
Depth to Top of Impacted Zone	L	0.05	m	Nominal depth to volatile impacts applied.
Thickness of Impacted Zone	W	2.65	m	Based on average depth to groundwater of 2.7 mbgs minus the depth to the top of the contamination (i.e., 2.7 m - 0.05 m)
Soil and Groundwater Temperature	T	15	°C	MECP default (MECP, 2011).

Analyte	Adjusted Koc Values (MECP, 2011)	Air Diffusivity	Water Diffusivity	Solubility	Henry's Law	Rounded Estimate Soil Concentration	Rounded Estimate GW Concentration	Half-life	Ground Surface Air Concentration Assuming No Degradation	Final Ground Surface Air Concentration
Units	cm^3/g	cm^2/s	cm^2/s	mg/L	$atm\text{-}m^3/mol$	mg/kg	µg/L	days	$µg/m^3$	mg/m^3
Acenaphthene	1.22E+04	4.21E-02	7.69E-06	3.90E+00	1.82E-04	1.10E+02	4.80E+01	1.00E+90	1.14E-01	1.14E-04
Acenaphthylene	1.22E+04	4.39E-02	7.53E-06	1.61E+01	1.25E-04	2.00E+00	6.60E-01	1.00E+90	1.68E-03	1.68E-06
Anthracene	4.08E+04	3.24E-02	7.74E-06	4.34E-02	5.55E-05	1.90E+02	3.70E+01	1.00E+90	2.51E-02	2.51E-05
Benzene	3.31E+02	8.80E-02	9.80E-06	1.79E+03	5.55E-03	3.10E-01	8.00E+01	1.00E+90	4.37E-03	4.37E-06
Benzo(a)anthracene	4.62E+05	5.10E-02	9.00E-06	9.40E-03	1.20E-05	2.40E+02	2.50E+01	1.00E+90	5.68E-07	5.68E-10
1,1-Dichloroethane	7.01E+01	7.42E-02	1.05E-05	5.04E+03	5.63E-03	5.00E-02	3.50E+01	1.00E+90	7.34E-04	7.34E-07
1,1-Dichloroethene	7.01E+01	9.00E-02	1.04E-05	2.42E+03	2.62E-02	5.00E-02	7.60E+01	1.00E+90	7.51E-04	7.51E-07
cis-1,2-Dichloroethene	8.76E+01	7.36E-02	1.13E-05	3.50E+03	4.09E-03	5.00E-02	1.10E+03	1.00E+90	8.02E-03	8.02E-06
trans-1,2-Dichloroethene	8.76E+01	7.07E-02	1.19E-05	3.50E+03	9.37E-03	5.00E-02	9.70E+01	1.00E+90	7.81E-04	7.81E-07
Ethylbenzene	1.04E+03	7.50E-02	7.80E-06	1.69E+02	7.88E-03	4.90E+00	1.00E+01	1.00E+90	6.55E-02	6.55E-05
Fluorene	2.26E+04	3.63E-02	7.88E-06	1.89E+00	9.62E-05	1.80E+02	9.90E+01	1.00E+90	7.22E-02	7.22E-05
n-Hexane	2.98E+02	2.00E-01	7.77E-06	9.50E+00	1.80E+00	1.00E+00	8.90E+00	1.00E+90	1.52E-02	1.52E-05
Mercury	1.32E+06	3.07E-02	6.30E-06	6.00E-02	1.15E-02	3.80E-01	2.00E-02	1.00E+90	2.27E-04	2.27E-07
2-(1-)Methylnaphthalene	5.95E+03	4.80E-02	7.84E-06	2.46E+01	5.19E-04	5.90E+00	3.30E+02	1.00E+90	3.04E-02	3.04E-05
Naphthalene	3.67E+03	5.90E-02	7.50E-06	3.10E+01	4.40E-04	2.60E+02	3.20E+01	1.00E+90	1.07E+00	1.07E-03
Phenanthrene	4.16E+04	3.45E-02	6.69E-06	1.15E+00	4.23E-05	1.00E+03	1.30E+02	1.00E+90	1.03E-01	1.03E-04
Tetrachloroethene	2.14E+02	7.20E-02	8.20E-06	2.06E+02	1.77E-02	5.00E-02	1.30E+00	1.00E+90	7.35E-04	7.35E-07
1,1,1-Trichloroethane	9.73E+01	7.80E-02	8.80E-06	1.29E+03	1.72E-02	5.00E-02	4.40E+01	1.00E+90	7.44E-04	7.44E-07
Trichloroethylene	1.35E+02	7.90E-02	9.10E-06	1.28E+03	9.86E-03	4.20E+01	9.40E+03	1.00E+90	6.17E-01	6.17E-04
Vinyl Chloride	4.75E+01	1.06E-01	1.23E-06	8.80E+03	2.79E-02	2.00E-02	9.90E+02	1.00E+90	7.43E-03	7.43E-06
Xylenes, Total	8.86E+02	7.14E-02	9.34E-06	1.06E+02	6.63E-03	4.60E+00	4.60E+01	1.00E+90	6.12E-02	6.12E-05
Aliphatic C>6-C8	7.96E+03	5.00E-02	6.00E-06	5.40E+00	1.22E+00	2.37E+01	3.99E+02	1.00E+90	3.49E-01	3.49E-04
Aliphatic C>8-C10	6.32E+04	5.00E-02	6.00E-06	4.30E-01	1.96E+00	1.55E+01	4.16E+01	1.00E+90	2.19E-01	2.19E-04
Aromatic C>8-C10	3.17E+03	5.00E-02	6.00E-06	6.50E+01	1.17E-02	3.87E+00	2.19E+02	1.00E+90	4.62E-02	4.62E-05
Aliphatic C>10-C12	5.02E+05	5.00E-02	6.00E-06	3.40E-02	2.94E+00	1.55E+03	6.00E+03	1.00E+90	1.92E+02	1.92E-01
Aliphatic C>12-C16	1.00E+07	5.00E-02	6.00E-06	7.60E-04	1.27E+01	1.89E+03	5.00E+02	1.00E+90	2.46E+02	2.46E-01
Aromatic C>10-C12	5.02E+03	5.00E-02	6.00E-06	2.50E+01	3.43E-03	3.87E+02	1.51E+05	1.00E+90	3.12E+01	3.12E-02
Aromatic C>12-C16	1.00E+04	5.00E-02	6.00E-06	5.80E+00	1.30E-03	4.73E+02	9.28E+04	1.00E+90	1.82E+01	1.82E-02

Sources:

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.

U.S. Environmental Protection Agency (EPA). 2004. *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* . Washington, D.C.: Office of Emergency and Remedial Response. February 22.

Notes:

ϕ = total porosity

ρb = dry bulk density

θm = moisture-filled porosity

$µg/m^3$ = microgram per cubic metre

µg/L = microgram per litre

> = greater than

$atm\text{-}m^3/mol$ = atmospheres per cubic metre per mole

cm^2/s = square centimetre per second

cm^3/g = cubic centimetre per gram

foc = fraction of organic carbon

g/cm^3 = gram per cubic centimetre

g/g = gram per gram

GW = groundwater

Koc = organic carbon-water partition coefficient

L = depth to top of impacted zone (length)

m = metre

mbgs = metre below ground surface

mg/kg = milligram per kilogram

mg/L = milligram per litre

mg/m^3 = milligram per cubic metre

MECP = Ontario Ministry of the Environment, Conservation and Parks

NA = not applicable

J&E = Johnson and Ettinger

EPA = U.S. Environmental Protection Agency

W = thickness of impacted zone (width)

Table G3-3. Trench Air Concentrations
Risk Assessment, 200 Beverley Street, Guelph, Ontario

Parameter	Symbol	Value	Unit	Reference
Total Porosity	ϕ	0.38	unitless	The default value applied in the J&E Model (EPA, 2004) for Sand.
Dry Bulk Density	ρ_b	1.66	g/cm^3	The default value applied in the J&E Model (EPA, 2004) for Sand.
Moisture-filled Porosity	θm	0.05	unitless	The default value applied in the J&E Model (EPA, 2004) for Sand.
Fraction of Organic Carbon	foc	0.005	g/g	MECP default (MECP, 2011).
Depth to Top of Impacted Zone	L	0.05	m	Nominal depth to volatile impacts applied.
Thickness of Impacted Zone	W	6	m	Conservatively set to 6 m. This assumes an impact zone containing estimated maximum concentrations of volatiles extends away from the trench walls 6 m in all directions.
Soil and Groundwater Temperatur	T	15	°C	MECP default (MECP, 2011).

Analyte	Adjusted Koc MECP (MECP, 2011)	Air Diffusivity	Water Diffusivity	Solubility	Henry's Law	Rounded Estimate Soil Concentration	Rounded Estimate GW Concentration	Half-life	Concentration Assuming No Degradation	Final Trench Air Concentration
Units	cm^3/g	cm^2/s	cm^2/s	mg/L	$atm\text{-}m^3/mol$	mg/kg	µg/L	days	$µg/m^3$	mg/m^3
Acenaphthene	1.22E+04	4.21E-02	7.69E-06	3.90E+00	1.82E-04	1.10E+02	4.80E+01	1.00E+90	1.59E+00	1.59E-03
Acenaphthylene	1.22E+04	4.39E-02	7.53E-06	1.61E+01	1.25E-04	2.00E+00	6.60E-01	1.00E+90	2.34E-02	2.34E-05
Anthracene	4.08E+04	3.24E-02	7.74E-06	4.34E-02	5.55E-05	1.90E+02	3.70E+01	1.00E+90	3.49E-01	3.49E-04
Benzene	3.31E+02	8.80E-02	9.80E-06	1.79E+03	5.55E-03	3.10E-01	8.00E+01	1.00E+90	1.23E-01	1.23E-04
Benzo(a)anthracene	4.62E+05	5.10E-02	9.00E-06	9.40E-03	1.20E-05	2.40E+02	2.50E+01	1.00E+90	7.91E-06	7.91E-09
1,1-Dichloroethane	7.01E+01	7.42E-02	1.05E-05	5.04E+03	5.63E-03	5.00E-02	3.50E+01	1.00E+90	2.18E-02	2.18E-05
1,1-Dichloroethene	7.01E+01	9.00E-02	1.04E-05	2.42E+03	2.62E-02	5.00E-02	7.60E+01	1.00E+90	2.30E-02	2.30E-05
cis-1,2-Dichloroethene	8.76E+01	7.36E-02	1.13E-05	3.50E+03	4.09E-03	5.00E-02	1.10E+03	1.00E+90	2.35E-01	2.35E-04
trans-1,2-Dichloroethene	8.76E+01	7.07E-02	1.19E-05	3.50E+03	9.37E-03	5.00E-02	9.70E+01	1.00E+90	2.34E-02	2.34E-05
Ethylbenzene	1.04E+03	7.50E-02	7.80E-06	1.69E+02	7.88E-03	4.90E+00	1.00E+01	1.00E+90	1.72E+00	1.72E-03
Fluorene	2.26E+04	3.63E-02	7.88E-06	1.89E+00	9.62E-05	1.80E+02	9.90E+01	1.00E+90	1.01E+00	1.01E-03
n-Hexane	2.98E+02	2.00E-01	7.77E-06	9.50E+00	1.80E+00	1.00E+00	8.90E+00	1.00E+90	4.74E-01	4.74E-04
Mercury	1.32E+06	3.07E-02	6.30E-06	6.00E-02	1.15E-02	3.80E-01	2.00E-02	1.00E+90	3.16E-03	3.16E-06
2-(1-)Methylnaphthalene	5.95E+03	4.80E-02	7.84E-06	2.46E+01	5.19E-04	5.90E+00	3.30E+02	1.00E+90	4.24E-01	4.24E-04
Naphthalene	3.67E+03	5.90E-02	7.50E-06	3.10E+01	4.40E-04	2.60E+02	3.20E+01	1.00E+90	1.49E+01	1.49E-02
Phenanthrene	4.16E+04	3.45E-02	6.69E-06	1.15E+00	4.23E-05	1.00E+03	1.30E+02	1.00E+90	1.43E+00	1.43E-03
Tetrachloroethene	2.14E+02	7.20E-02	8.20E-06	2.06E+02	1.77E-02	5.00E-02	1.30E+00	1.00E+90	2.19E-02	2.19E-05
1,1,1-Trichloroethane	9.73E+01	7.80E-02	8.80E-06	1.29E+03	1.72E-02	5.00E-02	4.40E+01	1.00E+90	2.26E-02	2.26E-05
Trichloroethylene	1.35E+02	7.90E-02	9.10E-06	1.28E+03	9.86E-03	4.20E+01	9.40E+03	1.00E+90	1.84E+01	1.84E-02
Vinyl Chloride	4.75E+01	1.06E-01	1.23E-06	8.80E+03	2.79E-02	2.00E-02	9.90E+02	1.00E+90	2.29E-01	2.29E-04
Xylenes, Total	8.86E+02	7.14E-02	9.34E-06	1.06E+02	6.63E-03	4.60E+00	4.60E+01	1.00E+90	1.59E+00	1.59E-03
Aliphatic C>6-C8	7.96E+03	5.00E-02	6.00E-06	5.40E+00	1.22E+00	2.37E+01	3.99E+02	1.00E+90	1.05E+01	1.05E-02
Aliphatic C>8-C10	6.32E+04	5.00E-02	6.00E-06	4.30E-01	1.96E+00	1.55E+01	4.16E+01	1.00E+90	6.18E+00	6.18E-03
Aromatic C>8-C10	3.17E+03	5.00E-02	6.00E-06	6.50E+01	1.17E-02	3.87E+00	2.19E+02	1.00E+90	1.04E+00	1.04E-03
Aliphatic C>10-C12	5.02E+05	5.00E-02	6.00E-06	3.40E-02	2.94E+00	1.55E+03	6.00E+03	1.00E+90	4.63E+03	4.63E+00
Aliphatic C>12-C16	1.00E+07	5.00E-02	6.00E-06	7.60E-04	1.27E+01	1.89E+03	5.00E+02	1.00E+90	4.42E+03	4.42E+00
Aromatic C>10-C12	5.02E+03	5.00E-02	6.00E-06	2.50E+01	3.43E-03	3.87E+02	1.51E+05	1.00E+90	4.93E+02	4.93E-01
Aromatic C>12-C16	1.00E+04	5.00E-02	6.00E-06	5.80E+00	1.30E-03	4.73E+02	9.28E+04	1.00E+90	2.54E+02	2.54E-01

Sources:
Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario. April 15.
U.S. Environmental Protection Agency (EPA). 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Washington, D.C.: Office of Emergency and Remedial Response. February 22.
Notes:

θm = moisture-filled porosity
ρb = dry bulk density
ϕ = total porosity
> = greater than
µg/L = microgram per litre
$µg/m^3$ = microgram per cubic metre
$atm\text{-}m^3/mol$ = atmospheres per cubic metre per mole
cm^2/s = square centimetre per second
cm^3/g = cubic centimetre per gram
EPA = U.S. Environmental Protection Agency
foc = fraction of organic carbon
g/cm^3 = gram per cubic centimetre
g/g = gram per gram
GW = groundwater
J&E = Johnson and Ettinger
Koc = organic carbon-water partition coefficient
L = depth to top of impacted zone (length)
m = metre
mbgs = metre below ground surface
mg/kg = milligram per kilogram
mg/L = milligram per litre
mg/m^3 = milligram per cubic metre
MECP = Ontario Ministry of the Environment, Conservation and Parks
NA = not applicable
W = thickness of impacted zone (width)

Table G3-4. Soil- and Groundwater-to-Outdoor-Air Pathway Model Uncertainties

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Input Parameter or Assumption	MECP S-OA component Approach (MECP, 2011)	RA Approach	Discussion of Uncertainty
Scenario Considered	Redeveloped brownfield	Existing conditions	The scenarios considered are different. The S-OA components are intended to be used as a check to determine if receptors are at risk outdoors after redevelopment of a property where the S-IA pathway has been blocked, while the intent of the RA approach is to evaluate existing conditions. The RA approach is considered appropriate to determine the risks under current conditions and whether RMMs or other actions (such as remediation) are required for the RA Property.
Vapour Source	Soil	Soil or groundwater	The S-OA component only considers vapour sources from soil. The RA approach considers the greatest vapour contribution from either a soil or groundwater source. Therefore, the RA approach considers more potential vapour sources present at the RA Property than the S-OA component.
Flux Value	Instantaneous flux after 1 year	Average flux over 25 years	The instantaneous flux is greatest early on (based on the time expression in the equation) and then may decrease rapidly. By assuming that 1 year has passed, the peak flux may not be captured by the S-OA component. The approach in this RA averages the flux over a longer duration for the exposure period, which includes the peak flux, which in turn, biases the average emissions to a greater flux, and thus greater potential exposure. The assumptions made for the MECP's S-OA component may not be appropriate for evaluating the existing conditions at the RA Property from long-term exposure. There are uncertainties associated with when the peak flux occurs and when the flux diminishes rapidly as mass is transferred from soil to air. The approach in this RA is considered to be more conservative since it considers a greater emission of the mass from soil.
Depth to Contamination	Assumes volatiles are present at the soil surface (Jury Model)	Assumes a clean layer of soil is present at the soil surface (Modified Jury Model)	The S-OA component assumes that the soil source is present at the soil surface. The RA assumes that a minimal 5 cm "clean" layer is present at the soil surface. This is the primary difference between the two forms of the Jury (1990) equation used in the S-OA approach and the RA approach. This nominal depth was assumed for two reasons: • Releases (or spill) of volatiles to the soil surface causing contaminated soil were assumed to have occurred in the past. Volatilization of COCs from near surface soils would be expected to have occurred following the release due to the proximity of the COCs to the surface soil air boundary layer, or • Fill soils may have been imported to the site and placed on top of historical volatiles impacts. The model's sensitivity to the depth input was tested by changing the 5 cm "clean" thickness to a 1 mm "clean" thickness (that is, essentially assuming the contamination is present at the surface, similar to the S-OA method assumption). On average, the final ground surface air concentrations increased by approximately 1 percent when the

Table G3-4. Soil- and Groundwater-to-Outdoor-Air Pathway Model Uncertainties

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Input Parameter or Assumption	MECP S-OA component Approach (MECP, 2011)	RA Approach	Discussion of Uncertainty
			contamination was assumed to be present at the surface compared to the 5 cm clean layer assumption. The difference in final air concentrations is considered negligible and does not affect the overall results and conclusions of the RA. The uncertainties associated with the RA approach is the depth to contamination which can be highly variable. Contamination at surface would be limited to the area of a release, with other areas having a clean layer over top of a migrating subsurface plume. The use of a nominal clean layer of 5 cm is not likely to underestimate the actual emissions of volatile COCs.
Mixing Cell Dimensions	13 m by 2 m by unit width	13 m by 2 m by unit width	The mixing cell dimensions are the same between the two approaches.
Windspeed	8.5 km/hr Based on long-term average annual windspeed at Waterloo Wellington A	City- or Region-specific Based on nearest available lowest reported windspeed data	The MECP uses a fixed windspeed based on an annual average. The RA uses a site-specific windspeed based on a lowest reported windspeed. Therefore, the RA approach is considered conservative, and is likely to overestimate outdoor air concentrations and risk. The uncertainty associated with selecting the lowest observed windspeed is likely to over estimate exposure.

Sources:

Jury, W.A., E. Russo, G. Streile, and H.E. Abd. 1990. "Evaluation of volatilization by organic chemicals residing below the soil surface." *Water Resour. Res*. 26: 13-30.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2011. *Rationale for the Development of Soil and Ground Water Standards for Use at Contaminated Sites in Ontario*. April 15.

Notes:

km/hr = kilometer per hour

m = metre

RA = risk assessment

MECP = Ministry of the Environment, Conservation and Parks

cm = centimeter

S-OA = soil to outdoor air

S-IA = soil to indoor air

Appendix G4
Ecological Risk Assessment Exposure Assumptions

Table G4-1. MECP Recommended Exposure Parameters for Representative Wildlife Species

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Species	Body Weight (kg)	Food Ingestion Rate (g ww/d)	Soil Ingestion Rate (g dw/d)	Inhalation Rate (m^3/kg/d)	Skin Surface Area (cm^2)	Food Source
American Woodcock	0.198	150	2.5	0.594	340	Invertebrates
Meadow Vole	0.044	5	0.018	1.02	144	Plants
Red Fox	4.5	430	3.85	0.403	2929	Mammals
Red-tailed Hawk	1.13	98.7	1.8	0.397	1090	Mammals
Red- winged Blackbird	0.064	91	1.09	1.92	160	Plants
Short-tailed Shrew	0.015	9	0.187	1.26	71.5	Invertebrates

Note:
The source of individual values can be found in Table 5.1 of the MECP Rationale Document (2011).
cm^2 = square centimetre
g dw/d = gram dry weight per day
g ww/d = gram wet weight per day
kg = kilogram
m^3/kg/d = cubic metre per kilogram per day
MECP = Ontario Ministry of Environment, Conservation and Parks

Appendix H
Toxicity Profiles

APPENDIX H

Toxicological Profile for Anthracene

Background Information

Anthracene belongs to the group of compounds called polycyclic aromatic hydrocarbons (PAHs). Natural sources of PAHs include: forest fires, volcanic activity, and agricultural burning, while anthropogenic sources include: industry and energy production facilities, vehicular sources, and domestic heating. There are over 100 individual PAH compounds, but PAHs typically occur as chemical mixtures. PAHs are used to make medicine, dyes, plastics, pesticides, and asphalt. They are also present in crude oil, coal, coal tar pitch, creosote, and roofing tar (ATSDR 1995).

Exposure pathways for PAHs typically include air, water, food, and soil via inhalation, ingestion, and dermal exposure routes. Inhalation is likely to be a major source of intake, as some PAHs can bind to particles and dust in the air, while others occur as vapours. Cigarette smoke is an important exposure pathway for PAH, as are vehicle exhaust in urban areas and wood smoke. The exposure to PAHs in food is also a major source of intake, as PAHs are frequently present in cereals, produce, meat, processed food, dairy products, and barbecued foods (ATSDR 1995).

Assessment of Carcinogenicity

With the lack of human data and inadequate animal data for anthracene, the U.S. Environmental Protection Agency (EPA) has classified the parameter as a Classification D carcinogen, "not classifiable as to human carcinogenicity" (2009).

Selection of Noncarcinogenic Inhalation Exposure Limits

Table 1 summarizes the noncancer inhalation exposure limits for anthracene.

Table 1. Noncancer Inhalation Exposure Limits for Anthracene

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MADEP (2004) (based on TPHCWG [1997])	0.05	Chronic	Body weight reduction, hepatic, renal, and developmental effects	• **Basis:** Based on TPHCWG (1997), as cited in MADEP (2003) for Aromatic hydrocarbons containing 9 through 18 carbons. • **Notes:** MADEP (2003) recommends an RfC of 0.05 mg/m^3 for aromatic fraction (C9-C18) based on the evaluation of RfCs identified for individual components and fractional mixtures.	Yes

Notes:
MADEP = Massachusetts Department of Environmental Protection
mg/m^3 = milligram(s) per cubic metre
RfC = reference concentration
TPHCWG = Total Petroleum Hydrocarbon Working Group

The MECP does not provide an inhalation RfC value. Although anthracene is not a volatile organic chemical, an inhalation exposure was evaluated as a conservatively protective approach in the RA assessment.

Selection of Carcinogenic Inhalation Exposure Limits

The MECP, ATSDR, and EPA do not provide exposure limits for cancer health effects resulting from oral exposure to anthracene.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. "Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs)." Toxic Substances Portal. Atlanta, Georgia: U.S. Department of Health and Human Services, Public Health Service. August. Accessed May 28, 2020. http://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=122&tid=25

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APPENDIX H

Toxicological Profile for Antimony

Antimony is a silvery white brittle metal which can be found in small amounts in the earth's crust and can be measured in natural soils, sediments, and water (ATSDR, 2019; Health Canada, 1999).

Antimony ores are mined and then either changed into antimony metal or combined with oxygen to form antimony oxide (ATSDR, 2019). Antimony is used to manufacture alloys with tin, lead, and copper, and in the compounding of pesticides, ammunitions, disk-brake pads, cutting disks, and fireworks. As a hardening alloy, antimony is used for storage batteries, bullets, cable sheaths, bearing metal, type metal solder, collapsible tubes, foil, and sheet and pipe metal. It is combined with chlorides as coloring agents and as catalysts, and with fluorides in organic synthesis and pottery manufacture (ATSDR, 2019).

Pure antimony is used in the production of semiconductors, infrared detectors, and diodes, but seldom found in this form (Health Canada, 1999). Antimony is more likely to be found as trivalent and pentavalent sulphides or chlorides.

Soluble pentavalent antimony (antimony[V]) compounds (sodium stibogluconate, stibosamine) are used as specific therapeutics against different forms of leishmaniasis and are physiologically tolerated more than trivalent antimony (antimony[III]) compounds. Antimony potassium tartrate (APT) (tartar emetic) has been used to induce vomiting in poisoning cases, and antimony compounds, such as piperazine antimony tartrate, were used as drugs against bilharzia (WHO DW, 2003).

Exposure pathways for antimony in environmental media include air, water, food, and urban dust via inhalation, ingestion, and dermal exposure routes. Antimony concentrations have been shown to be higher in urban air than in nonurban air, most likely because of the larger number of emission sources present in urban areas (ATSDR, 2019).

Assessment of Carinogenicity

The International Agency for Research on Cancer (IARC, 1989) has concluded that there is inadequate evidence for the carcinogenicity of antimony trisulfide and antimony trioxide (ATO) in humans but sufficient evidence of carcinogenicity in experimental animals for ATO and limited evidence for the carcinogenicity of antimony trisulfide in experimental animals. ATO was assigned to Group 2B (possibly carcinogenic to humans), and antimony trisulfide to Group 3 (not classifiable as to its carcinogenicity to humans) (WHO DW, 2003). The USEPA has not evaluated antimony for the carcinogenicity potential, and thus has not classified antimony (USEPA, 1987).

Selection of Non-Carcinogenic Oral Exposure Limits

Table 1 summarizes the non-cancer oral exposure limits.

Table 1. Non-cancer Oral Exposure Limits

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MECP, 2011 from USEPA IRIS, 1987	4.0E-04 (RfD)	Chronic	Longevity, blood glucose, and cholesterol (rat)	• **Basis:** Schroeder et al., 1970 • **Study Design:** 5 ppm of potassium antimony tartrate was administered to 50 male and 50 female rats in drinking water throughout their lifespan • **POD:** LOAEL of 5 ppm (0.35 mg/kg/day) • **UF:** 1000 (10 for interspecies conversion, 10 to protect sensitive individuals, and 10 for the LOAEL instead of NOEL)	No
RIVM, 2009 and WHO, 2003	6.0E-03 (TDI)	Subchronic	Decreased body weight, food and water intake (rats)	• **Basis:** Poon et al., 1998 and Lynch et al., 1999 • **Study Design:** Antimony potassium tartrate was administered (0, 0.5, 5.0, 50, and 500 ppm antimony) via drinking water in rats over a 90-day exposure period • **POD:** NOAEL of 50 ppm (6 mg/kg/day) • **UF:** 1,000 (100 for intra- and interspecies variation and 10 for the use of a subchronic study) • **Notes:** According to Lynch et al. (1999, as referenced in RIVM, 2009), the histological changes observed at low-dose levels were not considered signs of overt toxicity and were often identified without a dose-relationship. WHO (2003) and RIVM (2009) both considered the suggested NOAEL (Lynch et al., 1999) from the subchronic drinking-water study in rats conducted by Poon et al. of 6.0 mg/kg/day based on decreased body weight gain and reduced food and water intake.	Yes

Notes:

LOAEL = lowest observed adverse effect level
NOAEL = no observed adverse effect level
POD = point of departure
ppm = parts per million
RfD = reference dose
TDI = tolerable daily intake
UF = uncertainty factor

As discussed in RIVM (2009), several limitations in methodology and control data of the Schroeder et al. (1970) study were noted in a review by Lynch et al. (1999). Examples of the limitations of these studies include comparisons made between test and control groups from different studies and different ages. Lynch et al. (1999) also noted that a high rate of death from viral pneumonia in rats may have influenced the conclusions regarding reduced lifespan. Additionally, no detailed histopathological examination was performed in the mouse study. Based on this, Lynch et al. (1999) concluded that the Schroeder et al. (1970) rat study that administered antimony potassium tartrate (APT) via drinking water was unsuitable for the derivation of a health-based guidance level.

The WHO DW (2003) and RIVM (2009) derivations are based on subchronic effects from the Poon et al. (1998) study. While the derivation of the RfD presented in USEPA (1987) is based on chronic effects from the Schroeder et al. (1970) study, there is low confidence in the Schroeder et al. study for the following reasons:

- Only one species and dose level were used
- No NOAEL was determined
- Gross pathology and histopathology were not well described (USEPA, 1987)

Additionally, when the USEPA (1987) oral TRV was derived, confidence in the database was low due to a lack of adequate oral exposure investigations.

Although it was a subchronic study, the Poon et al. (1998) study, on which the adopted RfD was based, incorporates multiple exposure concentrations, whereas the Schroeder et al. study only incorporated a single exposure concentration. For this reason, the Poon et al. (1998) study is preferred to the Schroeder et al. (1970) study. Based on the rationale presented above, the Poon et al. (1998) study, and the NOAEL of 6 mg/kg/d, is considered the most appropriate for the selection of an oral noncancer TRV for antimony in this RA. A total UF of 1,000 is supported due to the study limitations; therefore, the non-carcinogenic oral TRV derived by WHO (2003) and RIVM (2009) of 6.0E-03 mg/kg/d is selected for antimony.

References

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APPENDIX H

Toxicological Profile for Benzene

Background Information

Benzene, also known as benzol, is a highly volatile, flammable, colourless liquid with a sweet odour. It is found in the atmosphere, water, and soil from both industrial and natural sources (ASTDR 2007). Derived from petroleum, benzene is ranked in the top 20 in production volume for chemicals produced in the United States (U.S.). It is used in various industries for the manufacturing of styrene (for plastics), cumene (for various resins), and cyclohexane (for nylon and synthetic fibres), in addition to the manufacturing of some types of rubber, lubricant, dyes, detergents, drugs, and pesticides. Although there are natural sources of benzene (from gas emissions from volcanoes and forest fires), the primary source is anthropogenic emissions from industrial processes, such as from burning coal and oil, motor vehicle exhaust, and evaporation from gasoline service stations. Leakage from underground storage tanks or from landfills can contaminate groundwater. Benzene is not known to bioaccumulate in plants or animals; however, benzene is soluble in water and can pass through the soil into groundwater, then volatilize into air (ASTDR 2007).

Exposure pathways for benzene include air, water, food, and soil via inhalation, ingestion, and dermal exposure routes. Inhalation is the major source of benzene exposure by the general population. Major inhalation sources include tobacco smoke, automobile service stations, vehicular exhaust, and industrial emissions. Vapours (or gases) from products that contain benzene, such as glues, paints furniture wax, and detergents, can also be a source of exposure. The level of exposure to benzene by ingestion through food, beverages, or drinking water is not as high through exposure by vapours (ATSDR 2007).

Assessment of Carcinogenicity

The U.S. Environmental Protection Agency (EPA), the International Agency for Cancer Research, and the Department of Health and Human Services have identified benzene as a carcinogen (as cited in the ATSDR 2007).

Selection of Noncarinogenic Inhalation Exposure Limits

Table 1 summarizes the noncancer inhalation exposure limits for benzene.

Table 1. Noncancer Inhalation Exposure Limits

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MECP (2011) EPA IRIS (2003) (derived from Rothman et al. [1996])	3.0E-02 mg/m^3	Chronic	Decreased lymphocyte count	• **Basis:** Derived from the BMD modelling of ALC data from the occupational epidemiologic study by Rothman et al. (1996, as reported in EPA IRIS [2003]). • **POD:** NOAEL from the Ward et al. (1985, as reported in EPA IRIS [2003]) subchronic experimental animal inhalation study. • **Study Design:** Identified a dose-related decrease in absolute lymphocyte count.	No
ATSDR (2007) (derived from	9.6E-03 mg/m^3	Chronic	Decreased lymphocyte count	• **Basis:** Occupation study by Lan et al. (2004) based on decreased lymphocyte count following inhalation exposure by workers.	Yes

Table 1. Noncancer Inhalation Exposure Limits

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
Lan et al. [2004])				• **Study Design:** 390 workers at two shoe factories exposed to benzene at levels below the U.S. occupational standard of 1 ppm were observed. Benzene-exposed workers were categorized into four exposure groups (control, <1 ppm, 1 to 10 ppm, >10 ppm). • **POD:** BMCL of 0.03 ppm for decreased B cell counts.	

Note:
NOAEL = no observed adverse effect level

The US EPA IRIS (2003) reference concentration (RfC) was based on an occupational study by Rothman et al. (1996), which identified a dose-related decrease in absolute lymphocyte count. Similarly, ATSDR (2007) used an occupational exposure study by Lan et al. (2004), which identified a dose-related decrease in B-cell counts. The study by Lan et al. (2004) had a larger study population and more exposure groups than Rothman et al. (1996), and included lesser exposure concentrations. As a result of the lesser exposure concentrations, the Lan et al. (2004) LOAEL is over 10-fold less than the LOAEL in Rothman et al. (1996). These factors provide more confidence in ATSDR's TRV.

Selection of Carcinogenic Inhalation Exposure Limits

The MECP (2011) unit risk factor of 2.2E-03 was selected for use in this RA.

References

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APPENDIX H

Toxicological Profile for Cadmium

Background Information

Cadmium (Cd) is a naturally occurring element in the earth's crust that forms both organic and inorganic compounds, but is usually found as a mineral combined with other elements such as oxygen, chloride, and sulphur (ATSDR 2012). All soils and rocks, including coal and mineral fertilizers, contain some cadmium. Most cadmium is extracted during the production of other metals (for example, copper, lead, and zinc). Cadmium does not corrode easily and has many uses, including batteries, pigments, metal coatings, and plastics. Cadmium is released into the environment through the burning of coal and other fossil fuels, and is also present in tobacco smoke. Volcanic emissions contain cadmium-enriched aerosols.

The main target organs for cadmium toxicity are the kidneys, gastrointestinal tract, and lungs (ORNL 1991; ATSDR 2012). Occupational exposure to high levels of cadmium in air can severely damage the lungs and may lead to death. The inhalation or oral exposure to lower levels of cadmium for prolonged periods of time can result in a buildup of cadmium in the kidneys, and if sufficiently high, may result in kidney disease. The oral ingestion (for example, food and drinking water) of high levels of cadmium severely irritates the stomach, leading to vomiting and diarrhea, and sometimes death. Oral exposure to lesser levels of cadmium for a prolonged period of time can also cause bones to become fragile and break easily. There is some evidence from animal studies that cadmium can be toxic to developing foetuses (for example, decreased foetal weight, and teratogenic and neurological effects).

Assessment of Carinogenicity

Health Canada Canadian Environmental Protection Act (CEPA) (1994) and International Agency for Research on Cancer (IARC) (1993) have classified cadmium and cadmium compounds as human carcinogens, concluding there was sufficient evidence for cadmium to produce lung cancer in humans and animals exposed by inhalation.

Selection of Noncarcinogenic Oral Exposure Limits

Table 1 summarizes the noncancer oral exposure limits.

Table 1. Noncancer Oral Exposure Limits

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MECP (2011)	3.2E-05 (RfD)	Chronic	Renal toxicity (humans)	• **Basis:** Modified from CalEPA DW (2006) • **Study Design:** Review of toxicokinetic studies in human males to estimate long-term daily oral cadmium intake associated with urinary cadmium levels of 1 µg/g creatinine after 50 years • **POD:** NOAEL of 19 µg/day • **UF:** 50 (5 for sensitive populations, 10 for cancer risk due to oral exposure) • **Notes:** A relative source contribution of 20% was applied to derive a Public Health Goal of 0.04 µg/L	No
ATSDR (2012)	1.0E-04 (MRL)	Chronic	Renal toxicity (humans)	• **Basis:** Buchet et al. (1990), Suwazono et al. (2006), Järup et al. (2000), Kobayashi et al.	Yes

Table 1. Noncancer Oral Exposure Limits

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
				(2006), Shimizu et al. (2006), Jin et al. (2004), Wu et al. (2001) • **Study Design:** Meta-analysis of 7 environmental exposure dose-response (human) studies estimating internal dose corresponding to probabilities of 10% excess risk of low molecular weight proteinurea. • **POD:** The dietary concentration in females (0.33 µg/g) associated with the 95% lower confidence limit of urinary cadmium dose of 0.5 µg/g creatinine • **UF:** 3 for human variability	
Health Canada (2010)	1.0E-03 (TDI)	Chronic	Renal toxicity (humans)	• **Basis:** Health Canada (1986) Guideline for Canadian Drinking Water Quality and Friberg et al. (1971) epidemiological study • **Study Design:** Epidemiological study of workers exposed to cadmium oxide dusts and/or fumes • **POD:** NOAEL of 2.5 µg Cd/g creatinine in urine • **UF:** None • **Notes:** The provisional tolerable weekly intake of 7 µg/kg/week was maintained, which is equivalent to 1 µg/kg/d or 1.0E-03 mg/kg/d.	No
EPA (1989) (same as CalEPA [2000])	1.0E-03 (RfD)	Chronic	Renal toxicity (human and animal)	• **Basis:** EPA (1985) • **Study Design:** Evaluation of multiple human and animal toxicity studies • **POD:** NOAEL of 0.01 mg/kg/day resulting in 200 µg Cd/g wet human renal cortex (i.e., highest renal level not associated with significant proteinuria) • **UF:** 10 for intrahuman variability • **Notes:** This RfD is for food intake assuming 2.5% adsorption of Cd from food	No

Notes:
% = percent
µg = microgram(s)
µg/g = microgram(s) per gram
µg/day = microgram(s) per day
µg/kg/day = microgram(s) per kilogram per day
µg/kg/week = microgram(s) per kilogram per week
µg/L = microgram(s) per litre
ATSDR = Agency for Toxic Substances and Disease Registry
CalEPA = California Environmental Protection Agency
Cd/g = cadmium per gram
DW = drinking water
EPA = U.S. Environmental Protection Agency
MECP = Ontario Ministry of the Environment, Conservation and Parks
mg/kg/d = milligram(s) per kilogram per day
MRL = minimal risk level
NOAEL = no observed adverse effect level
POD = point of departure
RA = risk assessment
RfD = reference dose
TDI = tolerable daily intake
UF = uncertainty factor

The ATSDR (2012) chronic oral minimal risk level (MRL) of 1.0E-04 mg/kg/d has been adopted as the chronic noncancer toxicity reference value (TRV) over the use of the MECP's (2011) recommended chronic RfD. This was based on the ATSDR (2012)'s robust comparable analysis of the POD data with a lower

uncertainty factor (UF) of 3 than the UF of 50 of the CalEPA DW (2006) evaluation. Similarly, the Health Canada (2010) oral TDI and EPA (1989) oral RfD were not selected because the ATSDR (2012) chronic oral MRL was based on a more robust analysis of more recent exposure studies.

Selection of Carcinogenic Oral Exposure Limits

EPA (1989) classified cadmium as B1 "probable human carcinogen" by inhalation, but determined oral animal studies have not shown evidence of a carcinogenic response. The National Institute of Public Health and the Environment (RIVM) (2001) also concluded the evidence for carcinogenic properties by the oral route is insufficient. Since the evidence for carcinogenic properties by the oral route is insufficient and the Health Canada and CalEPA oral slope factors (SFs) were derived by route-to-route extrapolation from inhalation, these TRV derivations were not considered appropriate for selection. Therefore, no SF is provided.

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APPENDIX H

Toxicological Profile for 1,1 Dichloroethane

Background Information

The production and use of 1,1-dichloroethane (1,1-DCA) as a solvent, cleaning agent and degreaser, and its use in the manufacturing of 1,1,1-trichloroethane; vinyl chloride; plastic wrap; and synthetic fibre may result in its release to the environment. It is a colourless, oily liquid with a chloroform-like odour. 1,1-DCA can be released into the air, water, and soil at places where it is produced or used as a solvent. Human exposure can occur from the air, water, or consumer products. 1,1-DCA is highly volatile based on its vapour pressure and Henry's Law constant, and has low bioaccumulation potential (ATSDR 2015).

1,1-DCA is a chlorinated aliphatic chemical. Exposure to 1,1-DCA can occur from the inhalation of air containing 1,1-DCA, and may cause central nervous system depression and irritation to the skin or respiratory tract. Historically, 1,1-DCA was used as an anesthetic; however, due to the risk of cardiac arrhythmia induction in humans at anesthetic doses (approximately 26,000 parts per million[ppm]), this was discontinued (ATSDR 2015).

Assessment of Carinogenicity

Based on numerous studies there is inconclusive evidence on the carcinogenicity of 1,1-DCA. While the U.S. Environmental Protection Agency (EPA) has classified 1,1-DCA as a possible human carcinogen, neither the Department of Health and Human Services nor the International Agency for Research on Cancer have classified the carcinogenic potential of 1,1-DCA (ATSDR 2015)

Selection of Noncarcinogenic Oral Exposure Limits

Table 1 summarizes the noncancer oral exposure limits.

Table 1. Noncancer Oral Exposure Limits for 1,1 Dichloroethane

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
EPA PPRTV (2006)	2.0E-01 (RfD)	Chronic	Renal toxicity in rats	• **Basis:** Muralidhara et al. (2001) • **Study Design:** A gavage study exposed male Sprague-Dawley rats for 13 weeks to an array of doses (as referenced in EPA PPRTV [2006]). • **POD**: NOAEL of 714.3 mg/kg/day • **UF:** UF 3,000 (10 for subchronic to chronic, 10 interspecies extrapolation, 10 for human variability, and 3 for database deficiencies)	Yes
EPA PPRTV (2006)	2.0 (RfD)	Subchronic	Renal toxicity in rats	• **Basis:** Muralidhara et al. (2001) • **Study Design:** A gavage study exposed male Sprague-Dawley rats for 13 weeks to an array of doses (as referenced in EPA PPRTV [2006]). • **POD**: NOAEL of 714.3 mg/kg/day • **UF:** UF 300 (10 interspecies extrapolation, 10 for human variability, and 3 for database deficiencies)	Yes

Table 1. Noncancer Oral Exposure Limits for 1,1 Dichloroethane

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
CalEPA DW (2003)	4.0E-02 (RfD)	Chronic	Kidney damage in cats	• **Basis:** Hofmann et al. (1971) • **Study Design:** An oral study where cats were exposed to 500 ppm of 1,1,-DCA for 13 weeks, followed by an additional 13 weeks at 1,000 ppm. • **POD:** NOAEL of 40 mg/kg/day • **UF:** 1,000 (10 for inter species differences, 10 for intraspecies differences, and 10 for sub-chronic to chronic extrapolation)	No
MECP (2011) (from CalEPA DW [2003])	4.0E-01 (RfD)	Subchronic	Kidney damage in cats	• **Basis:** Hofmann et al., 1971 • **Study Design:** An oral study where cats were exposed to 500 ppm of 1,1,-DCA for 13 weeks, followed by an additional 13 weeks at 1,000 ppm. • **POD:** NOAEL of 40 mg/kg/day • **UF:** 1,00 (10 for inter species differences and 10 for intraspecies differences)	No

Notes:
CalEPA = California Environmental Protection Agency
DW = drinking water
MECP = Ontario Ministry of the Environment, Conservation and Parks
mg/kg/day = milligram(s) per kilogram per day
NOAEL = no observed adverse effect level
POD = point of departure
PPRTV = Provisional Peer Reviewed Toxicity Values
RA = risk assessment
RfD = reference dose
UF = uncertainty factor

The MECP (2016) recommended the use of the EPA PPRTV (2006)-proposed RfD of 2E-01 mg/kg/day. The CalEPA RfD (previously selected by the MECP) was based on a 13-week inhalation study, while the EPA PPRTV RfD was based on a 13-week oral study. The use of a route-specific exposure study is preferred; therefore the selected RfD and subchronic RfD was based on the EPA PPRTV.

Selection of Carcinogenic Oral Exposure Limits

Table 2 summarizes the cancer oral exposure limits.

Table 2. Cancer Oral Exposure Limits for 1,1 Dichloroethane

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
CalEPA DW (2009)	5.7E-03 (SF)	Chronic	Mammary gland adenocarcinomas in rats	• **Basis:** Gold et al. (1984); NCI (1977) • **Study Design:** Gold et al. (1984) lists the NCI (1977) results of the oral gavage studies for male and female rats and mice. Doses of 350 mg/kg to up to 1,800 mg/kg in rats and 900 mg/kg to 3600 mg/kg in mice, were administered once per day, 5 days a week, for 78 weeks. • **Notes:** POD and UF were not available in the Cal EPA document	Yes

Notes:
mg/kg = milligram(s) per kilogram
SF = slope factor

The MECP, Health Canada, EPA Integrated Risk Information System (IRIS), and ATSDR do not provide evaluation for cancer health effects resulting from oral exposure to 1,1-DCA. However, the CalEPA (2009) included a cancer SF for oral exposures to 1,1-DCA of 5.7E-03 mg/kg/day. This cancer SF is based on female rat mammary gland adenocarcinoma tumor data and cross-route extrapolation methods (Gold et al. 1984, as reported in CalEPA DW 2009), and is also used by EPA in derivation of the regional screening levels (RSL) (EPA 2016).

Selection of Noncarinogenic Inhalation Exposure Limits

The MECP (2011) reference concentration (RfC) of 0.17 milligram per cubic metre (mg/m^3) has been selected for use in this RA.

Selection of Carcinogenic Inhalation Exposure Limits

Table 3 summarizes the carcinogenic inhalation exposure limits for 1,1 DCA.

Table 3. Carcinogenic Inhalation Exposure Limits for 1,1 Dichloroethane

Regulatory Agency	Exposure Limit $(mg/m^3)^{-1}$	Toxicological Endpoint	Study Details	Selected for Use in the RA
CalEPA DW (2003)	1.6E-03 (IUR)	Female rat mammary gland adenocarcinoma tumor	• **Basis:** Gold et al. (1984); NCI (1977) • **Study Design:** Goled et al. (1984) lists the NCI (1977) results of the oral gavage studies for male and female rats and mice. Doses of 350 mg/kg to up to 1800 mg/kg in rats and 900 mg/kg to 3,600 mg/kg in mice, were administered once per day, 5 days a week, for 78 weeks. • **Notes:** POD and UF were not available in the Cal EPA document	Yes

Note:
IUR = inhalation unit risk

The MECP, Health Canada, EPA IRIS, and ATSDR do not provide evaluation for cancer health effects resulting from inhalation exposure to 1,1-DCA. The EPA unit risk factor (CalEPA 2009) of 1.6E-03 per mg/m^3 was selected for this RA based on female rat mammary gland adenocarcinoma tumors. This value is also used by EPA in derivation of the RSLs (EPA 2016).

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APPENDIX H

Toxicological Profile for Fluorene

Background Information

Fluorene is a lighter polycyclic aromatic hydrocarbon (PAH) with three benzene rings. It exists as a white crystalline solid and is almost insoluble in water, but is soluble in a number of organic solvents, including: ether, benzene, and carbon disulphide (Budavari et al., 1989, as referenced in Agency for Toxic Substances and Disease Registry [ATSDR], 1995). Fluorene can be produced from coal tar or by the reduction of diphenyl ketone with zinc (Oak Ridge National Laboratory [ORNL], 1994). It is used as a chemical intermediate in various applications, in the formation of polyradicals for resins, and in the manufacture of dyestuffs. Fluorene occurs naturally in fossil fuels and is found in coal tars, products of incomplete combustion, vehicle emissions, and mainstream cigarette smoke – where it is the second most abundant PAH. Fluorene is a major component of the total PAH content in the environment. Human exposure to fluorene occurs primarily through smoking tobacco, inhaling polluted air, and ingesting food and water contaminated by combustion effluents (International Agency for Research on Cancer [IARC], 1983). Fluorene has been detected in soils, groundwater, and surface waters at a number of hazardous waste sites in the United States (ATSDR, 1995).

Assessment of Carcinogenicity

The USEPA (USEPA, 1990) classified fluorene as a Group D substance – not classifiable as to human carcinogenicity. This classification was based on a lack of human data and inadequate data from animal bioassays.

The International Agency for Research on Cancer (IARC) (1983) has classified fluorene as a Group 3 substance – not classifiable as to its carcinogenicity to humans.

Selection of Non-Carinogenic Inhalation Exposure Limits

Table 1 summarizes the noncancer inhalation exposure limits for cadmium.

Table 1. Non-cancer Inhalation Exposure Limits for Fluorene

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MADEP, 2004	5E-02	Chronic	CNS effects and increased liver and kidney weight.	• **Basis:** Based on a mixture study wherein rats were exposed to high flash aromatic naphtha by inhalation (Clark et al., 1989, as referenced in MADEP 2003). • **Study Design:** Derived an RfC value of 5.0E-02 mg/m^3 as a surrogate toxicity value for constituents of the C_9 to C_{18} aromatic TPH fraction (which includes fluorene). The parameters used to assess toxicity included: body and organ weight, clinical observations, and hematology and serum chemistry. • **POD:** The NOAEL was identified by MADEP (2003) as 9.0E02 mg/m^3 (adjusted to 160 mg/m^3 for continuous exposure) based on hepatic and central nervous system effects.	Yes

Table 1. Non-cancer Inhalation Exposure Limits for Fluorene

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
				• **UF:** 3000 (10 for use of a subchronic study for chronic RfC derivation, 10 each for inter- and intra-species variability, and 3 for database deficiencies)	
TPHCWG, 1997	2.0E-01	Chronic	Increased liver and kidney weight	• **Basis:** Based on a rat study by Clark et al. (1989) • **Study Design:** Rats were exposed to concentrations of 0, 450, 900, or 1,800 mg/m^3 for 6 hours per day, 5 days per week for one year. An increase in liver and kidney weights at the highest dose were identified as the sensitive endpoints of the study • **POD:** NOAEL of 900 mg/m^3 • **UF:** 1000 (10 most sensitive, 10 animal to human, and 10 sub-chronic to chronic)	No

Notes:

LOAEL = lowest observed adverse effect level

mg/m^3 = milligram per cubic metre

MRL = minimal risk level

NOAEL = no observed adverse effect level

POD = point of departure

RfC = reference concentration

TPH = total petroleum hydrocarbon

UF = uncertainty factor

Because the MADEP (2003) recommended RfC of 0.05 mg/m^3 for c_9 to c_{18} fraction is more conservatively protective, it is selected for use in this RA.

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APPENDIX H

Toxicological Profile for Iron

Background Information

Iron is a naturally-occurring element in minerals found in the earth's crust. Iron is a metal that is alloyed with carbon, manganese, chromium, nickel, and other elements to form steels. The primary use of direct-reduced iron is as a clean supplement that replaces the ferrous scrap charge in high quality-oriented electric arc furnace steelmaking. Iron is an essential element in the body. Exposure to iron may occur through handling of iron ores or iron compounds where it is mined or used (HSDB, 2009).

The Hazardous Substances Databank (HSDB) (2009) and United States Environmental Protection Agency (EPA) Provisional Peer Reviewed Toxicity Value (PPRTV) toxicological profile (2006) present the toxicokinetics for iron. In humans and other animals, iron levels in the body are regulated primarily through changes in the amount of iron absorbed by the gastrointestinal mucosa. The absorption of dietary iron is influenced by body stores, by the amount and chemical nature of iron in ingested food, and by a variety of dietary factors that increase or decrease the availability of iron for absorption. Ferrous iron is transported across intestinal mucosal cells by active transport with the rate of transport inversely related to body iron stores. Depending on the iron status of the body, stored iron is bound to ferritin within mucosal cells and macrophages in the liver, spleen, and bone, or is transported in the plasma bound to transferrin. Although iron absorption is regulated, excessive accumulation of iron in the body resulting from chronic ingestion of high levels of iron cannot be prevented by intestinal regulation, and humans do not have a mechanism to increase excretion of absorbed iron in response to elevated body levels (EPA, 2006).

Assessment of Carcinogenicity

The EPA (2006) PPRTV and International Agency for Research of Cancer have not evaluated iron for its carcinogenicity.

Selection of Noncarcinogenic Oral Exposure Limits

Table 1 summarizes the noncancer oral exposure limits.

Table 1. Noncancer Oral Exposure Limits for Iron

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
EPA, 2021; EPA, 2006	0.7	Acute	Gastrointestinal effects (Humans)	• **Basis:** Frykman et al. (1994) • **Study Design:** Evaluated the adverse effects of daily oral therapy with iron fumarate in a double-blind, crossover, placebo-controlled study in Swedish male [n=25; mean age 45 years (range 40-52)] and female [n=23; mean age 41 years (range 34-45)] adult blood donors. Study subjects were administered 60 milligrams (mg) elemental iron as a daily dose of iron fumarate for 1 month, with each study subject serving as their own placebo control. • **POD:** LOEL of 60 mg/kg/day • **UF:** 1.5 (use of minimal LOAEL)	Yes

Table 1. Noncancer Oral Exposure Limits for Iron

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		

Notes:
LOAEL = lowest observable adverse effect level
mg/kg/day = milligram(s) per kilogram per day
POD = point of departure
RA = risk assessment
UF = uncertainty factor

The Ontario Ministry of the Environment, Conservation and Parks (MECP) (2011) did not provide any oral toxicity reference values (TRVs) for iron. Therefore, an oral RfD of 0.7 mg/kg/day was selected from EPA (2006) PPRTV.

Selection of Carcinogenic Oral Exposure Limits

The EPA PPRTV and International Agency for Research of Cancer have not evaluated iron for its carcinogenicity.

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APPENDIX H

Toxicological Profile for Mercury

Background Information

Mercury occurs naturally in the environment and exists in several forms organized into three categories: metallic or elemental mercury, inorganic mercury, and organic mercury. This toxicological profile supports the toxicological reference values (TRVs) selected for inorganic and elemental mercury.

Elemental mercury is the only element to be liquid at room temperature. It is heavier than water, and is shiny, silver-white, odourless, and naturally occurring. (ATSDR, 2001). Mercury exposure Some uses of this type of mercury are production of chlorine gas; the extraction of gold from ore; and the production of thermometers, thermostats, fluorescent light bulbs, batteries, and dental fillings.

Assessment of Carinogenicity

The U.S. Environmental Protection Agency (EPA 1995a) classified mercury as a Group D substance – not classifiable as to human carcinogenicity. This classification was based on inadequate human and animal data. The International Agency for Research on Cancer (IARC) (1993) has classified metallic and inorganic mercury as a Group 3 substance – not classifiable as to its carcinogenicity to humans. The IARC concluded there is inadequate evidence for the carcinogenicity of mercury in humans, and there is limited evidence on experimental animals.

Selection of Noncarinogenic Inhalation Exposure Limits

Table 1 summarizes the noncancer inhalation exposure limits for mercury.

Table 1. Noncancer Inhalation Exposure Limits

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
EPA RSL (2012); EPA IRIS (1995a)	3.0E-04 (RfC)	Chronic	Neurophysiological effects (Humans)	• **Basis:** Based on various occupational studies (Fawer et al. [1983]; Piikivi [1989]; Piikivi and Hanninen [1989]; Piikivi and Tolonen [1989]; Ngim et al. [1992]; Liang et al. [1993], as referenced in EPA [1995a]) • **Study Design:** These studies involved inhalation exposure to mercury (air concentrations, 0.0008 to 0.042 mg/m^3; blood levels, 10 to 12 µg/L; urine levels – 17 to 20 µg/L) in occupational settings for average duration ranging from 5.5 years to 15.8 years • **POD:** LOAEL of 0.025 mg/m^3 based on studies by Fawer et al. (1983), Ngim et al. (1992), and Liang et al. (1993) • **UF:** 30 (10 for intraspecies variation, and 3 for lack of database, particularly developmental and reproductive studies) • **Notes:** Air concentrations were extrapolated from blood levels based on the conversion factor and description in studies of Roels et al. (1987), Piikivi (1989), Piikivi and	No

Table 1. Noncancer Inhalation Exposure Limits

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
				Hanninen (1989), and Piikivi and Tolonen (1989).	
MECP, 2011 (from CalEPA ChREL [2000])	9.0E-05 (RfC)	Chronic	Nervous system	• **Basis:** Based on various occupational studies (Fawer et al. [1983]; Piikivi [1989]; Piikivi and Hanninen [1989]; Piikivi and Tolonen [1989]; Ngim et al. [1992]; Liang et al. [1993], as referenced in EPA [1995a]) • **Study Design:** These studies involved inhalation exposure to mercury (air concentrations, 0.0008 to 0.042 mg/m^3; blood levels, 10 to 12 µg/L; urine levels – 17 to 20 µg/L) in occupational settings for average duration ranging from 5.5 years to 15.8 years • **POD:** LOAEL of 0.025 mg/m^3 based on studies by Fawer et al. (1983), Ngim et al. (1992), and Liang et al. (1993) • **UF:** 100 • **Notes:** Air concentrations were extrapolated from blood levels based on the conversion factor and description in studies of Roels et al. (1987), Piikivi (1989), Piikivi and Hanninen (1989), and Piikivi and Tolonen (1989).	No
CalEPA, 2014	3.0E-05 (RfC)	Chronic	Nervous system; development; kidney (Humans)	• **Basis:** Based on various occupational studies (Fawer et al. [1983]; Piikivi [1989]; Piikivi and Hanninen [1989]; Piikivi and Tolonen [1989]; Ngim et al. [1992]; Liang et al. [1993], as referenced in EPA [1995a]) • **Study Design:** These studies involved inhalation exposure to mercury (air concentrations, 0.0008 to 0.042 mg/m^3; blood levels, 10 to 12 µg/L; urine levels – 17 to 20 µg/L) in occupational settings for average duration ranging from 5.5 years to 15.8 years • **POD:** LOAEL of 0.025 mg/m^3 based on studies by Fawer et al. (1983), Ngim et al. (1992), and Liang et al. (1993) • **UF:** 300 (3 for intraspecies variation, 10 for LOAEL, and 10 for susceptibility of children) • **Notes:** Air concentrations were extrapolated from blood levels based on the conversion factor and description in studies of Roels et al. (1987), Piikivi (1989), Piikivi and Hanninen (1989), and Piikivi and Tolonen (1989).	Yes

Notes:

µg/L = microgram(s) per litre

ChREL =

mg/m^3 = milligram(s) per cubic metre

RfC = reference concentration

RSL = Regional Screening Level

Since the CalEPA value is more recent and reinterpreted from the same agency and source study as the MECP (2011) selection, the CalEPA (2014) inhalation RfC for elemental or metallic mercury was used in

this RA. The inhalation RfC derived by CalEPA (2014) was based on the same studies considered by USEPA IRIS (1995b) and MECP (2011), however CalEPA (2014) used a more conservative approach, as it accounted for a larger uncertainty factor. The CalEPA (2000) RfC adopted by the MECP (2011) was derived with an UF of 100, and was later revised by CalEPA to use an UF of 300 to account for "greater susceptibility among children". While the USEPA IRIS (1995b) based its RfC on the same study, a lower UF was used (30), and therefore a less conservative RfC was derived.

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APPENDIX H

Toxicological Profile for 2-(1-)Methylnaphthalene

Background Information

2-(1-)Methylnaphthalene (2-methylnaphthalene or 1-methylnaphthalene) are naphthalene-like compounds. 1-Methylnaphthalene is liquid, and 2-methylnaphthalene is solid. 2-Methylnaphthalene is used to make vitamin K. 1-Methylnaphthalene and 2-methylnaphthalene are used to make other chemicals, such as dyes and resins; both are present in cigarette smoke, wood smoke, tar, asphalt, and at some hazardous waste sites (ATSDR 2005).

Exposure to 2-(1-)methylnaphthalene may occur primarily through breathing air containing it. The release of methylnaphthalene in air occurs from burning wood or fossil fuel, automobile exhaust, and cigarette smoke. Low-level exposure to methylnaphthalene may also occur by drinking water or accidentally eating soil or inhaling dust that contains 2-(1-)methylnaphthalene (ATSDR 2005).

Assessment of Carinogenicity

Under the U.S. Environmental Protection Agency's (EPA's) *Draft Revised Guidelines for Carcinogen Risk Assessment* (1999), the data regarding the carcinogenicity of 2-methylnaphthalene in mice and the lack of human carcinogenicity data are inadequate to assess human carcinogenic potential.

Selection of Noncarinogenic Inhalation Exposure Limits

Table 1 summarizes the noncancer inhalation exposure limits for 2-(1-)methylnaphthalene.

Table 1. Noncancer Inhalation Exposure Limits for 2-(1-)methylnaphthalene

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MADEP (2003)	0.05 (RfC)	Chronic	CNS effects and increased liver and kidney weight	• **Basis:** Clark et al. (1989) • **Study Design:** This study exposed male rats to high flash aromatic naphtha vapors at 0, 450, 900, or 1,800 mg/m^3, 6 hours/day, 5 days/week for 12 months. • **POD:** NOAEL of 900 mg/m^3 • **UF:** 3,000 (10 for animal to human extrapolation, 10 for human variability, 10 for subchronic to chronic extrapolation, and 3 for database deficiency) • **Notes:** NOAEL was adjusted for continuous exposure (900 mg/m^3 x 6 hours/24 hours x 5 days/7 days = 160)	Yes

Notes:

LOAEL = lowest observed adverse effect level
MADEP = Massachusetts Department of Environmental Protection
NOAEL = no observed adverse effect level
POD = point of departure
RfC = reference concentration
UF = uncertainty factor

The MECP, Health Canada, EPA, and Agency for Toxic Substances and Disease Registry (ATSDR) do not provide evaluation for noncancer health effects resulting from inhalation exposure to 2-(1-)methylnaphthalene. However, MADEP provides an inhalation reference concentration for 2-methylnaphthalene (2003), which is used in the RA.

Selection of Carcinogenic Inhalation Exposure Limits

The data regarding the carcinogenicity of 2-methylnaphthalene in mice and the lack of human carcinogenicity data are inadequate to assess human carcinogenic potential (EPA 1999).

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APPENDIX H

Toxicological Profile for n-Hexane

Background Information

n-Hexane is a straight-chain, fully saturated hydrocarbon with six carbon atoms; it is also referred to as hexane and hexyl hydride, and is made from crude oil. Pure n-Hexane is a colourless liquid with a slightly disagreeable odour. It evaporates very easily into the air and dissolves only slightly in water. n-Hexane is highly flammable, and its vapours can be explosive. It is a solvent that has many uses in the chemical and food industries, either in pure form or as a component of a mixture. It is used for the extraction of edible fats and oils from crops, such as soybeans; and as cleaning agents in textile and shoe making, furniture manufacturing, and in the printing industry. n-Hexane is the solvent base for many commercial products, such as glues, rubber cements, paint thinners, and degreasers. It comprises about 11.6 percent of unleaded gasoline and about 2 percent of JP-4 aviation fuel (ATSDR 1999; EPA 2005a).

Exposures to n-Hexane can occur from the inhalation of air containing n-Hexane, and through skin by dermal contact with n-Hexane-containing products. Per the Agency for Toxic Substances and Disease Registry (ATSDR) (1999), "some occupational groups that may be exposed to n-Hexane include refinery workers, shoe and footwear assembly workers, laboratory technicians, workers operating or repairing typesetting and printing machinery, construction workers, carpet layers, carpenters, auto mechanics and gas station employees, workers in plants manufacturing tires or inner tubes, and workers in air transport and air freight operations." Products in the home containing n-Hexane can also be responsible for exposure if ventilation is not adequate (ATSDR 1999).

Assessment of Carcinogenicity

The U.S. Environmental Protection Agency (EPA) concluded there is inadequate information to assess the carcinogenic potential of n-Hexane. Specifically, there are no available animal carcinogenicity studies examining exposure to n-Hexane, and there is a single human study. The available studies for humans and laboratory animals are inadequate for cancer risk assessment (EPA 2005a and 2005b). The International Agency for Research on Cancer (IARC) did not classify n-Hexane for its carcinogenicity.

Selection of Noncarcinogenic Oral Exposure Limits

Table 1 summarizes the noncancer oral exposure limits.

Table 1. Noncancer Oral Exposure Limits for n-Hexane

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
EPA HEAST (1997)	6.0E-02 (RfD)	chronic	Nervous system neuropathy; testicular atrophy	• **Basis:** RfD from the subchronic gavage study by Krasavage et al. (1980, as referenced in EPA [1997 and 2005a]; ATSDR [1999]). • **Study Design:** The gavage study exposed male rats to n-hexane of a 90 day period, five days per week. Groups of five rats were exposed to doses of 0, 6.6, 13.2, and 46.2 mmol/kg (570 mg/kg/day) of n-Hexane over the study period. The rats in the 46.2 mmol/kg group, had an increased observation and exposure period of 120 days to ensure that an overt neuropathological endpoint was detected.	Yes

Table 1. Noncancer Oral Exposure Limits for n-Hexane

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
				The appearance of hind limb paralysis and giant axonal swellings were observed in the high-dose group, indicating a neuropathy endpoint. • **POD:** Neuropathy LOAEL of 570 mg/kg/day • **UF:** 10,000	
EPA HEAST (1997)	6.0E-01 (RfD)	sub-chronic	Nervous system neuropathy; testicular atrophy	• **Basis:** RfD from the subchronic gavage study by Krasavage et al. (1980, as referenced in EPA [1997 and 2005a]; ATSDR [1999]). • **Study Design:** The gavage study exposed male rats to n-hexane of a 90 day period, five days per week. Groups of five rats were exposed to doses of 0, 6.6, 13.2, and 46.2 mmol/kg (570 mg/kg/day) of n-Hexane over the study period. The rats in the 46.2 mmol/kg group, had an increased observation and exposure period of 120 days to ensure that an overt neuropathological endpoint was detected. The appearance of hind limb paralysis and giant axonal swellings were observed in the high-dose group, indicating a neuropathy endpoint. • **POD:** Neuropathy LOAEL of 570 mg/kg/d • **UF:** 1,000	Yes

Notes:

HEAST = Health Effects Assessment Summary Tables
LOAEL = lowest observed adverse effect level
mg/kg/day = milligram(s) per kilogram per day
mmol/kg = millimole(s) per kilogram
POD = point of departure
RfD = reference dose
UF = uncertainty factor

The Ontario Ministry of the Environment, Conservation and Parks (MECP) (2011) did not provide any oral toxicity reference values (TRVs) for n-Hexane. Therefore, a provisional chronic oral RfD of 6.0E-02 mg/kg/day and subchronic RfD of 6.0E-01 mg/kg/day were selected from EPA's HEAST from 1997.

Selection of Carcinogenic Oral Exposure Limits

The MECP, Health Canada, EPA, and ATSDR do not provide cancer health effects based toxicity criteria from oral exposure to n-Hexane.

Selection of Noncarinogenic Inhalation Exposure Limits

Table 2 summarizes the noncancer inhalation exposure limits for cadmium.

Table 2. Noncancer Inhalation Exposure Limits for n-Hexane

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MECP (2011), based on MECP 24-hour AAQC (2005)	2.5	Chronic	-	• **Basis:** The MECP's 24-hour AAQC. • **Notes:** Additional information regarding the basis of the MECP selection of this value is not available. However, the AAQC's are values protective of adverse effects to health and environment from air contaminants. Additional averaging periods of 1 hour and 10 minutes are available as AAQC guidelines for hexane.	No
EPA IRIS (2005a and 2005b)	7.0E-01	Chronic	Neurotoxic effects (functional impairment of the peripheral nervous system).	• **Basis:** Based on study by Huang et al. (1989, as referenced in EPA [2005a and 2005b]) on male Wistar rats. • **Study Design:** Rats were exposed to 0, 500, 1,200, or 3,000 ppm (0, 1,762, 4,230, 10,574 mg/m^3) n-Hexane (greater than 99 percent pure) for 12 hours per day, 7 days per week for 16 weeks. • **POD:** A reduction in body weight gain, MCV, grip strength, and motion were observed and a NOAEL of 500 ppm identified. • **UF:** 300 • **Notes:** The data from this study set provided an adequate dose response for benchmark dose modelling with an estimated point of departure of a benchmark concentration limit/human equivalent concentration of 215 mg/m^3.	Yes

Notes:
AAQC = ambient air quality criteria
IRIS = Integrated Risk Information System
mg/m^3 = milligram(s) per cubic metre
NOAEL = no observed adverse effect level
ppm = part(s) per million

An inhalation TRV of 7.0E-01 mg/m^3 was selected for n-Hexane based on the reference concentration (RfC) value provided by EPA IRIS. An inhalation TRV provided in the MECP guidance is not selected as it is based on ambient air quality standard, whereas the EPA value is derived based on dose-response studies and standard methods to derive the RfC.

Selection of Carcinogenic Inhalation Exposure Limits

The MECP, Health Canada, EPA, and ATSDR do not provide cancer health effects based toxicity criteria from inhalation exposure to n-Hexane.

References

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U.S. Environmental Protection Agency (EPA). 1997. *Health Effects Assessment Summary Tables* (HEAST). FY 1997 Update. EPA/540/R-97/.

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U.S. Environmental Protection Agency (EPA). 2005b. "Hexane-n; CASRN 110-54-3 (12/23/2005)." *Integrated Risk Information System (IRIS)*. Cincinnati, OH: Environmental Health Criteria and Assessment Office, Office of Health and Environmental Assessment. Accessed January 2017: https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=486

APPENDIX H

Toxicological Profile for Phenanthrene

Background Information

Phenanthrene belongs to the compound group called polycyclic aromatic hydrocarbons (PAHs). PAHs are emitted as byproducts of incomplete combustion and pyrolysis of organic matter. Natural sources of PAHs include forest fires, volcanic activity, and possibly, biosynthesis; while anthropogenic sources include industry and energy production facilities, vehicle emissions, and domestic heating. In North America, mobile emission sources are considered the primary emissions sources of PAH. PAHs are also produced during cooking and processing food. There are over 100 individual PAH compounds, but PAHs typically occur as chemical mixtures. PAHs are used to make medicine, dyes, plastics, pesticides, and asphalt. They are also present in crude oil, coal, coal tar pitch, creosote, and roofing tar (ATSDR 1995).

Exposure pathways for PAHs typically include air, water, food, and soil via inhalation, ingestion, and dermal exposure routes. Inhalation is likely to be a major source of intake, as some PAHs can bind to particles and dust in the air, while others occur as vapours. Cigarette smoke is an important exposure pathway for PAHs, as well as vehicle exhaust in urban areas and wood smoke. Exposure to PAHs in food is also a major source of intake, as PAHs are frequently present in cereals, produce, meat, processed food, dairy products, and barbecued foods (ATSDR 1995).

Phenanthrene and anthracene are both tricyclic PAHs, which influences their behaviour and mechanism of action.

Assessment of Carinogenicity

The International Agency for Research on Cancer (IARC) (1999) has classified phenanthrene as Group 3, not classifiable as to carcinogenicity. The U.S. Environmental Protection Agency (EPA) classifies phenanthrene in Group D, not classifiable as to human carcinogenicity (1997).

Selection of Noncarcinogenic Oral Exposure Limits

Table 1 summarizes the noncancer oral exposure limits.

Table 1. Noncancer Oral Exposure Limits for Phenanthrene

Regulatory Agency	Exposure Limit (mg/kg/day)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
RIVM (2001)	4E-02 (RfD)	-	Applicable to the noncarcinogenic C9 to C16 aromatic TPH fraction (or its constituents), and based on decreased body weight and increased kidney and liver weight.	• **Notes:** The RIVM (2001) derived an oral chronic RfD of 4.0E-02 mg/kg/day based on evaluation of total petroleum hydrocarbons (TPHCWG, 1997) for noncarcinogenic aromatic compounds with equivalent carbon numbers >C9 to C16 (that is, anthracene, fluorene, naphthalene and phenanthrene). Additional details regarding the development of this RfD are not readily available; therefore, confidence in this RfD is low due to a lack of supporting documentation.	Yes

Notes:

mg/kg/day = milligram(s) per kilogram per day

RA = risk assessment

RfD = reference dose

RVIM = Netherlands National Institute for Public Health and Environmental

TPH = total petroleum hydrocarbon

TPHCWG = Total Petroleum Hydrocarbon Criteria Working Group

The Ontario Ministry of the Environment, Conservation and Parks (MECP) and other regulatory agencies including Health Canada, Agency for Toxic Substances Disease Registry (ATSDR), and EPA Integrated Risk Information System (IRIS) do not provide exposure limits for noncancer health effects resulting from oral exposure to phenanthrene. Although the RIVM (2001) toxicological reference value (TRV) is not based on toxicological data specific to phenanthrene, there are a lack of suitable human and animal data for this chemical. No oral chronic noncancer reference concentration values for phenanthrene have been derived by any of the authoritative bodies reviewed; hence, the use of the RfD value of 4.0E-02 mg/kg/day derived by RIVM (2001) was selected for use as a conservative approach in this RA.

Selection of Carcinogenic Oral Exposure Limits

The ATSDR, EPA, and Health Canada do not provide exposure limits for cancer health effects resulting from oral exposure to phenanthrene.

Selection of Noncarinogenic Inhalation Exposure Limits

Table 2 summarizes the noncancer inhalation exposure limits for Phenanthrene.

Table 2. Noncancer Inhalation Exposure Limits for Phenanthrene

Regulatory Agency	Exposure Limit (mg/m^3)	Toxicological Basis		Study Details	Selected for Use in the RA
		Exposure Duration	Endpoint		
MADEP (2004)	5E-02 (RfC)	-	CNS effects, and increased liver and kidney weight	• **Notes:** The MADEP (2004) provides an inhalation RfC value of 5.0E 02 mg/m^3 based on evaluation of TPHs (TPHCWG 1997) for non-carcinogenic aromatic compounds with equivalent carbon numbers >C9 to C16 (that is, anthracene, fluorene, naphthalene and phenanthrene). Additional details regarding the development of this RfC are not readily available; therefore, confidence in this RfD Cs low due to a lack of supporting documentation.	Yes

Notes:
CNS =
MADEP = Massachusetts Department of Environmental Protection
mg/m^3 = milligram(s) per cubic metre
RfC = reference concentration

Due to the lack of human and animal studies, the ATSDR, EPA IRIS, Health Canada, and MECP do not provide noncancer inhalation RfCs following exposure to phenanthrene.

Although the MADEP (2004) TRV is not based on toxicological data specific to phenanthrene, there are a lack of suitable human and animal data for this chemical. No inhalation noncancer reference concentration values for phenanthrene have been derived by any of the authoritative bodies reviewed; hence, the use of the RfC value of 5.0E-02 mg/m3 derived by MADEP (2004) was selected for use as a conservative approach in this RA.

Selection of Carcinogenic Inhalation Exposure Limits

The ATSDR, EPA, and Health Canada do not provide exposure limits for cancer health effects resulting from inhalation exposure to phenanthrene.

References

Agency for Toxic Substances Disease Registry (ATSDR). 1995. "Toxicological Profile for Polycyclic Aromatic Hydrocarbons." *Toxic Substances Portal*. Atlanta, Georgia: U.S. Department of Health and Human Services, Public Health Service. August. Accessed September 2013. http://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=122&tid=25.

International Agency for Research on Cancer (IARC). 1999. *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*. Volume 71, Re-evaluation of Some Organic Chemicals, Hydrazine and Hydrogen Peroxide. Lyon, France: World Health Organization.

Massachusetts Department of Environmental Health (MADEP). 2004. *Revisions to Dose-Response Values used in Human Health Risk Assessment*. August.

National Institute for Public Health and the Environmental (RIVM). 2001. *Re-Evaluation of Human-Toxicological Maximum Permissible Risk Levels.* March. The Netherlands.

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Appendix I
Risk Management Plan Engineering Report

Certification

This report was prepared under the direction of a professional engineer registered in the Province of Ontario. It is intended solely for the use of the individual, company, government, or other entity for which it was prepared, and for the purposes and within the limitations stated in the report.

May 17, 2021

Travis Tan, M.A.Sc., P.Eng.
Project Manager, Jacobs Engineering Group Inc.

Acronyms and Abbreviations

City	City of Guelph
cm	centimetre(s)
COC	contaminant of concern
FCTC	Fill Cap Target Concentrations
HDPE	high-density polyethylene
HSP	Health and Safety Plan
Jacobs	Jacobs Engineering Group Inc.
m	metre(s)
m^3	cubic metre(s)
MECP	Ontario Ministry of the Environment, Conservation and Parks
mm	millimetre(s)
MNRF	Ontario Ministry of Natural Resources and Forestry
NAPL	non-aqueous phase liquid
PP	polypropylene
PVC	polyvinyl chloride
QP	Qualified Person
RA	Risk Assessment
RMM	risk management measure

Appendix I. Engineered Risk Management Measures

This engineering report is intended to support the Risk Management Plan as discussed in Section 7 of the RA main text. It presents the conceptual design of the engineered risk management measures (RMMs):

- Physical barriers (hard caps and fill caps) to eliminate risk associated with direct exposure of human and ecological receptors to impacted soil that will remain on the RA Property.
- Vapour intrusion (VI) controls to eliminate or manage risks associated with human exposure via the potential migration of contaminants into the indoor air of buildings, where required.

I.1 Physical Barriers

Contact with impacted soils currently present at the RA Property may result in unacceptable risks to human and ecological receptors. The fundamental approach to managing the risk is to block the contact by instituting physical barriers between both human and ecological receptors and the underlying impacted soils. Upon redevelopment of the RA Property, a physical barrier (either a fill or hard cap) is required across the entire Site. The type of physical barriers that will be required at the RA Property depends on their compatibility with the redevelopment plans. Physical barriers can involve one or more of the following broader categories:

- Hard caps
- Fill caps
- Utility corridors

Specific site design has not been finalized at this stage of the project; consequently, conceptual designs for physical barrier systems have been developed. These conceptual physical barrier specifications provide a basis of design for likely construction scenarios, and the designers will refine the conceptual designs, as needed, during preparation of site-specific plans, which will be verified by a Qualified Person (QP).

The cap designs discussed herein are not intended to limit or prevent surface water infiltration to mitigate leaching of contaminants from shallow, unsaturated soils. Infiltration of surface water was not identified as requiring risk management.

I.1.1 Hard Caps

Hard caps can be used for walkways, parking areas, driveways, and other purposes on the RA Property. Common hard cap materials include:

- Armour stone
- Asphalt
- Cobbles
- Concrete
- Grates
- Pavers (permeable, pervious, or porous)
- Paving stones
- Rubberized surfaces
- Other materials that are resistant to erosion and burrowing animals

The thickness of the hard cap layer required depends on the physical characteristics of the material selected, such as:

- Cracking
- Resistance to mechanical damage
- Vandalism
- Weathering
- Other effects that will result in exposure of the underlying contaminated soils

The thickness of the hard cap layer will be 75 mm. The layer will be underlain by a structural base material (granular "A" or equivalent) of minimum thickness of 150 mm for a total minimum thickness of 225 mm. Unimpacted fill may consist of soil located on the RA Property that meets the Fill Cap Target Concentrations (FCTC) as developed in the RA or imported soil that meets the Table 6 Site Condition Standards (SCS) as per Ontario Regulation 153/04 (MECP, 2011).

Structural or geotechnical considerations will determine the type of structural base material and unimpacted fill and the installed thickness (which may be greater than the minimum requirements). Figure I-1 illustrates a typical profile of a hard cap application.

It is expected that some minor cracking will occur, as is typical of hard surface treatments, such as asphalt and concrete. Provided the surface material is not entirely compromised, the underlying structural base layer will provide additional isolation from the underlying impacted soils until repairs are required. The barrier material should be stable and resistant to frost heave, settlement, or other wear that would necessitate frequent repair.

I.1.2 Fill Caps

In areas where ~~there are potential risks to terrestrial plants, soil invertebrates, birds, and small mammals, and~~ the land use requires unconsolidated material for vegetation growth, a fill cap consisting of unimpacted fill ~~should~~ can be used as the RMM. Fill cap thickness varies depending upon use, whether it will support vegetation, and if so, the type of plants to be grown in a specific area. Figures I-2 illustrate typical profiles of fill cap applications. Fill caps for community land will be maintained regularly as part of general site maintenance activities.

The following materials are defined as unimpacted fill:

- Soil located on the RA Property may be used as unimpacted fill on the RA Property provided it meets the FCTC (Table 7-2c) developed as part of this RA. Soil that meets the FCTC can remain in place as part of the fill cap, or be placed on existing impacted soils.
- Soil located off the RA Property considered for importation to the RA Property as unimpacted fill must meet the applicable generic Table 6 SCS.
- Granular materials, such as Granular A, Granular B, and crushed stone from a virgin source (that is, a commercial sand and gravel pit or quarry licensed by the Ontario Ministry of Natural Resources and Forestry [MNRF])
- Inert non-soil materials, such as crushed concrete that has been deemed suitable by a Qualified Person (QP), as necessary
- Commercial landscaping products, such as compost, bark chips, fertilizer, or other such products

When unimpacted fill is a blend of materials, professional judgement should be used to determine whether the blended material or only the soil component is analyzed for comparison to FCTC.

Table I-1 outlines a typical example of required fill cap thicknesses based on plant type. Typical profiles for fill cap applications are illustrated on Figure I-2.

Table I-1. Example Requirements for Fill Cap Thickness for Plantings

Risk Assessment, 200 Beverley Street, Guelph, Ontario

Vegetation Type [a]	Fill Cap Thickness (Minimum) [b, c]	Figure
Manicured Lawn or Grass	1,000 mm	I-2
Shrubs and Wildflowers	1,000 mm	I-2
New Trees [d]	1,500 mm to mature tree dripline or 3-m radius from tree trunk (whichever is greater) and 1,500 mm beyond	I-3~~, Detail 1~~
~~Existing Trees [d]~~	~~150 mm protective layer to mature tree dripline or 3-m radius from tree trunk (whichever is greater) and 1,500 mm beyond~~	~~I-3, Detail 2~~

[a.] Examples of vegetation type include manicured lawn or grass, shrubs, wildflowers and perennials, and new ~~and existing~~ trees.

[b.] Soil cap thickness requirements can be achieved by confirming presence of existing unimpacted fill over existing impacted soil, by placing additional unimpacted fill to make up thickness, or by excavating impacted soil to the desired cap thickness and backfilling with unimpacted fill to the existing elevation. Minimum fill cap barrier thickness depends on the vegetation type as shown on Table I-1. Once the development plans are established, a MECP Qualified Person for Environmental Site Assessments (QP_{ESA}) should confirm that the cap thicknesses are appropriate for the intended future use.

[c.] Fill cap barrier thickness may be increased by a landscape architect to reflect the specific types of vegetation (that is, rooting depths) to be planted on a site-specific or area-specific basis.

[d.] New trees will only be planted in areas containing a minimum soil cap thickness of 1,500 mm. ~~For existing trees that will not be removed, a 150-mm protective layer will be installed over the impacted soil to prevent human and ecological exposure.~~ Refer to Section I.1.3 for further details.

Notes:

m = metre(s)
mm = millimetre(s)

The minimum fill cap thicknesses required for other scenarios are specified in the following subsections.

I.1.3 Fill Caps around Trees

The existing trees at the RA Property have been naturally established along the property boundaries and between the remaining floor slabs due to the vacant condition of the Site. It is not anticipated that any of the trees currently existing at the RA Property will be retained as part of any redevelopment activities. Trees considered to be tolerant to urban conditions have root systems varying from shallow and wide-spreading to deep. Most of a tree's roots typically grow within the top 60 centimetres (cm) of the surface and are not usually found deeper than 1 to 1.5 m in good quality, well-drained, and uncompacted soil (City of Toronto, 2016; AECOM, 2009). Certain species of mature deep-rooted trees may extend deeper than 1.5 metres below ground surface (mbgs) which may, in limited areas of the Site, periodically reach the water table during wetter periods of the year. The root system can extend to more than two to three times the dripline distance of a tree. If a barrier thickness of 1,500 mm is considered by a landscape architect or certified arborist to be insufficient for the tree species rooting depth, then consideration should be given to alternate tree selection or compaction of the subgrade to minimize downward growth of roots. Also, if an alternate cap depth is considered sufficient, which may be the case for tree installations in Silva Cells, then the cap depth may be adjusted. For areas that include new trees, a minimum 1,500 mm (fill barrier and protective layer) is required to address the risk of dermal contact, support tree growth, and

adequately isolate roots from impacted subgrade, as depicted in Figure I-3. The fill materials must meet the FCTC (or Table 6 SCS for imported soil), support plant growth, and be deemed suitable by a QP and landscape architect. Selection of species of trees as part of future landscape plans must also consider the possibility of limited and periodic root system contact with the water table and potential contact with contaminants (specifically PHC, PAHs and zinc).

~~Consistent with the use of the dripline for existing trees, t~~The lateral extent of the minimum 1,500-mm fill cap for newly planted trees should extend to the expected width of the tree canopy at maturity, or to the extent of Silva Cells if used in tree planting, or to 3-m radius from the tree trunk, whichever is greater. This coincides with the 2013 recommendation that individually planted trees each need a minimum of 30 cubic metres (m^3) of soil to produce larger, healthier trees (DTAH et al., 2013). In areas where hardscaping will be installed around trees, pavers (permeable, pervious, or porous) or grates may be used to provide free passage of precipitation and air.

I.1.4 Utility Corridors

Utility corridors can provide a preferential path for contaminated groundwater, volatile, or non-aqueous phase liquid (NAPL) transport. To mitigate contaminant transport along the utility trench, several construction approaches can be used, though each is subject to minor infiltration or deterioration over time. The following approaches are options for mitigating migration along utility corridors:

- Trench plugs: Commonly used and comprise low-permeability materials
- Anti-seep collars: Barriers made of any rigid impermeable material, such as concrete, steel, or geomembranes
- Trench liner: Impermeable liner placed at the bottom and sides of utility trenches
- Watertight shoring: Shoring at the walls should be supplemented by lining the bottom of the trench with impermeable liner or low-permeability materials

Where new utilities in areas of impacted groundwater or impacted soil are connected to existing City utilities or enclosed structures, trench mitigation measures should be installed, except in the following instances, which do not require trench mitigation measures:

- Utilities installed above the high groundwater level
- Utilities less than 1 m deep
- Utilities that are directionally drilled

Of the previously described trench mitigation measures, trench plugs are most commonly used; and for these, the low-permeability barrier should be installed across the trench cross-section (extending ["keyed"] into the existing soils at least 300 mm at the base and sides of the trench) to prevent migration of contaminants in groundwater or soil vapour in the permeable backfill material along the buried piping, conduit, or duct banks. A conceptual design for a trench block, such as a trench plug or anti-seep collar, is presented on Figure I-4. Trench plugs should consist of compacted clay or bentonite, or other low-permeability material, such as concrete or unshrinkable fill. Clay seals should be compacted at appropriate moisture contents (i.e., at or on the plus side of the clay's optimum moisture content) and extend for a minimum length of 750 mm along the utility trench and across its full width. The trench plug should extend from the base of the trench to above the high groundwater level, and at least 1,000 mm above the top of the utility, or up to the base of the overlying cap barrier, whichever is greater.

Also, where existing utilities in areas of impacted soil are connected to new utilities, trench mitigation measures, such as low-permeability barriers, should be installed in the transition section of the new utility.

I.1.5 Equivalency

Cap or barrier materials can be replaced by any other cap or barrier materials that meet the FCTC, or that is clean material from a virgin source (that is, from a sand and gravel pit or MNRF-licensed quarry). In addition, the barrier must meet the dimensional requirements for separation from the existing impacted soils specified in Section I.1.

I.2 Vapour Intrusion Mitigation

As discussed in Section 7.2.1 of the RA, VI measures for mitigating indoor air inhalation risks are required for all future occupied buildings that meets the requirement of the Ontario Building Code.

The redevelopment design plans for the RA Property have not yet been confirmed/developed. Consequently, the designs for vapour mitigation systems presented in this document are conceptual, taking into consideration typical building and VI mitigation scenarios. The conceptual designs incorporate three key elements:

1. Passive venting systems, including subslab, submembrane, suction pits (or plenum boxes), and vapour cutoff trenches
2. Vapour proof barriers
3. Foundation and penetration sealing

All VI mitigations shall include at minimum a vapour proof barriers plus a passive venting system.

Conceptual designs for these three key RMM types are presented herein. The conceptual designs will be refined during preparation of building-specific plans, taking into consideration the type of building and whether the foundation will be in contact with groundwater.

I.2.1 Venting System Conceptual Design

The venting system is intended to act as a pressure-relief, collection, and venting system that will dilute soil vapours in contact with the foundation, in addition to collecting and venting those vapours away from the structure. A conceptual design for passive venting (applicable to a slab-on-grade or subgrade foundation) is illustrated in cross-section and plan views on Figures I-5 and I-6, respectively. The plan-view orientation illustrates a general layout of the pressure relief, collection, and venting components. Final orientation and coverage (that is, whether the entire building footprint or just a portion of the building requires venting) will depend on the identified vapour mitigation needs. Venting component orientation should account for structural elements, including footings, piles, piers, foundation drainage systems, building envelope components, utility and site servicing infrastructure, and any other aspects of site redevelopment that may be relevant.

The venting systems will operate in a passive manner, providing pressure relief, collection, and venting of soil vapours that may be present under or near the building foundation. Soil vapour is collected and conveyed away from the building footprint and vented to the atmosphere primarily because of pressure-induced gas flow. The operation of the system has the effect of diluting the vapour concentrations in contact with the foundation.

If the venting system is located within the footprint of the building, it will be connected to vent risers that exit to the exterior building, as illustrated on Figure I-7 under unsaturated and saturated conditions. It is likely that future subgrade structures at the RA Property will require depths that may involve saturated conditions, given the shallow depth to groundwater. This condition and integration with long-term

groundwater management will need to be considered in the final design. Since it is a restriction that NAPL be removed prior to permitting subgrade occupied structures within the NAPL area (Figure 7-2), it is not anticipated that NAPL will be in direct contact with the foundation. However, appropriate consideration must be given to the material selection for these systems in a saturated groundwater environment that may include various chemical constituents at concentrations between the applicable generic O. Reg 153/04 standards and the PSSs for the RA Property.

The vent risers will be at least 100 mm in diameter, and are typically constructed of Schedule 40 (minimum) polyvinyl chloride (PVC). The discharge end of the vent risers will be completed with a pipe return bend and insect screen. Alternatively, the outlet can be outfitted with a rotary wind turbine, which will impart a slight passive vacuum to the venting system when wind-driven operation occurs.

The following is recommended for the positioning of vent risers to mitigate potential exposure to venting vapours by outdoor receptor:

- 0.9 m above the roof line
- 0.9 m away from any parapet
- 1.2 m away from any property line
- 1.5 m away from any electrical device
- 3.0 m above grade
- 3.0 m away from any windows, doors, roof hatch, opening, or air intake into the building

Actual design of the vent risers should take into consideration diffusion modeling of the venting emission. Additionally, vent risers should be oriented around the foundation perimeter to avoid vapour discharge being drawn into building ventilation systems.

The venting layer should be composed of a system of perforated collection piping within a coarse-grained layer comprising coarse sand, pea gravel, clear crushed stone, or a geosynthetic three-dimensional vent core product that provides equivalent venting performance over the design life of the building. The collection pipes will be a minimum 100-mm diameter and are typically constructed of Schedule 40 (minimum) PVC. Pipe joints will be threaded or rubber-gasket bell and spigot, but not solvent welded.

The venting system components must be sufficiently permeable to allow unimpeded flow of soil vapour. Pipe perforations will be holes (13 mm maximum diameter) or slotted, providing a minimum open area of 5,000 square millimetres per linear metre (mm^2/lin.m). Horizontal separation of the collection pipes and the distribution of the collection pipes will be determined at the time of site-specific building design based on the system capacity, properties of the bedding and cover material, soil conditions underneath the building, and VI mitigation needs of the building.

Both during construction and in the long term, the permeability of the venting components must not be reduced by fine-grained material, building materials, concrete, or water entering the layer components; geotextile filter fabric may need to be incorporated into the building-specific barrier system design to achieve this requirement. A nonwoven geotextile layer will be installed under and over the venting system components before construction.

Soil vapour monitoring ports may be integrated into each of the vent risers, to monitor vapour concentrations collected via the venting system. As described in Section 7.4.1 of this RA, monitoring of the performance of the VI system may require the sampling of subslab vapour, through installation of subslab vapour pins. The combination of monitoring both subslab vapour in conjunction with the vent riser ports provides evaluation of the performance of the venting system.

The components of the passive venting system should be constructed so the system may be made active if VI RMM monitoring (outlined in Tables 7-7 and 7-8) indicates the VI RMM is not effective in a passive configuration. An active venting system works in the same conceptual manner as a passive system; however, vapour collection and venting are enhanced using fans or blowers that increase air exchange volumes. The size and number of fans or blowers that may be needed if a system is converted to an active system will depend on the size and configuration of the structure, and will be specified once the building design has been finalized. Piping for the passive venting system is to be installed so the purchase and installation of the fan or blower can be completed, if required, based on the findings of the baseline performance assessment.

Venting layer depressurization systems should be able to create a vacuum of 4 Pascals (Pa) or greater to overcome barometric pressure fluctuations.

I.2.2 Vapour-proof Barrier Conceptual Design

I.2.2.1 Background and Criteria

The ability of a material to retard the diffusion of vapour is measured by units known as "perms." Permeance is defined in ASTM International (ASTM) D1079-10, *Standard Terminology Relating to Roofing and Waterproofing*, as the rate of vapour per unit area at a steady state through a membrane or assembly, expressed in nanogram per second per square metre per Pascal (ng/Pa.s.m^2) (or in grains - square feet per hour per inch of mercury [ft^2.hr.in.Hg] for imperial units) or unit of perms.

There are numerous ASTM methods for determining permeance. Typical methods used are ASTM E96/E96M-10, *Standard Test Methods for Water Vapour Transmission of Materials*, which is specifically designed for single-ply sheets of materials, such as HDPE, low-density polyethylene, PVC, and other membranes.

Permeance is distinct from permeability. The vapour transmission rate of a material is referred to as its "permeability," typically stated in perm-inches; this number does not depend on the material's thickness. Instead, its "permeance" depends on thickness, much like the R-value in heat transmission. The permeability of a material divided by its thickness produces the material's permeance in perms. Permeance should be used to compare various membrane products with their vapour transmission resistance. The lower the permeance, the less vapour will come through the membrane.

Any material with a perm rating of less than or equal to 1.0 is commonly considered a vapour retarder. A true vapour-proof barrier would have a perm rating of 0.0; however, for practical purposes, the membrane industry often considers any material with a perm rating of 0.1 perm, and sometimes 0.01 perm for specific applications that are extremely sensitive to vapour transmission, to be a vapour-proof barrier.

The American Concrete Institute (ACI) defines a vapour retarder as having a permeance of less than 0.3 perm, as determined by ASTM E96. Further, ACI indicates that any material proposed for use as a vapour retarder or barrier should comply with ASTM E1745-09, *Standard Specification for Plastic Water Vapour Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs*, and have a thickness of not less than 10 mils (0.25 mm).

ASTM E1745-09 defines three performance classifications (Classes "A," "B," and "C"), depending upon building requirements and installation demands. The minimum requirements under Class "A" serve to qualify and specify a resilient and effective underslab retarder or barrier for highly demanding installations and performance expectations. Class "B" and "C" rated products are intended for less demanding applications requiring less strength and puncture resistance. At a minimum, underslab gas barriers

(including any vapour-proof barrier used for the VI RMMs proposed herein) should meet or exceed the following Class "A" permeance, strength, and puncture requirements as vapour retarders or barriers per ASTM E1745-09 (also see ASTM E2121-12, *Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings*):

- Permeance of 0.1 or less (as determined by ASTM E96/E96M-10 and ASTM E154-08a)
- Tensile strength of 7.9 kilonewton per metre (45 pound-force per inch) or better (as determined by ASTM E154-08a)
- Puncture resistance of 2,200 grams (5 pounds) or better (as determined by ASTM D1079)

ASTM E1745-09 does not specify a minimum material thickness.

I.2.2.2 Conceptual Design

A vapour-proof barrier will be installed over the venting system specified in Section I.2.1. At a minimum, the underslab gas barrier (vapour-proof barrier used for the VI RMMs proposed herein) should meet or exceed the ASTM E1745-09 Class "A" requirements; and have a minimum thickness of 15 mils (0.38 mm). The designer of the vapour barrier must also consider that the choice of membrane is appropriate for its intended application and will be chemically resistant to the specific COCs at their concentrations at the RA Property including residual NAPL. Although it is a requirement that NAPL will be removed within the area presented in Figure 7-2 before subsurface structures are permitted, residual concentrations of PHCs in the soil may remain. Slab-on-grade buildings are permitted in the NAPL area (Figure 7-2) and the barrier material selection must also consider resistance to hydrocarbon impacted vapours that may be present due to residual NAPL.

The membrane should be installed with an overlying sand or suitably graded crushed stone layer to prevent damage to the venting and barrier system components; particularly, the immediately underlying vapour-proof membrane. The barrier should be a sealed, continuous geomembrane with seamed and welded joints, as applicable to the material used. Alternatively, the barrier can consist of a cold-spray, fluid-applied, vapour-proof barrier material that will bond directly to a suitable geotextile, or to a new concrete surface.

Figure I-7 conceptually illustrates the installation of a vapour-proof barrier below a foundation slab as part of new construction. If a spray-applied membrane is installed, an appropriate protective base geotextile should be placed on the surface before application of the cold-spray, vapour-proof barrier material. In addition, a protective material should be applied over the cold-spray, vapour-proof barrier after application to provide durability and avoid damage during slab construction.

I.2.3 Sealing

For all new structures with foundations extending beneath the water table, waterproof and vapour-proof sealing of the interior of the foundation slab is a critical component of the VI RMM. Foundation joints or cracks may be sealed with a spray-on, vapour-proof-barrier material; urethane-based caulking; or expanding foam, depending on the need and application. Foundation penetrations, such as utility runs, floor drains, joints between slabs, or structural cracks in the foundation, will require sealing. The size and nature of the penetration or crack will dictate the sealing material and approach selected. As illustrated on Figure I-8, utility and pipe penetrations will be sealed using non-solvent-welded geomembrane boots in the case of HDPE-type liners, or sealing tape (or mastic) and lapping procedures for the thinner polyethylene and polyolefin vapour barriers.

I.2.4 Equivalency

Design concepts presented are conceptual. Other building-specific designs that meet the intent of the designs presented herein and achieve equivalent objectives, as determined by an appropriately skilled and qualified individual (such as a Professional Engineer registered in the Province of Ontario), can be used.

I.2.5 Quality Assurance and Quality Control Plan

In addition to specifying the adequate membrane thickness, strength requirements, puncture resistance, and permeance for the vapour-proof barrier related to its intended application, a quality assurance (QA) and quality control (QC) plan for the installation of the vapour barrier should be established. A QA/QC plan will mitigate the potential for defects that may arise from improper installation, as well as damage to the membrane that may arise during installation, subsequent concrete pours, and general construction activities. Protocols for addressing installation defects and membrane damage should also be developed and included in the QA/QC plans and installation and construction specifications, where appropriate. The QA/QC plans and specifications should include the following:

- Thorough inspection of liner seals along all edges and at penetrations
- Detailed examination for liner holes and tears
- Observations during subsequent concrete pouring or soil and granular filling
- Detailed procedures for testing the efficacy of the vapour-proof barrier upon its installation and after the slab is placed (for example, vacuum tests, pressure tests, smoke tests, and postconstruction indoor air tests)

Where damage or defects are identified, appropriate repairs should be undertaken and the associated inspection and testing procedures repeated to verify that the repair was completed in a satisfactory manner. The QA/QC plan and installation and construction specifications must be developed once site-specific project requirements are known. The manufacture of the membrane typically has a QA manual that specifies installation procedures.

I.2.6 Summary

The conceptual engineered systems for managing exposure risk associated with impacted soils and soil vapour within the RA Property will require additional detailed design elements as specific uses and designs for the RA Property are developed. The conceptual designs presented herein have considered constructability issues, as well as long-term issues, and should be readily applicable to detailed designs for the planned redevelopment.

I.3 References

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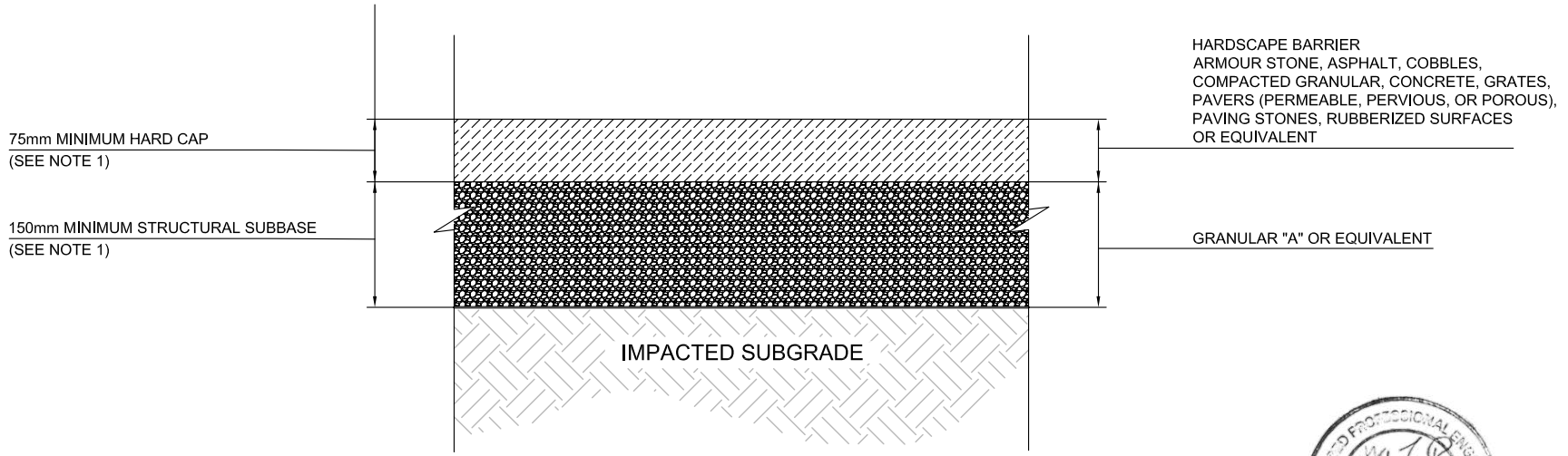
Figures

Figures



1 TYPICAL HARD CAP BARRIER
NTS

Nov 16, 2020

NOTES:
1. FINAL HARD CAP DESIGN REQUIREMENTS SHOULD BE DETERMINED BY A GEOTECHNICAL ENGINEER WITH LAYERS EQUALING OR EXCEEDING THE MINIMUM REQUIREMENTS SHOWN ON THIS DRAWING.
2. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

FIGURE I-1
Conceptual Design of Typical Hard Cap Barrier

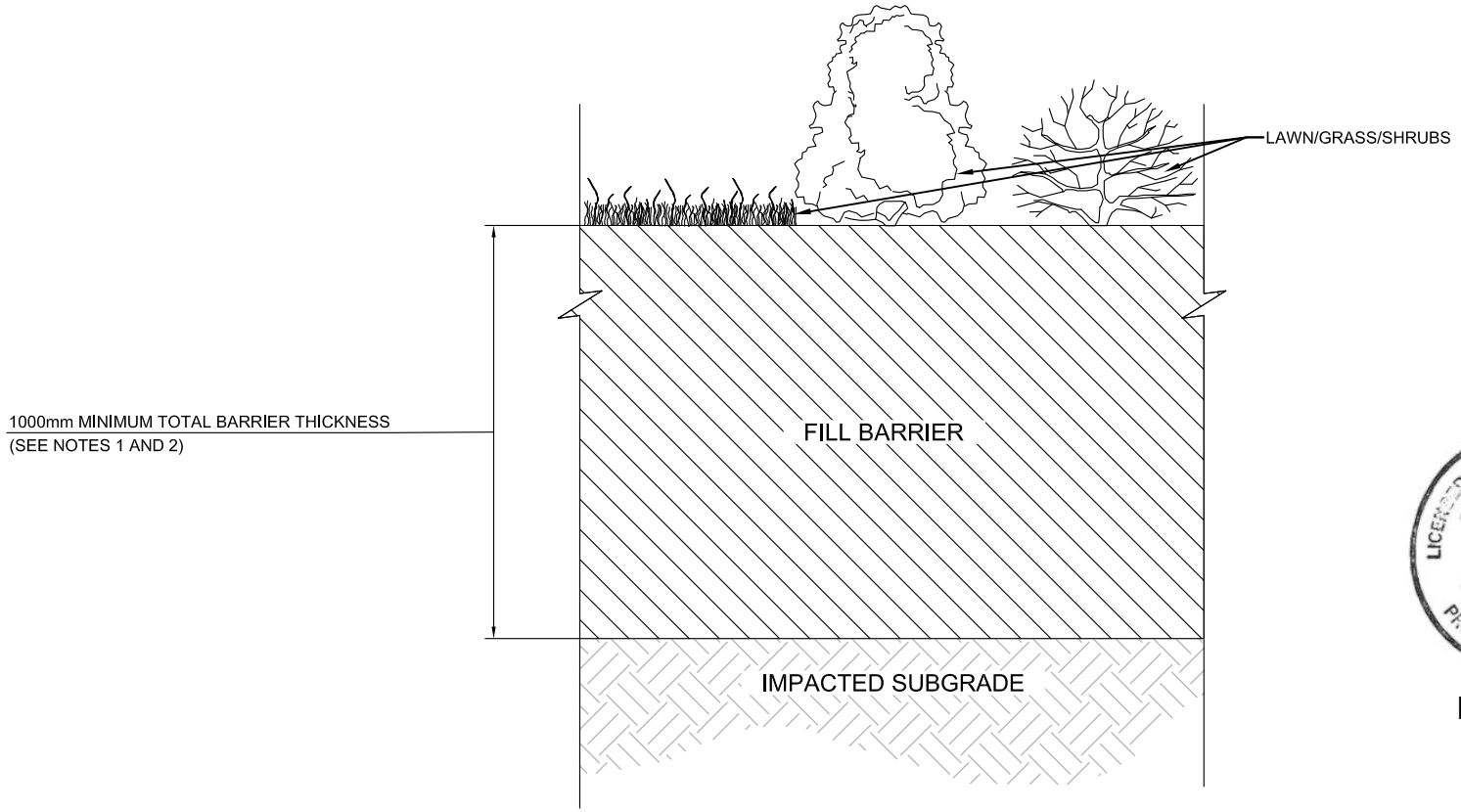
200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

694757_F001.dwg

Jacobs

June 9, 2020



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Nov 16, 2020

1 TYPICAL FILL CAP BARRIER

NTS

NOTES:
1. BARRIER MATERIAL AS DEFINED IN SECTION I.1.2 OF APPENDIX I.
2. FILL BARRIER THICKNESS MAY BE INCREASED BY A LANDSCAPE ARCHITECT TO REFLECT THE SPECIFIC TYPES OF VEGETATION (i.e., ROOTING DEPTHS) TO BE PLANTED ON A SITE-SPECIFIC AND/OR AREA-SPECIFIC BASIS.
3. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

FIGURE I-2
Conceptual Design of Typical Fill Cap Barrier

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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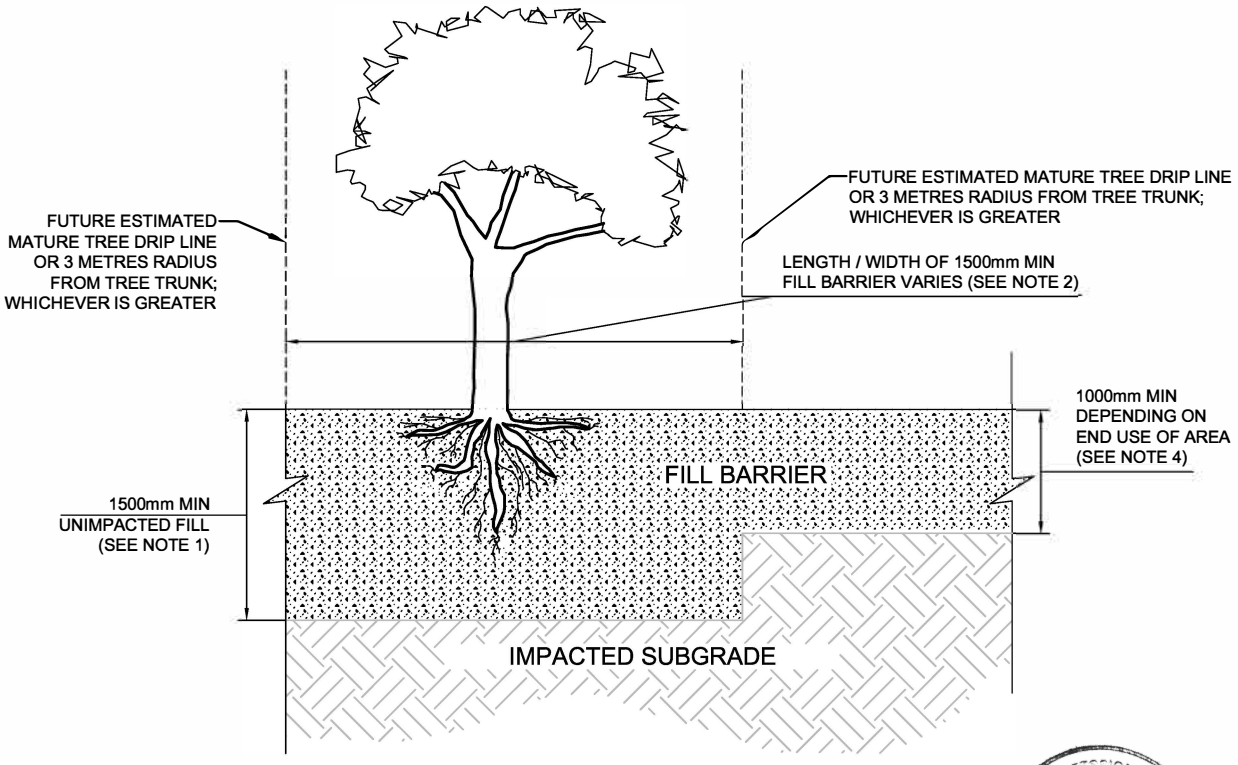
Jacobs



May 17, 2021

NOTES:
1. UNIMPACTED FILL AS DEFINED IN SECTION I.1.2 OF APPENDIX I. FILL BARRIER THICKNESS MAY BE INCREASED BY A LANDSCAPE ARCHITECT TO REFLECT THE SPECIFIC TYPES OF VEGETATION (ie., ROOTING DEPTHS) TO BE PLANTED ON A SITE-SPECIFIC AND/OR AREA-SPECIFIC BASIS.
2. THE LATERAL EXTENT OF THE 1500mm (min.) FILL BARRIER FOR NEWLY PLANTED TREES SHOULD EXTEND, AT A MINIMUM, TO THE EXPECTED WIDTH OF THE TREE CANOPY AT MATURITY OR 3 METRES RADIUS FROM TREE TRUNK; WHICHEVER IS GREATER.
3. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.
4. OR HARD CAP AS PER FIGURE I-1, DEPENDING ON END USE OF AREA.

FIGURE I-3
Conceptual Design of Typical Fill Cap Barrier
New Treed Areas

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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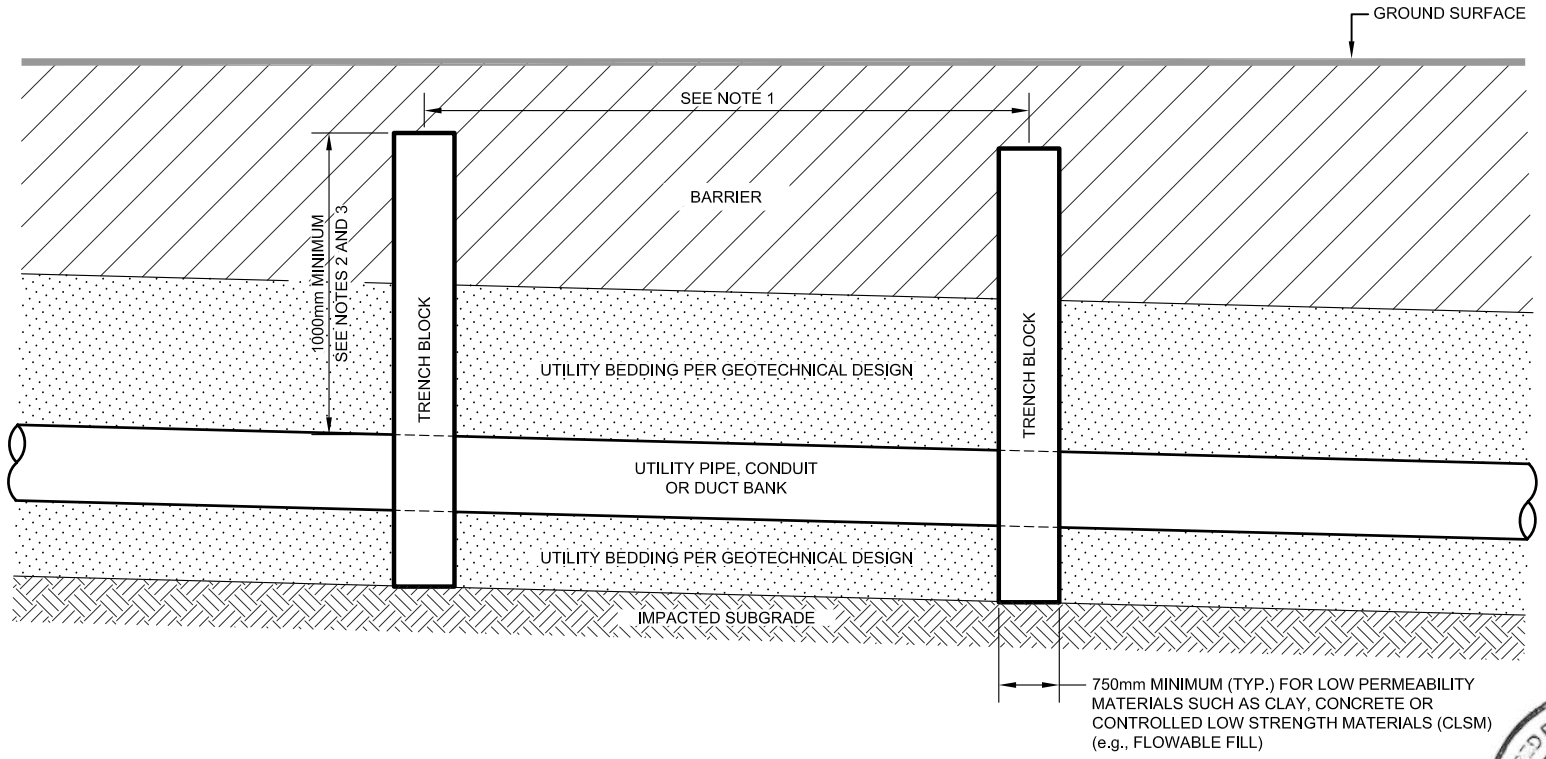
Jacobs



NOTES:
1. TRENCH BLOCKS SHOULD BE SPACED SO THERE IS A MINIMUM OF 90% VERTICAL OVERLAP WITH THE ADJACENT UPSTREAM TRENCH BLOCK.
2. TRENCH PLUGS OR ANTI-SEEP COLLARS, IF USED, SHOULD BE KEYED INTO THE EXISTING SOIL AT LEAST 300mm AT THE BASE AND SIDE OF THE TRENCH.
3. TRENCH PLUGS OR ANTI-SEEP COLLARS, IF USED, SHOULD EXTEND THE HIGH GROUNDWATER LEVEL AND AT LEAST 1000mm ABOVE THE TOP OF THE UTILITY OR UP TO THE BASE OF THE OVERLYING BARRIER, WHICHEVER IS GREATER. FOR INSTALLATIONS LESS THAN 1.5 METRES IN DEPTH, THIS REQUIREMENT MAY BE DECREASED TO 500mm.
4. IF A TRENCH LINER IS USED, AS AN ALTERNATIVE TO TRENCH BLOCKS, IT SHOULD BE PLACED ALONG THE BOTTOM AND SIDES OF THE TRENCH COMPLETE WITH SEALED JOINTS.

Nov 16, 2020

FIGURE I-4
Conceptual Design of Trench Block

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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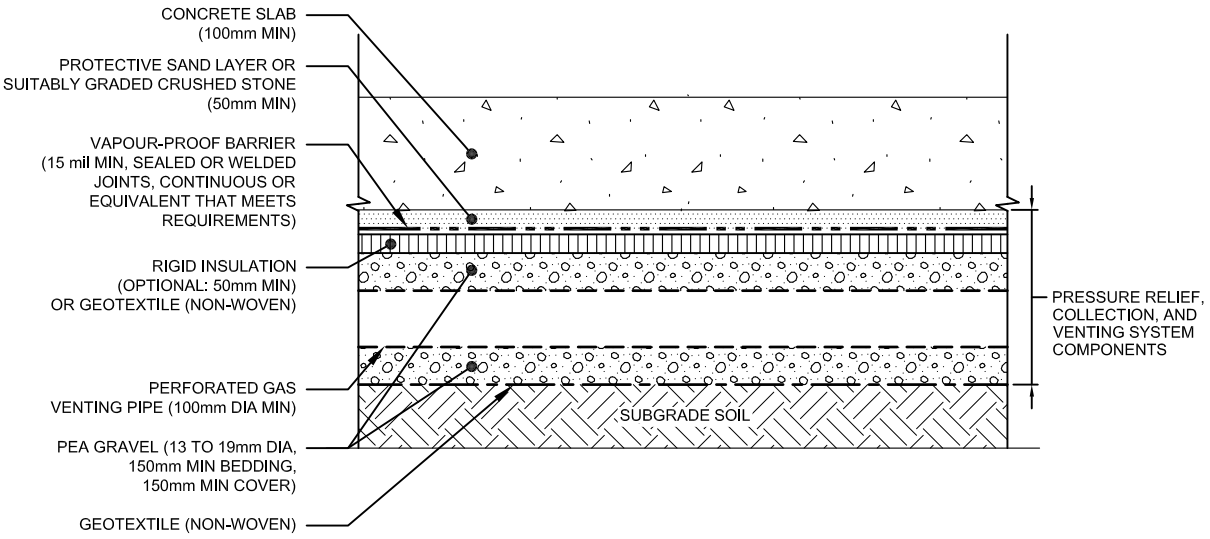

NOTES:
1. GAS VENTING PIPE PERFORATIONS TO BE HOLES (13 mm MAX DIAMETER) OR SLOTTED, PROVIDING A MINIMUM OPEN AREA OF 5,000 mm²/LINEAR METRE.
2. ACTUAL DIAMETER OF PERFORATED GAS VENTING PIPE TO BE DETERMINED BASED ON THE SYSTEM DESIGN CAPACITY, THE PROPERTIES OF THE BEDDING / COVER MATERIAL, AND THE SOIL CONDITIONS UNDERNEATH THE BUILDING.
3. PERFORATED GAS VENTING PIPE TO BE CENTERED HORIZONTALLY WITHIN THE LAYER OF PEA GRAVEL.
4. PEA GRAVEL TO BE CLEAN, NON-CALCAREOUS (<3% LIMESTONE) AND FREE OF FINES PRIOR TO PLACEMENT.
5. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

Nov 16, 2020

FIGURE I-5
Conceptual Design in Cross-Section View
Passive Relief, Collection, and Venting System

200 Beverly Street,
Guelph, Ontario

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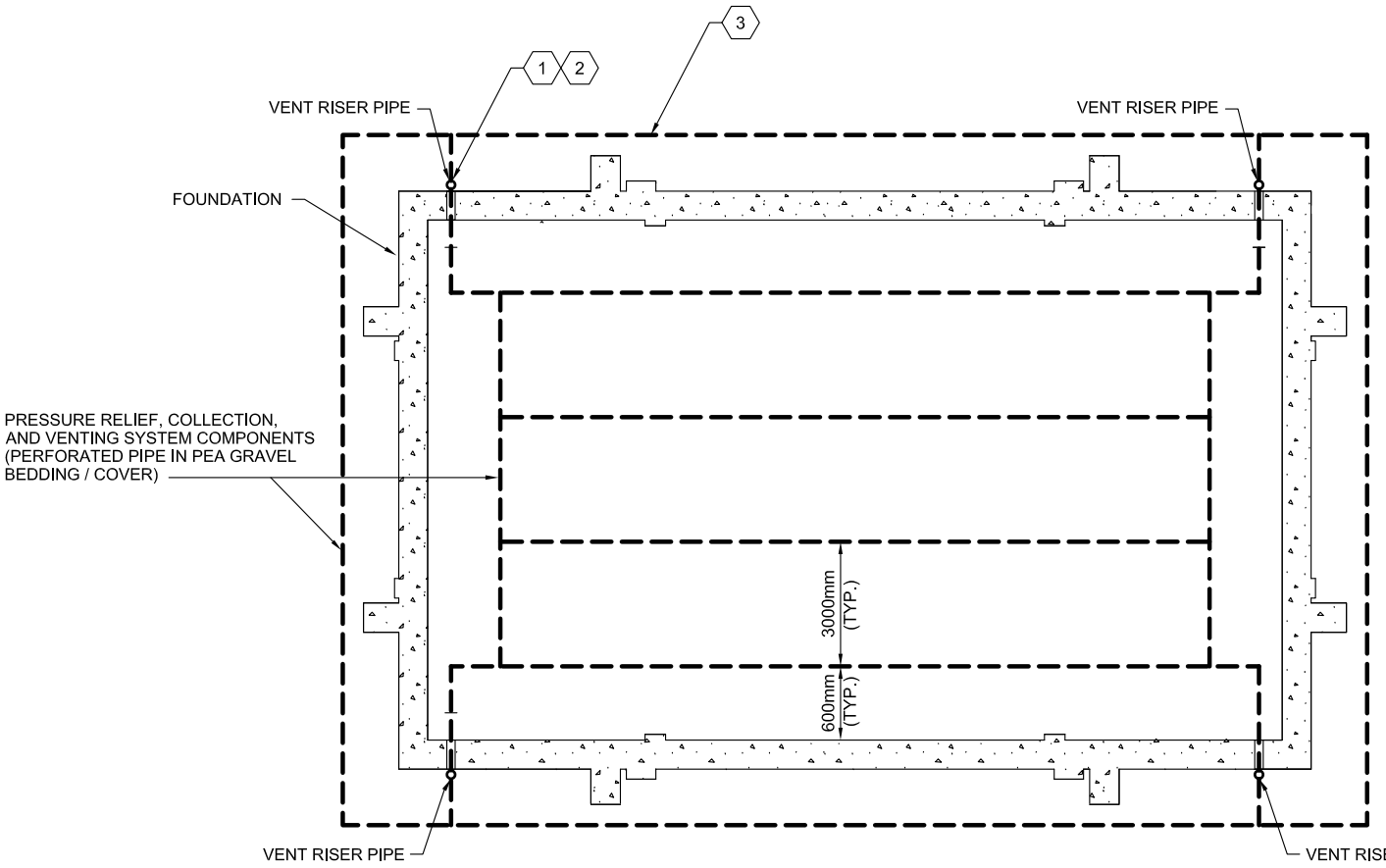
Jacobs

June 18, 2020



KEYED NOTES:

1. RISER PIPE EXTEND TO ABOVE STRUCTURE ROOFLINE (SEE FIGURE I-7).
2. PIPING TO ALLOW FOR CONTINGENCY CONVERSION TO ACTIVE VENTING IF REQUIRED.
3. PERIPHERAL VENTING WOULD NOT BE USED AS A VENTING COMPONENT FOR EXISTING STRUCTURES OR TEMPORARY FACILITIES.

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Nov 16, 2020

NOTES:
1. PERFORATED GAS VENTING PIPE SHALL BE SLOPED TO A 1% MIN GRADE AND PROVIDE POSITIVE DRAINAGE TO A FREE DRAINING AREA(S) BENEATH THE PIPE.
2. ACTUAL HORIZONTAL SEPARATION OF GAS VENTING PIPE TO BE DETERMINED BASED ON THE SYSTEM DESIGN CAPACITY, THE PROPERTIES OF THE BEDDING / COVER MATERIAL, AND THE SOIL CONDITIONS UNDERNEATH THE BUILDING.
3. THE LENGTH OF TRANSITION FROM A PERFORATED GAS VENTING PIPE TO A SOLID VERTICAL VENT RISER PIPE SHALL NOT BE MORE THAN 1.5 m.
4. EACH VERTICAL VENT RISER PIPE IS TO SERVICE NO MORE THAN 400 m² OF AREA FOR A 100 mm DIAMETER RISER PIPE OR 1,400 m² OF AREA FOR A 150 mm DIAMETER RISER PIPE. ACTUAL SERVICE AREA TO BE DETERMINED BASED ON THE SYSTEM DESIGN CAPACITY, THE PROPERTIES OF THE BEDDING / COVER MATERIAL, AND THE SOIL CONDITIONS UNDERNEATH THE BUILDING.
5. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

FIGURE I-6
Conceptual Design in Plan View
Pressure Relief, Collection, and Venting System

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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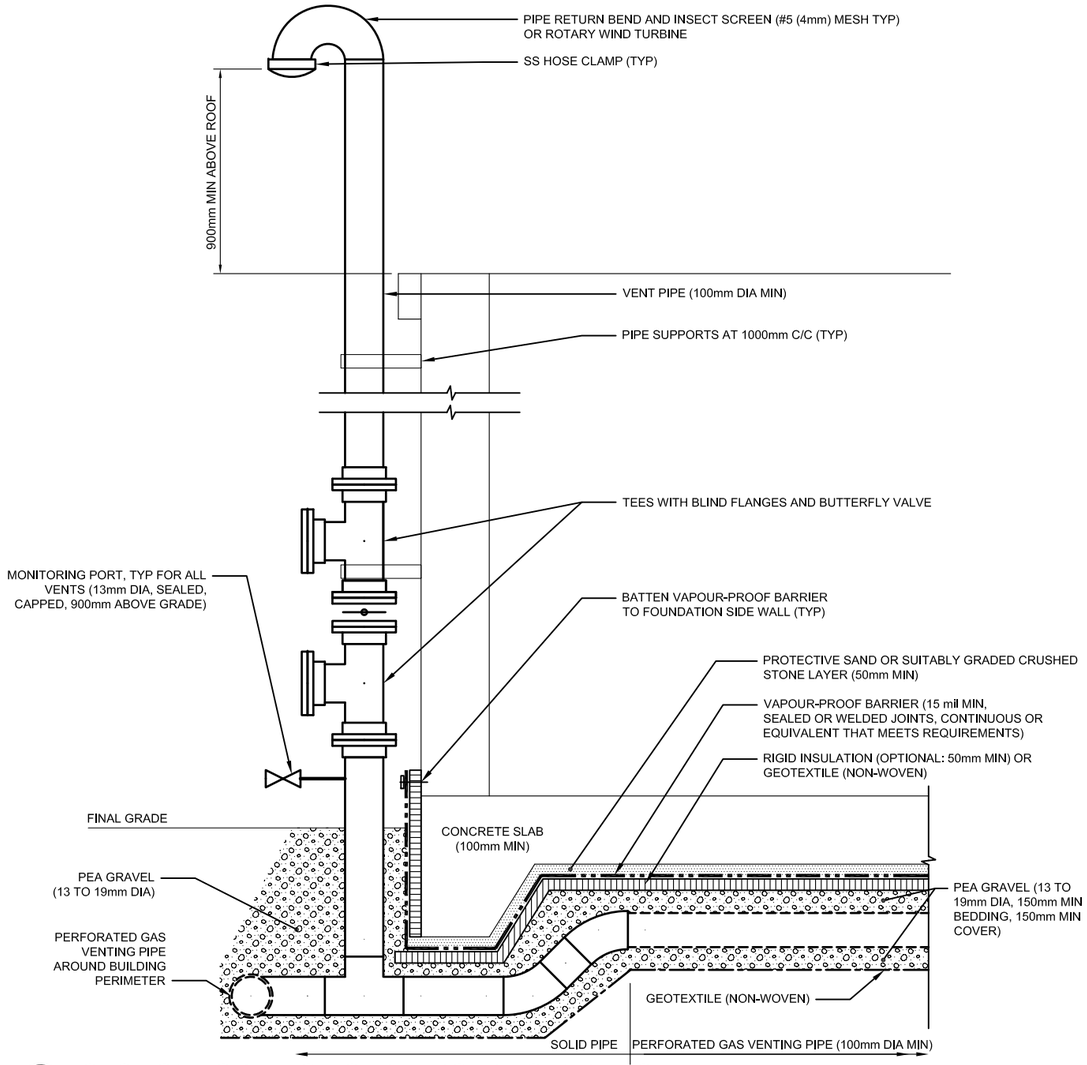
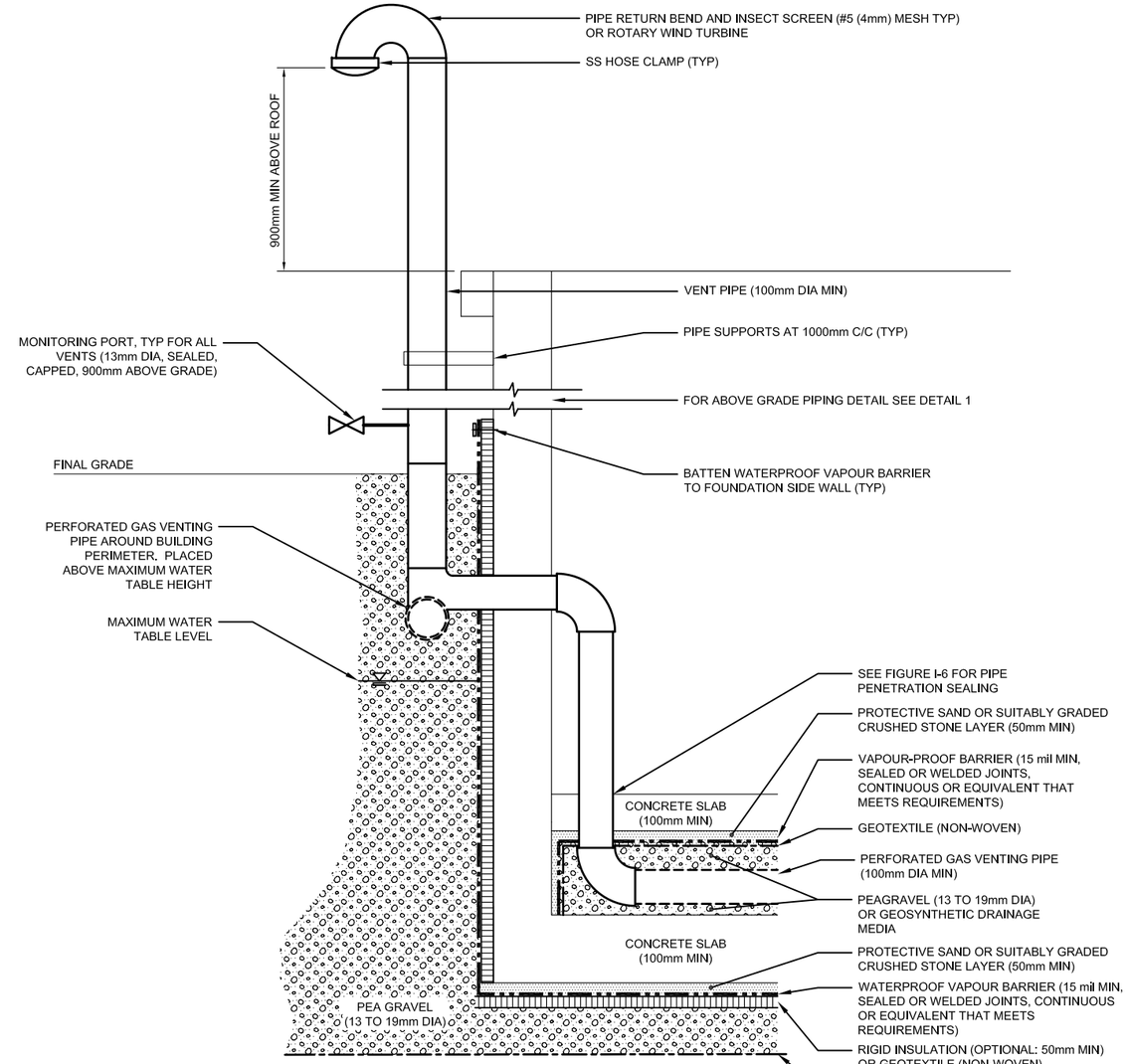
Jacobs



1 SECTION FOR A NON-SUBMERGED FOUNDATION

NTS

NOTES:
1. VAPOUR BARRIER UNDER FOUNDATION TO BE BATTENED TO SIDE OF FOUNDATION.
2. PERFORATED VENT PIPE TO BE CENTRED HORIZONTALLY WITHIN LAYER OF PEA GRAVEL.
3. PEA GRAVEL TO BE CLEAN, NON-CALCAREOUS (<3% LIMESTONE) AND FREE OF FINES PRIOR TO PLACEMENT.
4. ACTUAL VENT PIPE DIAMETER TO BE DETERMINED BASED ON THE SPECIFICS OF THE FOUNDATION AND BUILDING WALL DESIGN, THE SYSTEM DESIGN CAPACITY, THE PROPERTIES OF THE BEDDING / COVER MATERIAL, AND THE SOIL CONDITION UNDERNEATH THE BUILDING.
5. VENT PIPING TO BE INSTALLED ABOVE HIGH WATER TABLE AND ISOLATED FROM AND VERTICALLY ABOVE FOUNDATION DRAINAGE PIPING AND BEDDING MATERIAL.
6. ACTUAL COLLECTION PIPE DIAMETER AND ITS HORIZONTAL SEPARATION TO BE DETERMINED BASED ON THE SYSTEM DESIGN CAPACITY, THE PROPERTIES OF THE BEDDING / COVER MATERIAL, AND THE SOIL CONDITION UNDERNEATH THE BUILDING.
7. VAPOUR BARRIER, GEOTEXTILE AND PEA GRAVEL LAYERS TO EXTEND ACROSS FULL EXTENT OF BUILDING FOUNDATION.
8. VENTING HEADER ENGINEERED TO PASS THROUGH OR BENEATH FOUNDATION (WALLS OR FOOTER).
9. VENT RISERS CAN ALSO BE LOCATED TO INTERIOR OF BUILDING IF ARCHITECTURAL / MECHANICAL CONDITIONS DICTATE. HOWEVER, INTERIOR VENT RISER MUST BE MAINTAINED ACCESSIBLE FOR MONITORING PURPOSES AND RETROFITTING TO AN ACTIVE SYSTEM IF REQUIRED IN THE FUTURE.
10. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.



2 SECTION FOR A PARTIALLY SUBMERGED FOUNDATION

NTS

NOTES:
1. FOR A PARTIALLY SUBMERGED BUILDING FOUNDATION THE PASSIVE RELIEF, COLLECTION, AND VENTING SYSTEM COMPONENTS ARE CONFINED TO THE FOUNDATION AREAS ABOVE THE WATER TABLE. SIMILAR COMPONENTS AND CONFIGURATIONS FOR UNSATURATED CONDITIONS (SEE DETAIL 1) ARE USED, HOWEVER, THE VENTING PIPE SURROUNDS THE BUILDING PERIMETER ADJACENT TO THE UNSATURATED PORTION OF THE FOUNDATION.
2. VENT RISERS CAN ALSO BE LOCATED TO INTERIOR OF BUILDING IF ARCHITECTURAL / MECHANICAL CONDITIONS DICTATE. HOWEVER, INTERIOR VENT RISER MUST BE MAINTAINED ACCESSIBLE FOR MONITORING PURPOSES AND RETROFITTING TO AN ACTIVE SYSTEM IF REQUIRED IN THE FUTURE.
3. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

Nov 16, 2020

FIGURE I-7
Conceptual Venting System Design
(Unsaturated and Saturated Conditions)

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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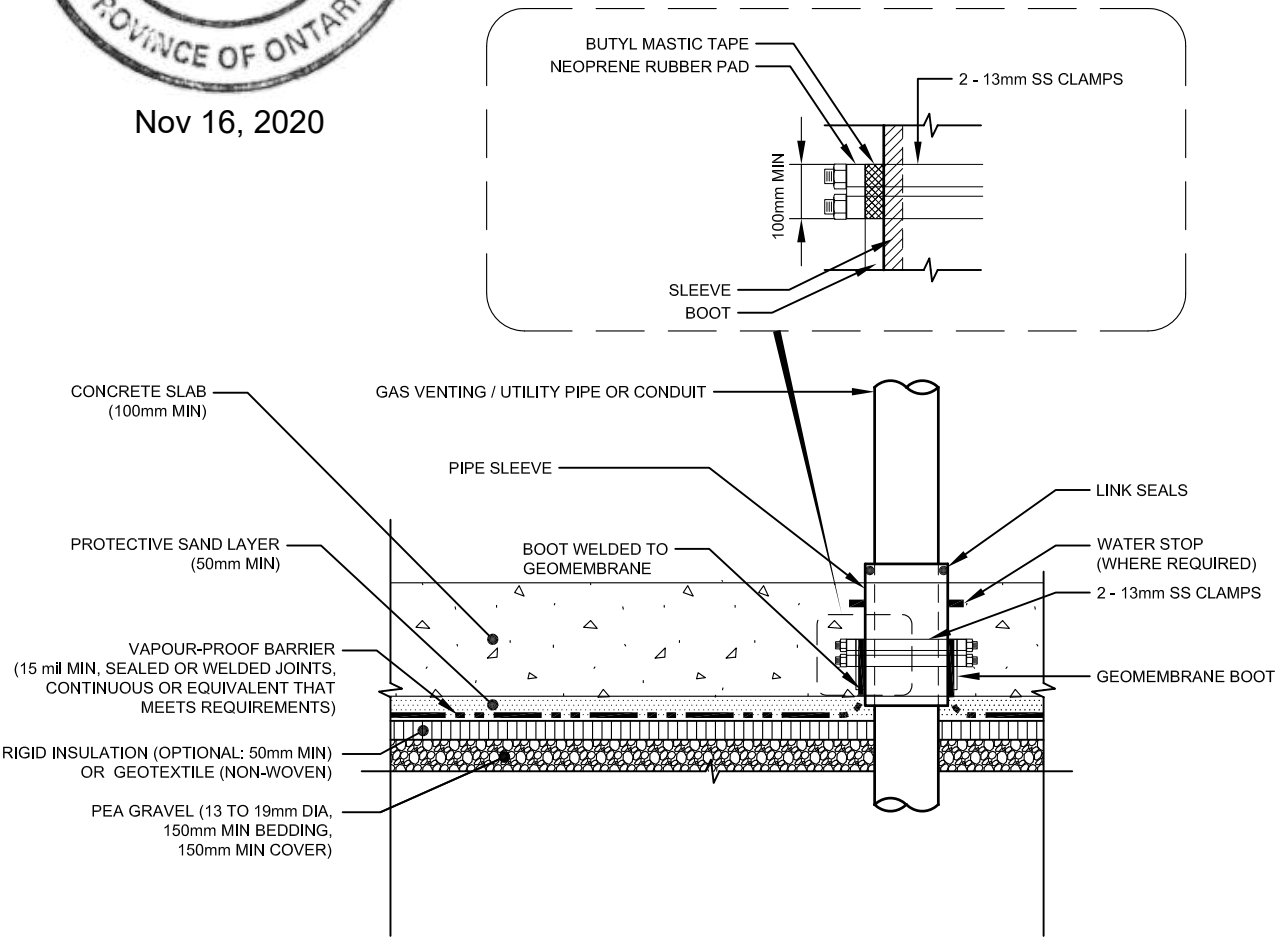

NOTES:
1. ONLY GEOMEMBRANE REQUIRES CONNECTION TO BOOT. CUT GEOTEXTILE OPENING 12mm GREATER THAN PIPE OD.
2. BUTYL MASTIC TAPE AND NEOPRENE RUBBER PAD APPLIED CONTINUOUSLY AROUND SLEEVE.
3. BOOT SHALL BE FABRICATED FROM SAME MATERIAL AS VAPOUR-PROOF BARRIER.
3. FORM BOOT WITH SUFFICIENT MATERIAL TO PREVENT OVERSTRESSING DURING BACKFILLING, BUT WITHOUT FOLDS OR WRINKLES.
4. DETAIL IS APPLICABLE TO THICKER (20 mil PLUS) HDPE TYPE LINERS FOR VERTICAL PENETRATIONS THROUGH FLOOR SLABS AND HORIZONTAL PENETRATIONS THROUGH FOUNDATION OR BUILDING WALLS. THINNER POLYETHYLENE AND POLYOLEFIN VAPOUR BARRIERS MAY USE SEALING TAPE (OR MASTIC) AND LAPPING (300mm MIN.) PROCEDURES.
5. DESIGN IS CONCEPTUAL. DESIGN APPROACHES THAT MEET THE INTENT OF THE CONCEPTUAL DESIGN AND ACHIEVE THE DESIGN OBJECTIVES DESCRIBED IN APPENDIX I MAY BE USED.

FIGURE I-8
Conceptual Design for Conduit and Pipe Penetrations

200 Beverly Street,
Guelph, Ontario

NOT TO SCALE

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Jacobs

Appendix J
Public Communication Plan

Appendix J1
Public Meeting – January 2018

Jacobs

Meeting Minutes

Subject **200 Beverley Street, Community Meeting, Tuesday, January 23, 2018**

Speaker: Glenn Pothier, think^{x} – Independent facilitator

Introductions:

- Scott Stewart: Deputy Chief Administrative Officer Infrastructure Development Enterprise, City of Guelph
- Martin Jewitt: Project Manager of Business Development, City of Guelph
- Terry Gayman: Manager of Development Environmental Engineering, City of Guelph
- Amer Obeidi: ARQi R&D Inc.

1. Senior City Officials

Speaker: Councilor Bob Bell (Ward 1)

Introduces, and mentions upcoming/ongoing Brownfield projects (Arthur Street, Gilmore St, upcoming Public meeting for Huron Street on Feb 12th)

IMICO – Why has it taken so long? Site has had a negative property value. Goal is to create a positive property value for developer to come in and make use of the Site. To move forward will need (1) public support; (2) support of rest of city councilor (continued funding); (3) federal/provincial government support to enable clean up to happen

Speaker: Councilor Dan Gibson (Ward 1)

2 years and $2.3 million allocated

2. City Objectives and Commitment

Speaker: Scott Stewart

- Represent Infrastructure development
- Objective is mixed use, priority for city council
- Money is spent on Brownfield clean up – one of 6 site requested funding from government
- MOU – includes future activities with Habitat for Humanity

Q&A – for councilors/city officials – No questions

3. Update on the Environmental Status/Conditions and Next Steps

Speaker: Terry Gayman

Introduces:

- Prasoon Adhikari (Environmental Engineer with City of Guelph)

- CH2M, Environmental Consultant with many Brownfield Projects; to file RSC, mandatory for mixed use redevelopment
- Introduce Ed Taves

Speaker: Ed Taves

Presentation

Discussion points outside presentation:

- Remediation: means getting concentrations down to MOECC guidelines
- Managed: leaving contamination on Site
- Anticipate some contaminants will be managed on site based on IMICO results to date
- Site Remediation: scope not known at this time, need to finish before speaking to site remediation

Q&A – Environmental

1. Can we have an example of how contaminants would be managed onsite:

   CH2M (Ed): Identified Risk Management Measure – prevents a contaminant from having an effect on environment; for example, if the parameter of concern is an issue for plants; a site gets paved and prevents plant growth

2. Corner of Alice and Stevenson, there is a little business with pipes– do they have anything to do with the IMICO cleanup

   City (Prasoon) answers– privately owned site, private remediation

   Owner of site (in crowd) answers further – owned for 20 years; main contaminant is toluene – site monitoring has been occurring from before he owned it. They have "put bugs down there", some chemicals, only remaining contamination is a small corner which is "not going anywhere". BP (British Petroleum) – bought Foseco and paying for ongoing environmental work.

3. With reference to the contaminant figures, they show a significant amount of the site is impacted. How much of the 13 acres is developable?

   CH2M (Ed): All of it is developable, just a matter of managing contaminants. Under the current regulatory regime, many industrial properties are fully developable.

4. With respect to the discussion on the difference between clean and managed – will the decision for what is to be cleaned up and what is to be managed depend on the development plan?

   CH2M (Ed): Yes. The decisions will depend on cost considerations if things start getting expensive. On site contaminant management versus clean-up will be rationalized with the development plan.

5. What happens at the edge of the property (with respect to delineation)?

   CH2M (Ed): Project ends at the property boundary.

6. If a chemical gets into the groundwater, does it move throughout the city?

   CH2M (Ed): Contaminants do move with groundwater; however, many mechanisms come into play. As it moves with the groundwater the concentration is reduced through dilution, contaminant movement is retarded through soil adsorption, precipitation of metals, biodegradation of organics. Depending on

the original amount of contaminants, these is always a time/distance when contaminant migration with groundwater essentially stops.

7. When dealing with zinc and managing in place, does it then have the potential to move to groundwater? How do you ensure the contaminants in place don't affect the groundwater?

   CH2M (Ed): Yes any contaminant left on site has the potential to migrate, but the groundwater quality has to be protected as part of any remedial solution. The current groundwater quality is being investigated and the end remediation plan will have to ensure that the groundwater quality is acceptable, including any long-term considerations. Risk management measures are often required to protect the groundwater; as an example, you change characterization of the site. Soil caps change the amount of infiltration from such things as rain water.

8. With respect to the mechanisms for managing on site – with the COCs we've seen, is there more natural treatment methods?

   CH2M (Ed): Yes, phytoremediation, bio treatments – usually these involve long term monitoring; generally for short term development they are not preferred due to timelines.

9. Does IMICO compare to other projects worked on, and timelines?

   CH2M (Ed): The Site is not exceptional, from our perspective, by end of year we should be looking at options for remediation.

4. ARQi /Planning and Team Introductions (7:55)

Speaker: Amer

- Not a mandatory process, lives here and is part of the community
- Interest in cutting edge technology on remediating site
- Micro retail
- Introduces team: Urban Strategies – Tim Smith, Emily Wall
- Masri O Architects – Reema Masri (based in Waterloo)
- Steve Howard, Chief Executive Officer, Habitat for Humanity, Wellington Dufferin Guelph
- Urban village, destination for the community

Speaker: Tim Smith, introducing Urban Strategies – worked on many Brownfields, mixed use community

- Sterling Road Redevelopment Toronto – planned light industrial and residential
- Planning Process: Spring 2018 for Open house #2 (Concept Development to share initial ideas for Site); Summer/Fall 2018 Open house #3 (Urban Design Master Plan)
- Goal: green city building.

5. Draft Development Principles

Speaker: Tim Smith

- What is important to achieve on the Site
- 1. Green – 2. Resource-Efficient 3. Mixed-Use (live work and visit) 4. Social inclusivity (mixed housing/incomes 5. Incubate creators and makers 6. Public Open Space 7. Community Amenities 8.

Pedestrian Friendly 9. Transitions – PDI facility on north end of rail tracks; south side empty buildings 10. Design excellence.

6. Roundtable Discussions

Other Guelph projects

York Road Parkland
Metal works –

Comment from Alice Street Resident: – Hwy 7 to downtown – vehicles cross Elizabeth and MacDonnell

- Opening a street have third artery to reduce traffic on Elizabeth
- Tim responds master plan will to have bigger picture in mind, Guelph junction railway will be part of discussions going forward

7. Next Steps & Closing Remarks

Speaker: Tim Smith

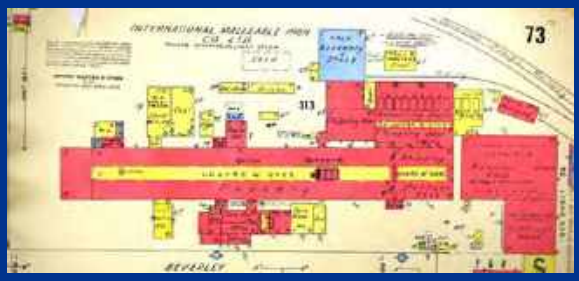
- Environmental will be on City's website; urban strategies may not be available.
- Will work with city to get 200 Beverley site up to date; dedicated website will be available in near future by ARQi
- Develop Preliminary Concepts
- Consult with Community Liaison Committee and City Staff
- Refine Preferred Concept
- Open House #2

Closing Remarks (9 pm) from Councilor Gibson: stay engaged, community

Former International Malleable Iron Company (IMICO)

200 Beverley Street, Guelph, Ontario

Environmental Site Assessment



Prepared for City of Guelph
January 23, 2018

JACOBS ch2m

Presentation Outline

1. Site Overview
2. Environmental Site Assessment (ESA) / Remediation Process
3. Phase One ESA
4. Phase Two ESA
5. Next Steps
6. Schedule
7. Questions/Discussion

Site Overview

- 5.2 hectares/12.8 acres in size
- First developed for industrial purposes in 1913 by IMICO, as a iron-jobbing foundry
- Over 40 buildings/areas with various operations: plating, galvanizing, annealing rooms, machine shop, etc.
- Foundry closed in 1989, generally vacant since that time
- 1989 to 1997 various non-industrial occupants, 1997 to present – City of Guelph
- All buildings have been demolished
- Interest to redevelop for mixed uses; residential/ parkland/ commercial
- Environmental conditions need to be investigated and managed

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Environmental Site Assessment (ESA) / Remediation Process

- Phase One ESA
  - Review of historical operations to identify potential contamination
- Phase Two ESA
  - Verify presence or absence of contamination, if present delineate extent of contamination
- Remedial Option Analysis (Cost Considerations)
  - remove contamination (Remediation)
  - manage the contamination (Risk Assessment, Risk Management Measures)
- Complete Site Remediation, Risk Assessment
- Complete Documentation, Regulatory Review Process

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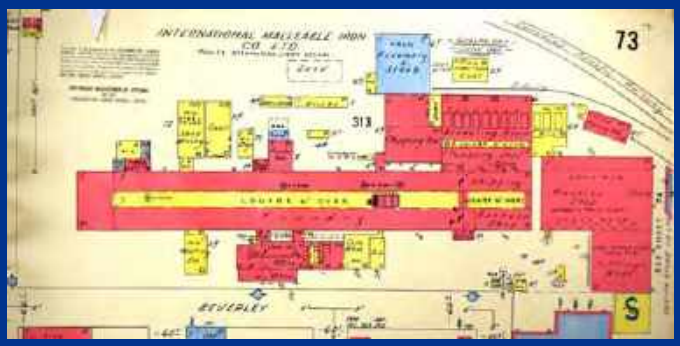
Phase One ESA

Terms

- Potentially Contaminating Activity (PCA)
- Area of Potential Environmental Concern (APEC)
- Contaminants of Concern (COCs)



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Phase One ESA

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- Potentially Contaminating Activity (PCA)
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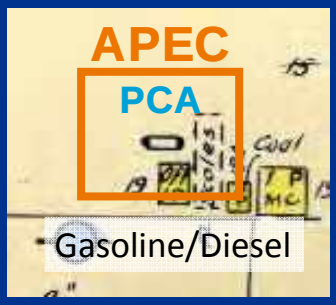
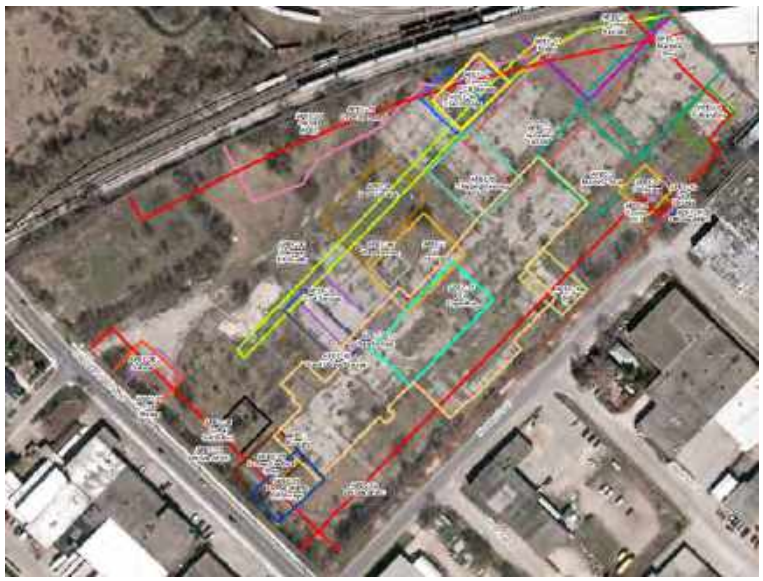


PCA	APEC	COCs
Operation of Underground Storage Tank	Soil and Groundwater around Tank	Gasoline/Diesel

IMICO - Phase One ESA has been completed

- 33 APECs, examples
  - Underground Storage Tank
  - Oil House
  - Plating, Galvanizing
  - Railway spur lines
  - Adjacent (off-Site) operations
  - and others

Contaminants of Concern (COCs)
- Metals (zinc)
- Petroleum hydrocarbons (PHCs)
- Solvent (trichloroethylene)
- PCBs
- PAHs (from coal, diesel, combustion byproducts)
- Salt(s)



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Phase Two ESA

- Verify presence or absence of contamination
  - dig test pits, drill boreholes, construct groundwater monitoring wells
  - sample soil and groundwater
  - chemical analysis
- If contamination identified, delineate extent
  - depth and lateral extent of contamination

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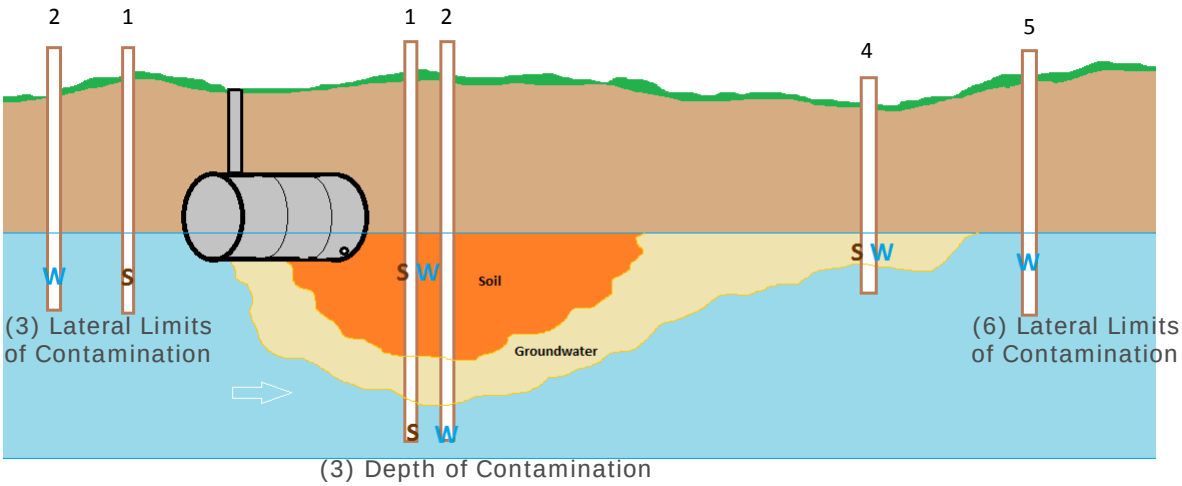
Previous Investigations and Reports

- 1989/1991 Environmental Investigation, Proctor & Redfern
- 1999 Supplemental Hydrogeologic Investigation Gartner Lee
- 1999 Demolition and Waste Removal Report Earth Tech
- 2004 Contaminant Investigation, Gartner Lee
- 2007 Phase I/II ESA Decommissioning Consulting Services (DCS)
- 2008 Preliminary Remedial Action Plan, DCS
- 2010 to 2016 Annual Groundwater Monitoring AECOM
- 2014 Phase One/Two ESA DCS
- 2016 Vertical Delineation of Chlorinated Volatile Organic Compounds (VOCs) WSP Canada

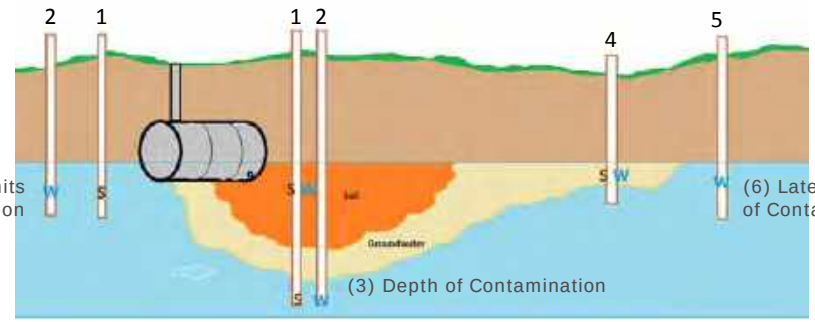
Phase Two ESA



IMICO – Status of Phase Two ESA

For most contaminants in soil Depth and Lateral Limits of Contamination have been established (3 and 6), but a few chemical compounds still need complete delineation

For groundwater, again most limits of contamination have been identified, but considerable effort still needed to define depth for some contaminants.



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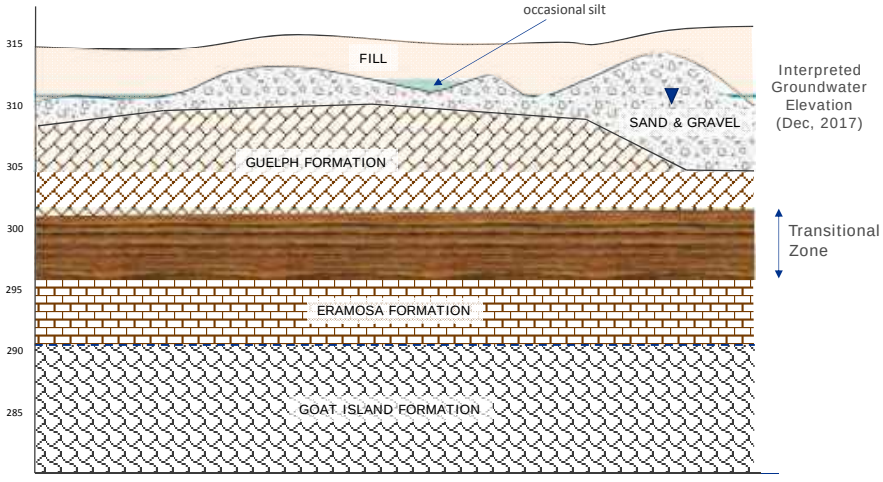
Phase Two ESA – Conceptual Site Model

Geology and hydrogeology

- Overburden Soil
  - Fill
  - Sand and Gravel
- Groundwater - generally occurs at the bottom of the overburden soil, where bedrock starts
- Bedrock, limestone, dolostone
  - Guelph Formation

    Hanlon, Wellington Member
  - Eramosa Formation

    Stone Road, Reformatory Quarry, Vinemount Member
  - Goat Island Formation



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Phase Two ESA – Groundwater Flow Direction

Shallow Groundwater flow generally to the south/ southwest

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Phase Two ESA – Investigation Locations/Results Metals in Soil

- Metal and inorganic exceedances widespread, zinc most common exceedance

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Phase Two ESA – Investigation Locations/Results
Metals in Groundwater

- Metal and inorganic exceedances localized, zinc most common exceedance

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Phase Two ESA – Investigation Locations/Results
Volatile Organic Compounds in Groundwater

- Trichloroethylene and other chlorinated degradation products found on eastern portion of the Site in deeper bedrock
- Low exceedances in other areas of the Site

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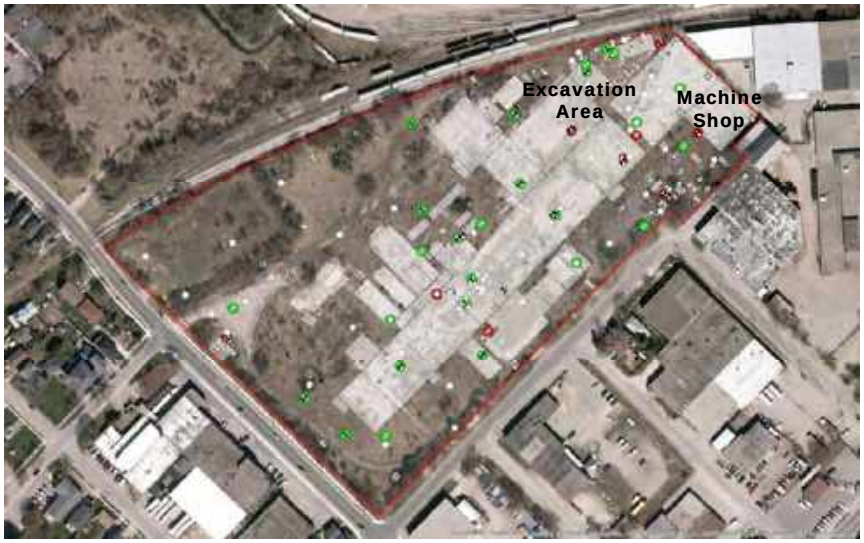
Phase Two ESA – Investigation Locations/Results
Petroleum Hydrocarbons in Soil

- Petroleum hydrocarbon (PHC) exceedances in several localized areas
- Free phase oil and high concentrations of PHCs observed in the area of the machine shop and excavation area



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Phase Two ESA – Investigation Locations/Results
Petroleum Hydrocarbons in Groundwater

- Petroleum hydrocarbon (PHC) exceedances in the area of the machine shop and excavation area, corresponding to soil impacted areas. Some free phase oil in this area
- Localized impact in former foundry building

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Summary thoughts

- Dirty versus Contaminated
- Remediated versus Clean

What does Clean mean - Remediated and/or Managed

Technical, regulatory processes are available to manage environmental conditions on the IMICO site. Remediation will likely include Risk Assessment. Development will likely need to incorporate Risk Management Measures.

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Next Steps

- Complete Phase Two ESA, depth and lateral delineation of contaminants in soil and groundwater } Underway
- Remedial Option Analysis (Cost Considerations)
  - remove contamination (Remediation)
  - manage the contamination (Risk Assessment, Risk Management Measures)
- Complete Site Remediation, Risk Assessment
- Complete Documentation, Regulatory Review Process

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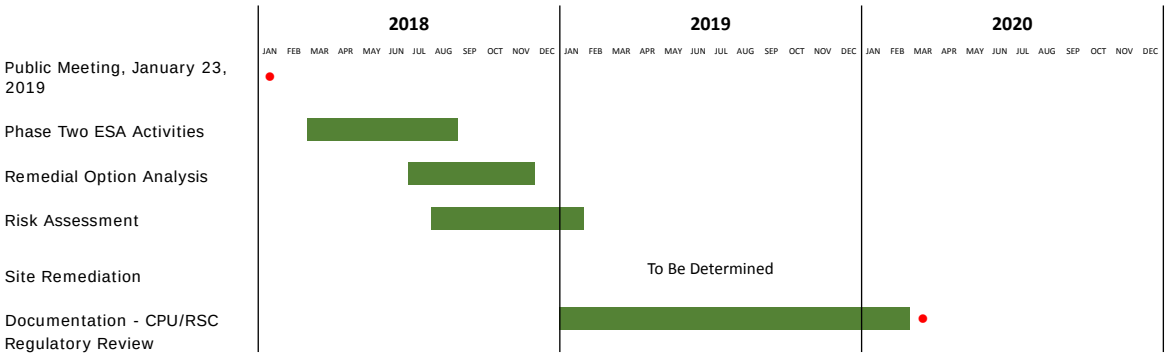
Schedule / Next Steps



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Questions/Discussion

Thank You

Appendix J2
Response to Additional Public Comments Submitted to the City – March 2021

APPENDIX J2

Response to Public Comments on the November 2020 RA for 200 Beverley Street, Guelph, Ontario

Public Comments		Jacobs Response	Addressed Via
Risk Assessment			
Comments have been briefly described below for brevity. Please refer to the enclosed annotated version of the Intrinsik report entitled *Summary Memo of a Risk Assessment for the Property at 200 Beverley Street in Guelph, Ontario*, dated March 9, 2021 for full comments.			
RA1	PSF - Screening table does not show OTRs	Table F1-1 of the November 2020 RA provided both the applicable SCS and any alternate screening values, such as OTRs. The current RA has been revised to address the MECP comments on the screening process.	November 2020 RA O. Reg. 153/04 MECP Regulatory RA Review Process
RA2	PSF - HH CSM does not call out potable water pathway	Figure 4-1 of the November 2020 RA provided clarification on the potable drinking water pathway. Footnote f states: As groundwater at the Site is potable, the ingestion of groundwater pathway includes both incidental ingestion (as a result of subsurface activities) and ingestion of water from the municipal water supply.	November 2020 RA O. Reg. 153/04 MECP Regulatory RA Review Process
RA3	Discrepancy in groundwater flow direction between Section 3 and Section 4.4.6	The groundwater flow direction wording in Section 4.4.6 was revised to be consistent with the Phase Two CSM, that is: "…the predominant groundwater flow direction in the Overburden and Bedrock Contact Zone is from the northeast to the southwest, with localized flow from west to east on western portion of the Site and localized flow from east to west on the eastern portion of the Site. Groundwater in the Eramosa Formation (Potentiometric surface), appears to flow predominantly to the east."	May 2020 RA
RA4	Use of half MDLs in B(a)PE calculation vs. Intrinsik approach of using full MDL value	Use of Half MDLs in B(a)PE Calculation – The half MDL method is inferred from the MECP's approach outlined in the 2011 document entitled *Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act* (Analytical Protocols). Section 3.1.1.4 (Dibenzo-p-Dioxins/Dibenzofurans [Dioxins/Furans, PCDDs/PCDFs]) of the Analytical Protocols outlines the MECP's approach for calculating the TEQ for dioxins and furans, which substitutes half MDLs for nondetect results. As the dioxins and furans TEQ and B(a)PE calculations are essentially analogous, the approach employed in the RA is considered appropriate.	O. Reg. 153/04 MECP Regulatory RA Review Process
RA5	Use of only the S1 component value in secondary screening vs. Intrinsik approach of also using S2 and S3 component values	Since the most sensitive future use of the Site is residential, the most conservative MECP component value (S1) was selected as the secondary screening value for soil. This approach was taken to simplify the exposure and risk calculations. That is, so a common set of COCs was carried forward for all human receptors onsite, including residents, workers, and subsurface workers. The approach is different than that employed by Intrinsik, but achieves the same result (that is, exposure and risk to the onsite receptors are either qualitatively or quantitatively assessed).	O. Reg. 153/04 MECP Regulatory RA Review Process
RA6	Secondary screening using S-GW1 and GW1-Odour	Acknowledged. These pathways are considered minor in relation to the pathways for groundwater which were assessed quantitatively. For completeness, the following has been added to the May 2020 RA: • A qualitative assessment of groundwater odour has been added as Section 4.4.3.10. Since this pathway is based on aesthetic criteria and is not health-based, no RMMs above and beyond what is currently outlined in the RMP (Section 7) have been proposed in relation to this pathway. • A qualitative assessment of soil leaching to potable groundwater has been added as Section 4.4.3.11. No additional RMMs above and beyond what is current outline in the RMP (Section 7) have been proposed in relation to this pathway.	May 2020 RA O. Reg. 153/04 MECP Regulatory RA Review Process
RA7	Screening using component values derived in the MGRA using updated TRVs	Acknowledged. Jacobs agrees that this method of screening has become more commonplace in recent months. On other projects, Jacobs has noted that the MECP has typically commented that this "updated" method of screening be used on new RAs when reviewing the PSF, but has not made the same comment on RAs that are already drafted (which appears to be the case for the 200 Beverley Street RA). Using either method, all COCs identified at the Site are either qualitatively or quantitatively assessed in the RA; therefore, slight differences in the screening values used for a subset of the COCs is unlikely to result in a material change to the results or conclusion of the RA, nor the proposed RMMs.	O. Reg. 153/04 MECP Regulatory RA Review Process
RA8	Showing Offsite Residents on HH CSM	Section 4.2.1 of the November 2020 RA includes Residents under the umbrella of "Offsite Surface Receptors". Residents were inadvertently omitted from the same list in Footnote b on Figure 4-1 and 4-2 (HH CSM). The current RA has been revised to address this omission.	May 2020 RA O. Reg. 153/04 MECP Regulatory RA Review Process
RA9	TRV selection	Acknowledged. Any TRV not endorsed by the MECP, but utilized in the RA have been identified in Table 4-26. For these TRVs, a corresponding toxicity profile has been provided in Appendix H.	O. Reg. 153/04 MECP Regulatory RA Review Process
RA10	Use of an HQ of 0.5 for TCE for inhalation only	Acknowledged. Section 4.4.1 of the RA provides a rationale for the choice of inhalation HQ for TCE, which Jacobs considers to be reasonable and adequately protective of human health given that groundwater on the Site is not and will not be used as a potable resource.	O. Reg. 153/04 MECP Regulatory RA Review Process

Public Comments		Jacobs Response	Addressed Via
RA11	Offsite ingestion of groundwater for subsurface workers and potable groundwater	Acknowledged. A comprehensive GMP has been developed as part of the RMP (Section 7.4.3.1) for the RA Property and will form a requirement of the CPU. As shown in Tables 7-9 and 7-10 both these offsite pathways have been considered in the development of the GMP. The data collected through the GMP will establish groundwater quality trends at select monitoring wells through a minimum of quarterly monitoring (Year 1) and semi-annual monitoring (Year 2). The CPU binds the Property Owner to specific actions depending on the results of the GMP, in consultation with the MECP District Office. The MECP Abatement Process specifically deals with addressing offsite risks.	O. Reg. 153/04 CPU Regulatory Process MECP Abatement Process
RA12	Remedial actions not listed as contingencies in RMP	The remedial actions listed in the comment were indeed listed in the RMP. Section 7.4.3.1 (page 7-19) of the November 2020 RA states: *The remediation measures, if required, will be designed by a P.Eng. and may include in situ chemical or biological treatment, installation of a passive NAPL collection system, hydrogeological or reactive barrier wall, vapour cut-off trench, or altering groundwater flow patterns using a pump-and-treat system.*	O. Reg. 153/04 CPU Regulatory Process MECP Abatement Process
RA13	Why conduct ongoing groundwater monitoring	As described in the response to Comment RA11, the data collected through the GMP will establish groundwater quality trends at select monitoring wells through a minimum of quarterly monitoring (Year 1) and semi-annual monitoring (Year 2). The GMP has merit because it will allow decisions to be made based on the evaluation of more recent groundwater data collected at a higher frequency of sampling than has been collected to date (via the staged Phase Two ESA investigations). The CPU binds the Property Owner to specific actions depending on the results of the GMP, in consultation with the MECP District Office. The MECP Abatement Process specifically deals with addressing offsite risks. Section 7.4.3 describes the potential "actions" that may arise via the CPU and Abatement Process based on the results of the GMP including: • Further investigation or assessment including modelling or fate and transport assessments • Removal of NAPL to characterize and assess persistence and volume • Installation of additional monitoring wells or soil vapour probes • Completion of a remedial option feasibility study, remedial action plan, or both • Assessing and implementing remedial technology options to prevent such offsite migration; or • Some combination of these The March 18, 2021 MECP Schedule A comments on the RA specifically state: "Any assessment of risk or development of property specific standards in the RA that may be intended to apply to off-site properties are beyond the scope of a RA under the Regulation and accordingly are not part of the Ministry's review." Therefore, the evaluation of risk for offsite receptors is beyond the scope of the RA. Offsite risks will be addressed in the future via the requirements of the CPU and the MECP Abatement Process, if necessary.	O. Reg. 153/04 CPU Regulatory Process MECP Abatement Process
RA14	Public Communication only done because Wider Area of Abatement was expected	The requirement for Public Communication for the overall project was stipulated in the 2017 Request for Proposals. Public communication is a key aspect of the City's planning process to guide decisions regarding the future redevelopment of the Site. Updates regarding the environmental condition of the property and status of the Phase One and Two ESA investigations constituted a portion of the overall Public Communication Plan carried out by the City and their partners. Therefore, the Public Communication Plan was not executed with O. Reg. 153/04 processes in mind, but rather as part of the City's planning process to foster community engagement. The decision to declare a Site with a Wider Area of Abatement designation is at the discretion of the MECP District Engineer.	City Planning Process O. Reg. 153/04 MECP Regulatory RA Review Process

Notes:

B(a)PE = benzo(a)pyrene equivalence
City = City of Guelph
COC = contaminant of concern
CSM = conceptual site model
CPU = Certificate of Property Use
ESA = Environmental Site Assessment
GMP = Groundwater Monitoring Program
HH = human health
MDL = method detection limit
MECP = Ontario Ministry of the Environment, Conservation and Parks
NAPL = non-aqueous phase liquid
OTR = Ontario Typical Range
PSF = pre-submission form
RA = Risk Assessment
RSC = Record of Site Condition
RMM = risk management measure
RMP = risk management plan
RPI =Residential/Parkland/Institutional
SCS = site condition standard
TEQ = toxic equivalence
TRV = toxicity reference value
VOR – vendor of record

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March 9, 2021

Peter-James Mauro
RWDI
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Guelph, Ontario
Canada
N1G 4P6

via email to: Peter-James.Mauro@rwdi.com

CONFIDENTIAL

Dear Mr. Mauro:

RE: Summary Memo of a Risk Assessment for the Property at 200 Beverley Street in Guelph, Ontario

Intrinsik Corp. (Intrinsik) is pleased to submit the following summary memo addressing the request for a review of the Risk Assessment (RA) and supporting Record of Site Condition (RSC) information submitted to the Ministry of the Environment, Conservation and Parks (MECP) by CH2M/Jacobs for the property located at 200 Beverley Street (hereafter referred to as the "Site").

The memo focuses on the key conclusions from the RA and supporting RSC information and identifies technical deficiencies, as per the requirements of Ontario Regulation 153/04 (O. Reg. 153/04) and best scientific practices. This memo assumes that the underlying data presented in the Phase Two CSM documentation and/or related reports has properly characterized identified areas of potential environmental concern (APECs) on the Site. As such, Intrinsik has not reviewed the data for the purposes of determining if appropriate characterization has been completed on Site. The proposed Risk Management Measures (RMMs) outlined in the revised November 2020 RA have blocked most of the relevant possible exposure pathways at the Site based on existing concentrations and as such any potential changes in the maximum concentrations arising from future environmental assessment or delineation work are not anticipated to alter the RA conclusions or RMM recommendations.

Ultimately the primary concern we have with the RA, its conclusions, and the resulting Risk Management Plan (RMP) is how it has managed (or not managed, as the case appears to be) the potential for off-site migration of contamination in groundwater. Contaminated groundwater is leaving the RA property and flowing onto the neighbouring downstream 10 Kingsmill Avenue property. It is important to consider offsite migration of contaminated groundwater because there may be a potential for risks to off-site human receptors that are not being protected by the RMMs planned for the 200 Beverley Street property. Rather than identifying the requirement of a remediation option such as a permeable reactive barrier, the RMP provides contingency measures for offsite groundwater movement or NAPL observations. As discussed in this memo, the data illustrates exceedances at sentinel monitoring wells located in the northeast corner of the Site, and taken with the RWDI investigations, there is contaminated groundwater flowing onto the downstream property at 10 Kingsmill Avenue.

This memo provides a short discussion of the Site background, Intrinsik's comments on the Pre-Submission Form (PSF) and revised RA, a discussion on off-site migration of contaminants of concern (COCs) in groundwater to 10 Kingsmill Avenue, and a final conclusion section. Short summaries of the Phase One ESA, PSF submission and the revised RA are provided in Attachment 1 at the end of this document. The pertinent information for the RA review is presented in the PSF submission and revised RA are based on the findings of the Phase Two ESA. A summary of the Phase Two was not provided in this memo as the detailed review of the site investigations were completed by RWDI.

As part of this summary memo, Intrinsik staff reviewed the following seven (7) documents:

- CH2M (CH2M HILL Canada Limited). 2017. Draft Phase One Environmental Site Assessment - Former International Malleable Iron Company 200 Beverley Street, Guelph, Ontario. Prepared for City of Guelph. August 18, 2017.
- CH2M. 2019. Risk Assessment Pre-Submission Form 200 Beverley Street, Guelph, Ontario. Prepared for City of Guelph. February 2019.
- Appendix A2 Response to PSF Comments in Schedule A for 200 Beverly Street, Guelph, Ontario.
- Jacobs (Jacobs Engineering Group Inc.). 2020. Former International Malleable Iron Company – Draft Phase Two Environmental Site Assessment. Prepared for City of Guelph. June 12, 2020
- Jacobs. 2020. 200 Beverley Street, Guelph, Ontario Risk Assessment (Rev 0). Prepared for City of Guelph. June 2020.
- Appendix A3 Response to RA Comments in Schedule A for 200 Beverley Street, Guelph, Ontario
- Jacobs (Jacobs Engineering Group Inc.). 2020. 200 Beverley Street, Guelph, Ontario Risk Assessment (Rev 1). Prepared for City of Guelph. November 2020.
- RWDI. 2021. Review of Supporting Documentation – City of Guelph Record of Site Condition. 200 Beverley Street, Guelph, Ontario. Final Report. RWDI # 2102539. March 9, 2021.

Site Background

Based on our review of these documents, the following brief discussion presents background information for the Site. The Site was historically utilized for industrial/commercial purposes and was identified as the former International Malleable Iron Company (IMICO) foundry facility. To Intrinsik's understanding, with the exception of concrete foundations, the RA Site was vacant with no buildings or structures at the time of the site reconnaissance. The redevelopment plans are unknown but may include residential, parkland, and/or commercial use. Residential, commercial, and industrial properties are to the north and east of the Site. Beverley Street is to the south of the site and farther south are residential, commercial, and industrial properties. Stephenson Street South is to the west of the Site and farther west are residential and commercial properties. As such, off-site human receptors identified in the RA include residents, patrons, and workers at nearby homes, businesses, or facilities. The nearest surface water bodies are the Eramosa River located approximately 0.5 kilometres (km) south), and the Speed River approximately 1.1 km west. Based on the Phase Two CSM (Jacobs, 2020), groundwater flow in the overburden and bedrock contact zone is northeast to southwest and the flow in the Eramosa formation is to the east. The minimum depth to groundwater was identified as being 0.93 metres below ground surface (mbgs). Based on the site characteristics, the Table 6 Generic Site Condition Standards (SCS) for Shallow Soils in a Potable Groundwater Condition

for Residential/ Parkland/Institutional (RPI) Property Use in coarse soils were selected as the applicable SCS for the Site. Based on the screening conducted in the RA, thirty-eight (38) chemical parameters in soil and thirty (30) chemical parameters in groundwater were retained as COCs for the RA. It was also noted that non-standard delineation was used for cis-1,2-dichloroethylene (cis-1,2-DCE) in groundwater at OW31.

Intrinsik's Comments on the PSF and RA

Though Intrinsik and CH2M/Jacobs differ on some of the finer elements of the completed risk assessment, these are not expected to affect the conclusions of the assessment for the property itself. The RA appears to have been competently conducted with appropriate risk management measures established to address residual risk on the property itself. The following bullets identify notable differences from RA methodology typically employed by Intrinsik on similar O. Reg. 153/04 RA submissions:

RA1

- PSF (CH2M, 2019)
  - Appendix D - Screening for soil and groundwater chemical parameters was against Table 6 SCS and, for select chemicals, also against Ontario Typical Range (OTR) and provincial groundwater monitoring information system (PGMIS) values. However, the screening tables show values for the Table 6 SCS only. Additionally, there are several contaminants which do not have SCS or ORT values and have been identified as not having a standard available. It is acknowledged that the Ministry also commented on this screening approach and specifically about bismuth in their comments on the PSF and on the RA.

RA2

  - Appendix E
    - It is acknowledged that no existing drinking water wells were identified on the Site, however, the human health CSM should assess "ingestion of potable groundwater" as the site is a Table 6 site. The CSM identified "Ingestion (incidental) and dermal" as incomplete pathways which, based on the applicable SCS, is not representative of the Site.

- Revised RA (Jacobs, 2020)

RA3

  - Based on the Phase Two CSM shown in Section 3.2 of the RA, groundwater flow in overburden and bedrock contact zone is northeast to southwest. The flow in the Eramosa formation is east. However, the RA discussion in Section 4.4.6 (Interpretation of Off-Site Health Risks) identifies that groundwater in the overburden and bedrock contact zone generally flows from west to east on western portion of the Site and flows from east to west on the eastern portion of the Site. Groundwater in the Eramosa Formation (Potentiometric surface), appears to flow to the southeast. There is a discrepancy between the flow descriptions for the overburden and bedrock contact zone and it is recommended that groundwater flow be clearly described. From Intrinsik's review of the Jacobs and RWDI data, the groundwater flow is to the south or southeast.

RA4

  - For the calculation of benzo(a)pyrene equivalent (B(a)PE), half detection limits were used in the calculation for concentrations that were reported as non-detect. In Intrinsik's methodology, concentrations that are non-detected are not halved for this calculation.
  - Secondary screening was presented in Tables F1-3 through F1-5e. Screening was against the Table 2 S1, GW1, S-GW3, and GW3.

RA5	• Intrinsik's methodology includes screening against the S2 and S3 component values protective of the maintenance worker and construction worker via direct contact.
RA6	• As the potable water scenario is applicable to this site, secondary screening against S-GW1 and GW1-odur should also be completed.
RA7	• Updated TRVs are selected and endorsed by MECP. Intrinsik's methodology includes completing the secondary screening with the component values presented in the MGRA model (2016) with the updated MECP TRVs.
RA8	○ The Human Health CSM on pg. 279/3142: It is noted that there are off-site residential uses and as such, off-site residents would be a receptor also considered by Intrinsik.
RA9	○ In some instances, the TRVs selected in the RA differ from what Intrinsik would utilize. However, the Ministry allows for deviations from the Ministry endorsed values with property toxicological justification.
RA10	○ The RA identifies that a hazard quotient of 0.5 (for inhalation pathways only) for trichloroethylene is considered appropriate for the assessment. Intrinsik's methodology conservatively uses the hazard quotient of 0.2 for trichloroethylene for all pathways if the site is identified as a potable site.
RA11	○ Ingestion of groundwater: RA identified that "risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers". The RA should discuss off-site migration of groundwater impacts for the potable water supply. As noted below, this is inappropriate as the on-site risks to construction and utility workers are addressed through the implementation of a health and safety plan (HASP) while no such HASP may be present for downstream neighbouring properties (like 10 Kingsmill Avenue) not bound by the requirements of the filed CPU for the Site.

Off-site Considerations

Based on the Interpretation of Off-Site Health Risks discussion, provided in Section 4.4.6 of the RA, of the thirty (30) COCs identified in groundwater, twenty-three (23) COCs were identified to potentially have off-site exceedances of their respective Table 6 RPI SCS. Chlorinated VOCs identified as COCs in groundwater (including trichloroethylene) were noted to have the potential to exceed Table 6 SCS off-site on the eastern portion of the site in the overburden and bedrock contact zone and Eramosa Formation where the groundwater appears to flow to the east. Additionally, there are PHC exceedances in groundwater, corresponding to soil impacts in the area of the machine shop and excavation area where there is residual free phase product.

Section 4.4.6 of the RA concludes that "the potential for an offsite exceedance of the applicable generic MECP standard for several parameters cannot be ruled out." Further, based on the RWDI analysis, there are confirmed off-site exceedances as a result of migration from the site. Based on our review of the data presented in the revised RA, we would agree with this conclusion. However, Jacobs addresses this possibility not by specifying mitigation actions to prevent or reduce COC flow off-site (such as a permeable reactive barrier [PRB] or similar remedial action) as we have observed used in other sites with similar groundwater plumes travelling off-site. Rather they state "[o]ffsite groundwater quality can be addressed onsite by monitoring groundwater movement, allowing natural attenuation, and notifying appropriate stakeholders in the event of offsite migration." A number of these COCs are recalcitrant chemicals that do not degrade readily or rapidly in the environment (*i.e.*, chlorinated volatile

organic compounds), and as such, natural attenuation should not be relied on to mitigate offsite risks to directly adjacent properties.

To further assess off-site health risks, based on the location of 10 Kingsmill Avenue in relation to the Site, the monitoring wells in the northeast corner of the Site were reviewed by Intrinsik for exceedances which may impact the 10 Kingsmill Avenue property. Table 1 below identifies the list of monitoring wells which were screened by Intrinsik. Figure 1 and 2 are provided to illustrate the location of the sentinel monitoring wells reviewed.

Table 1	**List of Sentinel Monitoring Wells Reviewed for Assessment of Potential Off-Site Exceedances from the Northeast Corner of the Site**
MW17-105S	OW24D
MW17-105D	OW24S
MW18-129D	MW18-134S
OW09-I	MW18-134D
OW09-II	OW13-39S
MW19-137S	OW13-39D
OW14	OW18-I
OW31	OW18-II

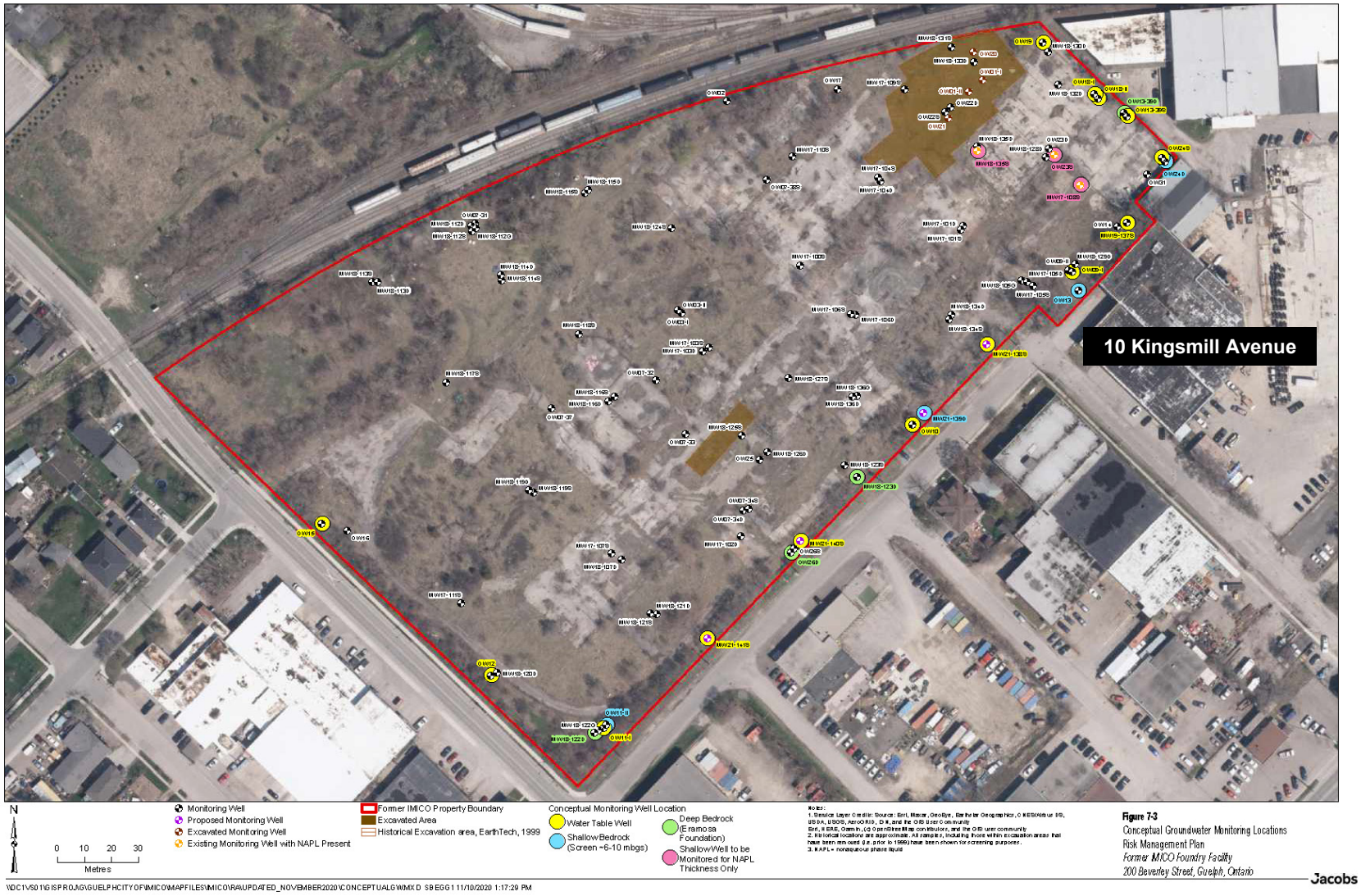


Figure 1 Groundwater Monitoring Locations presented in the Risk Management Plan

Figure 2 Locations of Sentinel Monitoring Wells (highlighted in orange) Reviewed for Assessment of Potential Off-Site Exceedances from the Northeast Corner of the Site

Based on the exceedances presented in the Phase Two CSM and RA, the following maximum concentrations in groundwater were identified as exceedances of the applicable on-site Table 6 RPI SCS at the monitoring wells identified in Table 1. Please note, the following table (Table 2) presented the Table 2 RPI SCS in addition to the Table 6 RPI SCS as off-site properties may potentially have deeper bedrock and as such the applicable off-site SCS may be the Table 2 SCS. Additionally, although the current land use for the 10 Kingsmill Ave property is industrial/commercial, the RPI SCS were conservatively utilized for this screening approach to account for potential future redevelopment.

Table 2	Identified Exceedances of Maximum Groundwater Concentrations from Select Monitoring Wells Located in the Northeast Corner of the Site Against the Table 2 and/or Table 6 Site Condition Standards						
Reference Figure	**Table 2 RPI Coarse SCS (µg/L)**	**Table 6 RPI Coarse SCS (µg/L)**	**Groundwater COCs**	**MW Location**	**Max. Concentration (ug/L)**	**Max. Concentration Sampling Date**	**Other Reviewed MW Locations with Exceedances**
Figure 6-12	**Metals**						
	10	10	Lead	OW09-II	17	DEC 2012	-
	1,100	890	Zinc	OW14	3,700	OCT 2010	OW18-I, OW18-II, OW09-I, OW09-II, OW24D
Figure 6-14	**BTEX**						
	5	0.5	Benzene	MW17-105S	66.8	OCT 2017	MW18-129D, OW09-II, OW23D, MW17-105D, MW18-134D
	2.4	2.4	Ethylbenzene	MW17-105S	8.42	OCT 2017	-
Figure 6-15	**PHCs**						
	750	420	PHC F1	OW24D	1,100	SEPT 2011	-
Figure 6-16	**PAHs**						
	0.01	0.01	Benzo(a)pyrene	OW18-I	0.013	MAR 2010	-
Figure 6-17 (part 1&2)	**VOCs**						
	1.6	0.5	1,1-Dichloroethene	OW24D	64	NOV 2015	OW13-39S, OW24S
	1.6	1.6	cis-1,2-Dichloroethene	OW24D	960	NOV 2015	OW09-I, MW17-105S, MW17-105D, MW18-129D, OW09-II, OW13, OW14, OW23S, OW13-39S, OW13-39S, OW13-39D
	51	5	Hexane, n-	MW17-105S	7.46	OCT 2017	-
	1.6	1.6	trans-1,2-Dichloroethene	OW24D	87	NOV 2015	OW13-39S, OW13-39D, OW18-II
	1.6	0.5	Trichloroethylene	OW24D	7,900	NOV 2015	OW18-I, OW23S, OW14, OW09-I, OW13, OW18-II, MW18-128D, OW13-39D, OW24S, OW13-39S, OW13
	0.5	0.5	Vinyl Chloride	OW24D	86	SEPT 2011	OW23S, OW18-I, OW09-II, MW18-129D, OW09-I, OW13, MW17-105S, MW17-105D, OW18-II, OW13-39S, OW13-39D, MW18-134D,

Conclusions

As presented in Table 2 above, groundwater concentrations of a number of COCs (*e.g.*, benzene, ethylbenzene, PHC F1, 1,1-DCE, n-hexane, TCE and vinyl chloride) exceed the appropriate generic SCS at the closest sentinel wells on the property boundary with the 10 Kingsmill Avenue property (*e.g.*, MW18-134D, MW17-105S, OW13, MW17-105D, OW09-I, OW09-II, MW18-129D, MW19-137S, OW14, OW31, OW24S, and OW24D). Furthermore, the RA states that "[t]he proposed PSSs for groundwater COCs (presented in Table 4-39) could result in concentrations exceeding the applicable generic MECP standards (Table 6 SCS) at the nearest downgradient offsite property if groundwater containing COCs at PSS concentrations greater than the applicable SCS migrates offsite" (page 78 of revised RA report). As noted in the RA report, groundwater in the Eramosa Formation appears to flow to the east which would appear to be flowing to the 10 Kingsmill Avenue property. Further, as noted above, shallow groundwater from 200 Beverley Street is also flowing south and southeast towards the 10 Kingsmill Avenue property.

In our experience, sites which have significant groundwater contamination (particularly chlorinated VOCs) flowing onto downstream properties would require some form of remedial action to mitigate the flow, such as installation of PRBs, chemical injections and/or hydraulic

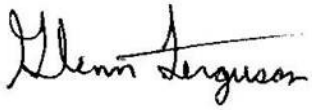
RA12 control by pump and treat. The highlighted options are often presented as measures to prevent offsite movement of contaminated groundwater. However, none of these were suggested in the current RA or RMP even as contingencies should off-site concerns be raised in the future.

RA13 Given concentrations at the sentinel wells at the property boundary already exceed the generic SCS and based on what is known from the RWDI data that there are already concentrations above the generic SCS, we are unsure what would be gained by ongoing groundwater monitoring. For example, if we consider the maximum concentration of TCE of 7,900ug/L at OW24D, we would be expecting potential risks to downgradient indoor workers through the inhalation pathway as the Table 6 GW2 industrial component value is 0.86ug/L. The concentrations onsite already require a significant amount of mitigation to prevent adverse human health risks, including vapour mitigation, potable water use prohibitions, basement prohibitions in areas of LNAPL, and HASPs to protect construction or trench workers. These can easily be enforced through ongoing requirements specified in a filed CPU for the RA property. However, there are no proposed protections or mitigation measures in the RA or RMP for stopping the migration onto 10 Kingsmill Avenue. We are unsure of what simply notifying appropriate stakeholders in the event of off-site migration (which appears to have already occurred and is still ongoing) will gain.

RA14 Additionally, we are surprised that the MECP District Engineer has not declared this Site (200 Beverley Street**)** a *Wider Area of Abatement* (WAA) designation. It is a high-profile site with significant contamination which has obviously migrated beyond the property boundaries. Intrinsik has conducted a number of risk assessments under O. Reg. 153/04 for much simpler and less contaminated sites across the Greater Toronto Area – some of which the contamination was from a flow-through condition – that the District Engineer designated as WAA. In fact, as part of Section 8 of the RA, a description of an optional communication plan was included. This is not typically required for any Tier 3 RA unless it is declared a WAA site. I suspect that Jacobs and their client expected it to be declared a WAA and had initiated this process in anticipation of the requirement potentially arising during the Ministry regulatory review process.

We hope this summary memo provides you and your client with the necessary information required for your purposes. If you have any questions regarding these comments, please do not hesitate to contact me at (905) 364-7800, ext. 206, or *via* email at gferguson@intrinsik.com. We thank you for the opportunity to complete this review.

Yours sincerely,
INTRINSIK CORP.



Glenn Ferguson, Ph.D., QP_{RA}
Vice President / Senior Environmental Health Scientist

cc: Joanna Vince, Willms & Shier Environmental Lawyers LLP

Attachment 1 - Document Summaries

The following section provides summaries of the Phase One ESA, PSF submission and the revised RA dated November 2020.

CH2M. 2017. Draft Phase One Environmental Site Assessment - Former International Malleable Iron Company 200 Beverley Street, Guelph, Ontario. Prepared for City of Guelph. August 18, 2017.

- At the time of the Phase One Environmental Site Assessment (ESA), the Site was vacant with concrete floor slabs of the demolished buildings. The site was historically used for industrial purposes and was identified as the former International Malleable Iron Company (IMICO) foundry facility.
- At the time of the Phase One ESA, adjacent property uses to the north, east, and south of the Site were residential, industrial, and commercial. Residential use was identified to the west of the Site.
- Thirty-three (33) areas of potential environmental concern (APEC) were identified, of which twenty-nine (29) were from on-site potentially contaminating activities (PCAs) and four (4) were from off-site PCAs.
- Contaminants of potential concern (COPCs) identified included metals and inorganics, VOCs, PHCs, PAHs, PCBs, ABNs and CPs. Free phase product was noted to be potentially exist on Site.
- The Site was identified to be redeveloped for residential/ parkland/ institutional land use purposes.
- The groundwater flow was anticipated to be south, toward Eramosa River located approximately 800m southeast of the site. Waterbodies within the Phase One Study area included a portion of the Hanlon Creek and Mill Creek Swamp located off site.
- Based on previous investigations, which were reviewed by CH2M, depth to bedrock was identified to be approximately 2.0 metres below ground surface (mbgs).

CH2M. 2019. Risk Assessment Pre-Submission Form 200 Beverley Street, Guelph, Ontario. Prepared for City of Guelph. February 2019.

- PSF identified the following:
    - Applicable SCS: Table 6 RPI SCS for coarse soils
        - Site intended for commercial, community, parkland, residential use.
        - pH value for surface soil was less than 5 and greater than 9. PSF identified that further investigation was needed to ensure this would not be a Table 1 Site. The PSF assumes the Table 6 SCS is applicable.
        - Potable site
        - Shallow bedrock (encountered < 2 mbgs)
    - Media sampled included: Soil and Groundwater.

- Identified depth of organic contamination in soil to be from 0-2.89m and inorganic contamination to be from 0-3.2m
- Three (3) groundwater units identified, and minimum depth to groundwater was 0.93 mbgs.
- Thirty-nine (39) centimeters of light non-aqueous phase liquid (LNAPL) was visually observed on site.

- Attachment A – Phase One and Two Summaries
  - The Phase Two ESA did not look at vapour intrusion. RA would need to be reviewed to ensure that future buildings be assessed for this exposure pathway.
  - The following tables present COCs in soil and in groundwater.

Table 6-7c. Contaminants of Concern Identified in Soil
200 Beverley Street, Guelph, Ontario

Soil Contaminants of Concern	
2-(1-)Methylnaphthalene	Fluorene
Acenaphthene	Indeno(1,2,3-Cd)Pyrene
Acenaphthylene	Lead
Anthracene	Mercury
Antimony	Molybdenum
Arsenic	Naphthalene
Benzene	Nickel
Benzo(a)anthracene	PCB, Total
Benzo(a)pyrene	Petroleum Hydrocarbons F2 (C10-C16)
Benzo(b)fluoranthene	Petroleum Hydrocarbons F3 (C16-C34)
Benzo(g,h,i)perylene	Petroleum Hydrocarbons F4 (C34-C50)
Benzo(k)fluoranthene	Phenanthrene
Cadmium	Pyrene
Chrysene	Thallium
Cobalt	Trichloroethylene
Copper	Vanadium
Dibenzo(a,h)anthracene	Xylenes, Total
Ethylbenzene	Zinc
Fluoranthene	

F = fraction
PCB = polychlorinated biphenyls

Table 6-10c. Contaminants of Concern Identified in Groundwater
200 Beverley Street, Guelph, Ontario

Groundwater Contaminants of Concern	
1,1,1-Trichloroethane	Fluoranthene
1,1-Dichloroethane	Lead
1,1-Dichloroethene	Naphthalene
2-(1-)Methylnaphthalene	n-Hexane
Acenaphthene	Petroleum Hydrocarbons F1 (C6-C10)
Anthracene	Petroleum Hydrocarbons F2 (C10-C16)
Arsenic	Petroleum Hydrocarbons F3 (C16-C34)
Benzene	Petroleum Hydrocarbons F4 (C34-C50)
Benzo(a)anthracene	Phenanthrene
Benzo(a)pyrene	Pyrene
Benzo(b&j)fluoranthene	Tetrachloroethene
Benzo(k)fluoranthene	trans-1,2-Dichloroethene
Chrysene	Trichloroethylene
cis-1,2-Dichloroethene	Vinyl Chloride
Ethylbenzene	Zinc

F = fraction

- Attachment C – Sampling & Analysis Plan

- Attachment D – Data relied on for the RA
    - Soil screening is completed against Table 6 SCS. The table also identifies screening against Ontario Typical Range (OTR) values for select chemical parameters.
    - Groundwater screening is completed against Table 6 SCS. The table also identifies screening against provincial groundwater monitoring information system (PGMIS) values for select chemical parameters.

- Attachment E – Human health and ecological conceptual site models (CSMs)

- Attachment F – Toxicity reference values

- Attachment G – Legal Property Information
    - Legal letter from City of Guelph and plan of survey

- Attachment H – Supporting Infromation includes
    - Discussion on species at risk
    - Certificate of compliance for CH2M
    - CVs of team

Jacobs (Jacobs Engineering Group Inc.). 2020. 200 Beverley Street, Guelph, Ontario Risk Assessment (Rev 1). Prepared for City of Guelph. November 2020.

- Non-standard delineation was used for cis-1,2-dichloroethylene (cis-1,2-DCE) in groundwater at OW31. Additional vertical delineation is not required as per the RA.

- Chemical Screening
    - Thirty-eight (38) chemical parameters in soil and thirty (30) chemical parameters in groundwater were retained as COCs for the RA.
    - For the calculation of benzo(a)pyrene equivalent (B(a)PE), half detection limits were used in the calculation for concentrations that were reported as non-detect.
    - Future vinyl chloride concentration in groundwater was calculated to be 990µg/L.
    - Secondary screening is presented in Tables F1-3 through F1-5e screen against Table 2 S1, GW1, S-GW3, and GW3.

- Risk characterization
    - The RA identifies that a hazard quotient of 0.5 (for inhalation pathways only) for trichloroethylene is considered appropriate for the assessment.
    - Ingestion of groundwater: RA identified that “risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers”.
    - The RA identified that the proposed Property Specific Standards (PSS) could exceed the Table 6 SCS for downgradient sites and as such, groundwater monitoring is proposed.
        - The following is provided in the RA: Offsite groundwater quality can be addressed onsite by monitoring groundwater movement, allowing natural attenuation, and notifying appropriate stakeholders in the event of offsite migration.
        - Based on the Phase Two CSM, groundwater flow in overburden and bedrock contact zone is northeast to southwest. The flow in the Eramosa formation is flow is east.
- RMMs were presented in Appendix I RMP engineering report: The following RMMS were proposed:
    - Physical barriers: Hard cap/fill cap; options to mitigate contaminant transport along utility corridors (e.g., trench plugs, anti-seep collars, trench liners, watertight shoring)
    - Vapour Intrusion Mitigation: Passive venting system; vapour proof barrier; and foundation and penetration sealing.
    - Groundwater monitoring was mentioned in the RA. TCE and other chlorinated degradation products were identified in groundwater on the eastern portion of the site in the overburn and bedrock contact zone and Eramosa Formation where the groundwater appears to flow to the east. Additionally, there are PHC exceedances in groundwater, corresponding to soil impacts in the area of the machine shop and excavation area. There is residual free phase product in this area. However, no discussion is provided regarding the movement of this off-site to the downgradient in the RMP and how this could be mitigated.

- Section 7 of the RA: Includes discussion on hard cap/fill cap; vapour intrusion mitigation with sub-slab or indoor air monitoring program prior to any building occupancy; health and safety plan; soil and groundwater management plan; groundwater control and management; land use restriction; building restriction associated with NAPL; groundwater monitoring program include wells along the downgradient perimeter of the site and compare concentrations to GW1 for the potable water considerations and implement a restriction of use of groundwater as a source of water. Implications to offsite human and ecological receptors will be assessed through groundwater monitoring.

- For Section 7.4.3.1: As per MECP comments, the groundwater monitoring program included monitoring wells OW24S/D and OW13-39S/D to monitoring COCs coming onto the property and ensure that they do not exceed the PSS. Wells OW23S, MW17-108S, and MW18-135S have been also been added to the groundwater monitoring program to monitor NAPL presence as these are within the areas identified as having residual NAPL.

- ERA
  - Primary routes of exposure that were semi-quantitatively evaluated are:
    - Soil organisms – ingestion and dermal contact with soil
    - Terrestrial plants—root uptake from soil and groundwater
    - Birds and mammals—ingestion of soil and food-chain transfer by the consumption of contaminated prey or forage items
  - Receptors utilized:
    - For onsite birds and mammals: American Woodcock, Red-winged Blackbird, and Red-tailed Hawk to represent birds; Meadow Vole, Red Fox, and Short-tailed Shrew to represent mammals.
    - Plants and soil organisms: grasses and Manitoba Maple trees, earthworms
  - Secondary screening for groundwater indicated that concentrations of ten (10) COCs (i.e., anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b&j)fluoranthene, benzo(k)fluoranthene, chrysene, PHC F1, PHC F2, pyrene and zinc) exceeded the Table 6 GW3 component value.
  - Ecological Risk-based Target Concentrations were developed based on the lowest of the selected EcoBMCs used in the ERA (for plants and soil organisms or birds and mammals) or the higher of the lowest EcoBMC and the Table 6 SCS (so that the selected values are not more stringent than MECP generic standards). Fill cap target concentration was developed by using the Ecological Risk-based Target Concentrations.

Attachment 2
Additional Email Correspondence (Request for Additional Information)

Appleby, Katherine/KWO

From: Appleby, Katherine/KWO
Sent: Tuesday, September 14, 2021 4:46 PM
To: Mo, Alexina (MECP)
Cc: prasoon.adhikari@guelph.ca; Volpato, Jennifer (MECP); Floyd, Geoffrey (MECP); Wong, Melanie (MECP)
Subject: RE: Request for Additional Information - RA for 200 Beverley Street, Guelph, Ontario [RA1748-19c; IDS#6417-B9XQGZ]
Attachments: IMICO_RA_Sec4-HHRA_14Sept2021.pdf; IMICO_RA_Fig7-2_AdminReqs_NAPL_14Sept2021.pdf

Tracking:

Recipient	Delivery
Mo, Alexina (MECP)	
prasoon.adhikari@guelph.ca	
Volpato, Jennifer (MECP)	
Floyd, Geoffrey (MECP)	
Wong, Melanie (MECP)	
McCarthy, Tania/KWO	Delivered: 9/14/2021 4:46 PM
Taves, Ed/KWO	Delivered: 9/14/2021 4:46 PM

Hello Alexina,
Please see the response to Comment 18 below in blue. The associated text edits adding the potential hazards from inhalation of iron dusts are shown in tracked changes (red) in the attached PDF of Section 4. Please see PDF pages 42 (*Section 4.4.3.5 – Qualitative Assessment of Parameters without Toxicity Data, Iron [Dust Only]*) and 57 (*Section 4.5 – References*) for the edits.

Figure 7-2 is also attached to address the RMP comment.

Please let me know if these additional materials/edits satisfy the comments, or if additional information is required.

Katherine

Katherine Appleby, B.E.S., EP, QPRA | Jacobs | Senior Environmental Scientist
~~O:+1.519.579.3500~~ | katherine.appleby@jacobs.com
72 Victoria Street South, Suite 300 | Kitchener, ON N2G 4Y9 | Canada

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From: Mo, Alexina (MECP) <Alexina.Mo@ontario.ca>
Sent: Monday, September 13, 2021 11:33 AM
To: Appleby, Katherine/KWO <Katherine.Appleby@jacobs.com>
Cc: prasoon.adhikari@guelph.ca; Volpato, Jennifer (MECP) <Jennifer.Volpato@ontario.ca>; Floyd, Geoffrey (MECP) <geoffrey.floyd@ontario.ca>; Wong, Melanie (MECP) <melanie.wong@ontario.ca>
Subject: [EXTERNAL] Request for Additional Information - RA for 200 Beverley Street, Guelph, Ontario [RA1748-19c; IDS#6417-B9XQGZ]

Hi Katherine,

The Ministry's review of the above listed risk assessment is currently ongoing. In order for the Ministry to complete its review, it is requested that the following information/clarification be provided:

New Risk Assessment Comment (September 2021)

18. Section 4.4.3.5 – Regarding the issue of iron dust, it should be clarified that there is a known hazard associated with chronic inhalation of iron dust (and the nature of the hazard should be noted) and this is being evaluated qualitatively based on the elevated exposure relative to background. Since elevated exposures may occur in the absence of risk management measures, it has been assumed that potentially unacceptable risks may occur and risk management measures are therefore prompted (i.e., capping). The Reviewer assumes this is the QP's intent. Please clarify.

Jacobs Response: According to the US EPA (2006)[1] there is inadequate data to derive a reference concentration (RfC) for exposure to iron via inhalation. However, the hazards associated with occupational exposures to iron may include "irritation to eyes, skin, and respiratory tract" (from inhalation of aerosols or mists of soluble iron salts); "siderosis, a benign pneumoconiosis" and "accumulation of iron dust in the lungs" (from inhalation of ferric oxide dusts and fumes). There is conflicting evidence regarding the carcinogenicity of humans from iron via inhalation routes of exposure; however, the US EPA has classified iron and its compounds as a "possible human carcinogen". There is inadequate data to derive a unit risk factor (URF) for exposure to iron via inhalation. The specific hazard information has been added to Section 4.4.3.5, along with the associated US EPA reference to Section 4.5, please see the attached PDF.

As mentioned in Section 4.4.2.9, a quantitative assessment of iron via dust inhalation could not completed due to a lack of appropriate TRVs; therefore, a qualitative assessment using background values was completed in Section 4.4.3.5. The qualitative assessment concluded that risks to human receptors via the inhalation of iron in dust could potentially pose a risk because concentrations of iron in soil are greater than background in some areas of the Site. Therefore, RMMs are required to prevent or reduce dust generation at the Site. As noted in Table 4-40, the RMMs specifically required for iron in soil are listed as: Surface Cover for Site Users; Dust Suppression During Construction Activities; and PPE for Subsurface Workers.

[1] United States Environmental Protection Agency (EPA). 2006. Provisional Peer Reviewed Toxicity Value for Iron and Compounds. Superfund Health Risk Technical Support Center National Center for Environmental Assessment, Office of Research and Development, Cincinnati, Ohio. September. Accessed September 2021: http://hhpprtv.ornl.gov/issue_papers/IronandCompounds.pdf.

Comment on RMP

Comment 3 - There appears to have been an error in loading/viewing the revised Figure 7.2. Please provide the revised figure so that it is viewable and downloadable.

Jacobs Response: Figure 7-2 is attached.

Please provide this information (in PDF format showing tracked changes) by no later than **September 17, 2021**.

Please do not hesitate to contact me if you have any questions.

Regards,
Alexina Mo, P.Geo.
Streamlined Risk Assessment Coordinator
Technical Assessment and Standards Development Branch
Ministry of the Environment, Conservations and Parks
40 St. Clair Ave. West, Toronto

M4V 1M2
437-244-4437

4. Human Health Risk Assessment

This section of the risk assessment (RA) primarily evaluates risk to human health at the RA Property by addressing the elements required in the RA process. Jacobs completed a quantitative and qualitative Human Health Risk Assessment (HHRA) and deemed the level of risk to be appropriate based on the RA Property's existing conditions and anticipated future use, and the implementation of a risk management plan (RMP). HHRAs assess the potential for human health risks resulting from contamination and the presence of contaminants of concern (COCs) at a site.

This HHRA adheres to the prescribed Ontario Regulation (O. Reg.) 153/04 (as amended) (MECP, 2011a) reporting format and includes the following four major elements:

1) Problem Formulation
2) Exposure Assessment
3) Hazard Assessment
4) Risk Characterization

4.1 Problem Formulation

4.1.1 Human Health Conceptual Site Model

The previously identified risk components, namely chemicals detected, site-specific soil characteristics, pathways, and receptors, as well as proposed redevelopment conditions, are combined to synthesize the conceptual site model (CSM) for the HHRA. The CSM is used to direct the quantitative and qualitative assessments to complete the RA. This section describes elements considered in the development of the CSM.

Receptors have been identified under pre- and post-redevelopment situations, independent of the screening of COCs. This is so that the most conservative scenarios for the RA Property are considered and modelled quantitatively, if necessary. Jacobs understands the RA Property will be redeveloped into mixed residential, parkland, and commercial use. Consequently, Jacobs considered residential and commercial development scenarios while identifying receptors and potentially complete exposure pathways. Residential exposures are protective of parkland exposures.

The following onsite receptor types have been identified for the CSM:

- Residents
- Site Visitors
- Indoor Workers
- Construction Workers
- Utility Workers
- Outdoor Workers

Offsite potential receptors include the following:

- Surface Receptors[1]
- Construction Workers
- Utility Workers

[1] Surface Receptors incorporate offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as Residents, Visitors, Outdoor Workers, or Patrons of nearby properties who may be exposed to dust (soil particulates) migrating offsite during the redevelopment of the RA Property in the absence of risk management measure (RMMs).

Onsite Outdoor Worker, Indoor Worker, Site Visitor, and Resident receptors could be exposed to surface soil. Onsite Construction and Utility Workers receptors could be exposed to surface and subsurface soil. Offsite receptors could be exposed to COCs migrating offsite through soil particulate or groundwater migration. Groundwater is not typically accessible to receptors other than Construction and Utility Workers. Section 4.2.1 provides additional details on potential receptors.

Figure 4-1 presents the Human Health CSM that was developed for the RA Property under current and proposed future conditions. It was based on, and is consistent with, information gathered during site investigation activities and visits described in Section 3 and Appendix D. Section 4.2 describes in more detail how the Human Health CSM was developed and used in the HHRA. Figure 4-2 illustrates the Human Health CSM that is relevant after the RMP in Section 7 of this document is implemented.

4.1.2 Contaminant of Concern Screening for Human Health

Chemical screening incorporates elements of toxicity analysis and exposure assessment by selecting screening criteria that have previously been developed through an RA approach. Risk-based screening criteria use toxicity reference values (TRVs) derived by regulatory agencies in Canada and the United States (U.S.). Regulatory agencies use TRVs to back-calculate standards considered protective of various land uses. The risk-based standards also incorporate assumptions regarding the most sensitive receptor characteristic, such as body weight (BW), ingestion rate, and exposure duration (ED) (based on land use). Chemical screening was conducted to focus the number of retained COCs for the quantitative HHRA.

As presented in Section 3.3, Contaminants of Concern, parameters in soil and groundwater were screened against the Ministry of the Environment, Conservation and Parks (MECP's) *Table 6: Generic Site Condition Standards for Shallow Soils in a Potable Groundwater Condition* for Residential/ Parkland/ Institutional/ Industrial/ Commercial/Community property use (Table 6 SCS) (MECP, 2011c) based on detected concentrations and method detection limits (MDLs) (refer to Tables F1-1 and F1-2 in Appendix F). This screening process identified the set of COCs requiring evaluation in both the HHRA and ecological risk assessment (ERA).

The following subsections outline the secondary screening process for human health and identify which COCs were assessed quantitatively or qualitatively.

Estimated Site Maximums. Jacobs used estimated Site maximums to complete the secondary human health screening and risk calculations; the approach was inferred from information provided in the Modified Generic Risk Assessment (MGRA) model spreadsheet (MECP, 2016a; 2016b). The MGRA model spreadsheet accepts an estimated maximum concentration up to 20 percent greater than the measured maximum. The estimated Site maximums were, therefore, derived by applying the greater of the maximum detected concentration, multiplying it by 1.2 and then rounding it down to two significant digits, as appropriate, or by applying the MDL. Jacobs did not apply this calculation to COCs with observed maximum concentrations based on an MDL.

Chemical Fate and Transport. The potential fate and transport of a chemical is characterized, in part, by its physical and chemical properties. Water solubility predicts the amount of a chemical that will dissolve in water. The soil sorption coefficient predicts the ratio of the chemical mass that will adsorb to soil versus the mass that will dissolve in soil pore water. The vapour pressure of a chemical can indicate the likelihood that a chemical will volatilize from its pure compound state; chemicals with high vapour pressures are expected to readily volatilize. The Henry's Law Constant (H) for a chemical indicates the theoretical amount of a chemical that will volatilize from the dissolved water phase to the vapour phase; chemicals with high H (that is, greater than 1×10^{-5} [atmospheres per cubic metre per mol [atm-m^3/mol]) or a high vapour pressure (that is, greater

than 1.0 Torricelli [Torr] [Blok, 2019, pers comm.]) are expected to volatilize. Inorganics were not considered volatile; therefore, they were not retained for the vapour inhalation (VI) pathway. The heavier petroleum hydrocarbons (PHCs) (that is, PHC F3 and PHC F4) were also not considered volatile, and were not retained for the VI pathway. Additional details on the volatility designation of parameters are presented in Appendix F2.

As part of the exposure assessment, these values are examined for each COC to evaluate the potential for migration and to model the movement of COCs from the subsurface to a receptor along a potentially complete exposure pathway. Chemical properties provided in the Rationale Document (MECP, 2011a) were used in this assessment unless otherwise indicated. Jacobs used the chemical properties provided in the Rationale Document (MECP, 2011b) in this assessment, unless otherwise indicated.

Tables 4-1 and 4-2 present the estimated maximum concentrations for soil and groundwater. Section 4.1.2.1 describes the secondary screening process for soil.

4.1.2.1 Soil Screening

Parameters were retained for *quantitative* analysis related to direct contact exposure to soil if the parameter was selected as a COC through the screening process in Section 3.3 and its estimated site maximum concentration is greater than the S1 (direct contact) component values used to derive the Table 2 *Full Depth Generic Site Condition Standards in a Potable Ground Water Condition* for coarse-grained soils and residential/parkland/institutional land use (Table 2 Standard) (Appendix F1, Table F1-3).

Parameters were retained for *quantitative* analysis related to inhalation of dust particulate if the parameter was selected as a COC through the screening process in Section 3.3, and the parameter was retained for direct contact exposure to soil (that is, the estimated maximum concentration is greater than the Table 2 S1 component value) (Appendix F1, Table F1-3).

Jacobs employed a two-step screening process for the selection of parameters to be retained for *quantitative* analysis related to inhalation of volatiles through the soil-to-indoor-air (S-IA) pathway and the soil-to-outdoor-air pathway[2] (including inhalation in a trench). Appendix F2 provides additional details on the volatility designation of the COCs (Appendix F2, Table F2-1) and the screening process applied to soil COCs determined to be volatile (Appendix F2, Table F2-2).

COCs and pathways that were not retained for quantitative assessment were, therefore, retained for qualitative assessment. Refer to Section 4.4.3. Table 4-1 summarizes the pathways to be retained for each COC resulting from the secondary screening. Appendix F1, Table F1-3 and Appendix F2, Table F2-2 provide the detailed screening for non-volatile COCs and volatile COCs, respectively.

4.1.2.2 Groundwater Screening

Parameters were retained for *quantitative* analysis related to direct contact exposure to groundwater (for Construction and Utility Workers) and potable water use for Residents if the parameter was selected as a COC through the screening process in Section 3.3, and its estimated site maximum concentration is greater than the GW1 (direct contact) component value used in the derivation of the Table 2 Standard (MECP, 2011a) (Appendix F1, Table F1-4).

Jacobs employed a two-step screening process for the selection of parameters to be retained for quantitative analysis related to inhalation of volatiles through the groundwater- to-indoor-air (GW) pathway and the groundwater-to-outdoor-air pathway (including inhalation in a trench). Appendix F2 provides additional

[2] Appendix G2 provides the rationale for why the MECP outdoor air (OA) component values were not specifically used in the RA.

details on the volatility designation of the COCs (Appendix F2, Table F2-1) and the screening process applied to groundwater COCs determined to be volatile (Appendix F2, Table F2-2).

COCs and pathways that were not retained for quantitative assessment were, therefore, retained for qualitative assessment. Refer to Section 4.4.3. Table 4-2 summarizes the results of the secondary screening. Appendix F1, Table F1-4 and Appendix F2, Table F2-2 provide the detailed screening for non-volatile COCs and volatile COCs, respectively.

4.1.2.3 Additional Considerations Applicable to the Human Health Risk Assessment

Approach for Polycyclic Aromatic Hydrocarbons

The MECP uses a toxicity equivalence factor (TEF) approach to assess risks related to environmental mixtures of carcinogenic polycyclic aromatic hydrocarbons (PAHs). Jacobs reviewed Canadian Council of Ministers of the Environment (CCME) guidance on PAHs when selecting an approach to assess risks related to environmental mixtures of carcinogenic PAHs (CCME, 2010).The MECP guidance indicates that when it is possible for exposure to a PAH mixture to occur at a site, the combined carcinogenic risk from all PAHs with the same mode of action must be assessed, even if an individual PAH is present at a concentration less than its individual SCS.

The TEF approach to assessing potential carcinogenic risks related to environmental mixtures of PAHs is based on evaluating the relative toxicity of carcinogenic PAHs to benzo(a)pyrene (B(a)P). Table 4-3 presents the TEFs applied in this assessment.

To assess the combined carcinogenic risk from all PAHs at the RA Property, a total toxicity equivalence concentration (Washington Department of Ecology, 2008) or benzo(a)pyrene equivalent (B(a)PE) (Law et al., 2002) must be developed as follows:

$$B(a)PE = \sum(Cn \times TEFn) \qquad (1)$$

Where:

Cn = Concentration of the individual carcinogenic PAH in the mixture (micrograms per gram [µg/g] for soil and micrograms per litre [µg/L] for groundwater)

TEFn = Toxic equivalency factor of the individual carcinogenic PAH in the mixture

For each sample (soil or groundwater) analyzed for PAHs, a B(a)PE value was calculated per Equation (1). Half detection limits were used in the calculation for concentrations that were reported as nondetect. The calculated B(a)PE values were evaluated, and the maximum B(a)PE concentration was retained for use in the RA (Table 4-4). The estimated maximum concentration was applied (maximum result multiplied by 1.2), to produce a B(a)PE for soil of 282 µg/g and a B(a)PE for groundwater of 10.3 µg/L.

As contact with PAHs may occur through the dermal, ingestion, and dust-inhalation pathways, these pathways were evaluated using the B(a)PE. Results for these parameters appear as B(a)PE within the tables and text in Section 4.

Approach for Canadian Council of Ministers of the Environment Petroleum Hydrocarbons

The MECP has adopted the CCME Tier 1 standards for petroleum hydrocarbons (PHCs) in soil (CCME, 2008), and included them in the O. Reg. 153/04 Standards (as amended). Assumptions are available to

estimate appropriate concentrations of CCME subfractions, based on the available gross PHC measurements. For PHCs in soil, the CCME determined proportions for the 14 subfractions considered in the Total PHC Criteria Working Group (TPHCWG) (1997a,b; 1998a,b; 1999) approach within the four CCME fractions, based on published data. Table 4-5 summarizes these proportions, which were applied to the PHC fraction soil sampling results and used to evaluate the associated risk.

For PHC in groundwater, Health Canada has identified proportions for the 14 subfractions within the four CCME fractions in the *Preliminary Quantitative Risk Assessment (PQRA) Guidance Part IV* (Health Canada, 2008). Table 4-6 summarizes these proportions, which were applied to the PHC fraction groundwater sampling results and used to evaluate the associated risk.

Approach for Parameters without Toxicity Data

Human health toxicity data may not be available for all parameters evaluated in the HHRA. Refer to Section 4.4.3.5 for the qualitative assessment of electrical conductivity (EC) and lead, which do not have human health toxicity data.

Approach for Vinyl Chloride in Groundwater

In accordance with the *Rationale Document* (MECP, 2011b), the RA evaluated the potential for chlorinated ethylene concentrations in groundwater to degrade to vinyl chloride (VC). As the MECP guidance document discusses, the anaerobic biodegradation of chlorinated compounds to VC involves a reductive dechlorination step, which is influenced by chemical-specific parameters (that is, solubility) and site-specific geochemical parameters (that is, oxidation-reduction [redox] potential). The following chlorinated parent compounds are known to degrade to VC through reductive dechlorination (MECP, 2011b):

- Trichloroethylene (TCE)
- Tetrachloroethylene (PCE)
- 1,1-Dichloroethylene (1,1-DCE)
- cis-1,2-Dichloroethylene (cis-1,2-DCE)
- trans-1,2-Dichloroethylene (trans-1,2-DCE)

To account for the potential degradation of parent compounds to VC at the RA Property, the maximum concentrations of the parent compounds were summed, and 10 percent of the sum was added to the maximum VC concentration (identified as the greater of the detected concentration and MDL) to produce a potential VC concentration. An estimated maximum VC concentration was also derived by either multiplying the maximum detected VC concentration by 1.2 (if the maximum detected concentration exceeded the MDL), or applying the maximum VC detection limit. The greater of the potential VC concentration and estimated maximum VC concentration was applied as the input value in the risk calculations. Using the greatest VC concentration from these two methods provides a conservative estimate of potential future site-related risks by accounting for the potential degradation of VC parent compounds.

Table 4-7 summarizes concentrations of VC and its parent compounds in groundwater as well as the development of the potential VC concentration and compares this value to the estimated maximum VC concentration. The input value for modelling and risk calculations for the RA Property groundwater used a VC concentration of 990 µg/L, based on the estimated maximum concentration.

Approach for the Presence of Nonaqueous Phase Liquid

Over the course of the Phase Two investigation activities, nonaqueous phase liquid (NAPL) was measured in three locations: OW23S, MW17-108S, and MW18-135S. NAPL has been measured at OW23S (screened from 2.52 and 5.26 metres below ground surface [mbgs]) at thicknesses of 0.005 to 0.97 m in 21

monitoring events between 2010 and 2020. At MW17-108S (screened from 1.93 and 4.98 mbgs), NAPL has been measured at thicknesses of 0.002 and 0.18 m in six monitoring events between 2017 and 2020. At MW18-108S (screened from 4.27 to 5.79 mbgs), NAPL has been measured at thicknesses of 0.02 and 0.93 m in five monitoring events between 2019 and 2020.

The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor and outdoor air). Direct contact exposure to NAPL itself would also be possible if NAPL was present. The MECP SCS and component values considered in the evaluation of soil and groundwater COCs, and the equations applied in the calculations of risk and hazard, assume that NAPL-associated contaminants (such as PHCs; benzene, toluene, ethylbenzene, and xylenes (BTEX); and PAHs) are distributed between the dissolved, vapour, and sorbed phases (that is, three phases are considered). If NAPL is present, an additional fourth phase must be considered. Section 4.4.3.6 qualitatively evaluates the potential risks to human health from NAPL.

4.1.3 Risk Assessment Objectives

The objective of the HHRA is to estimate the potential health risks to human receptors from the COCs identified in RA Property soil and groundwater in the absence of RMMs. The RA Property is currently proposed to be redeveloped into mixed residential, parkland, and commercial use. As such, the HHRA assessed the following receptors:

- Residents
- Site Visitors
- Construction Workers
- Utility Workers
- Outdoor Workers
- Indoor Workers

As detailed in the CSM, the assessment included exposure pathways related to the ingestion of, dermal contact with, and the inhalation of COCs originating from impacts in soil or groundwater.

Risk is assessed both quantitatively and qualitatively. Quantitative risk characterization is conducted to evaluate the noncancer hazard and cancer risk posed by Site COCs to each receptor for identified potentially complete pathways. In some cases, the risk was assessed qualitatively, based on the exposure of certain receptors being protected by quantitative evaluation of a more sensitive receptor, and based on select pathways being demonstrated to be incomplete. The quantified levels of risk were used to determine whether RMMs are required at the Site. Property-specific Standards (PSSs) were also determined as required.

Human health risks and hazards were calculated for the RA Property following a standard RA approach under O. Reg. 153/04. Section 1.1.1 describes the general framework for carrying out the RA.

4.1.3.1 Jacobs Quality Control and Data Quality Objectives

Soil and groundwater sampling was either performed or supervised by Jacobs staff with experience in intrusive field investigation techniques and with the COCs encountered at the Site, under the supervision of a MECP Qualified Person for ESAs (QPESA). Soil and groundwater sampled by Jacobs between 2017 and 2020 were collected according to our standard operating procedures (SOPs), which were developed in accordance with O. Reg 153/04 (MECP, 2011a). The selected analytical laboratories performed the chemical analysis in compliance with the MECP's Laboratory Services Branch *Protocol for Analytical Methods Used in the Assessment of Properties under Past XV.1 of the Environmental Protection Act,* as amended (MECP, 2011d).

In combination with the field QA/QC program, a Jacobs project chemist has completed an evaluation of the laboratory QA/QC program to verify the accuracy, precision, and validity of the data reported by the laboratory. Various elements of the laboratory QA/QC program are used to evaluate the data: blanks are analyzed to detect laboratory contaminations that can cause data to be biased high; laboratory control samples are used to evaluate the laboratory performance; laboratory duplicates are used to measure precision in the laboratory; matrix spikes are used to identify high or low bias caused by matrix interference; and surrogate spikes are used to evaluate the method performance that can cause high or low bias in the data. Evaluation of the laboratory QA/QC program was performed by examining blanks, laboratory control samples, matrix spikes, and surrogate spike samples.

The groundwater and soil analytical data evaluated herein is considered valid. All results can be used to support the project decision making process. Appendix D2 provides additional details on the QA/QC program.

The current database includes soil and groundwater data from past investigations completed by other consultants. As discussed in Section 3.3.2, Jacobs determined that some historical soil data are useful for inclusion in the RA report. Appendix D2 lists the historical reports which were included as part of the Phase Two ESA.

Since the intent is to manage the potential risk associated with soil and groundwater contamination in place by using engineering controls as necessary, Jacobs considers the data collected to be adequate. Uncertainties associated with data quality are not likely to affect the objectives of the RA or the ability of current and future land owners to manage potential risks at the RA Property. Overall, the quality of data used in the RA were considered sufficient to meet the objectives of the HHRA and to be usable for RA decision making.

4.2 Exposure Assessment

The exposure assessment quantifies or estimates the potential exposure to environmental media (for example, groundwater or air) in which humans could possibly have contact with COCs at the RA Property under current and future scenarios. This section also presents the methodology used to estimate exposure concentrations, the equations and models, as well as the exposure assumptions used for the retained exposure pathways.

4.2.1 Receptor Characteristics

For this RA, receptor assumptions have been compiled for human characteristics for use in quantitatively or qualitatively determining the various exposure doses or exposure concentrations. MECP (2011b) or Canadian-specific values were used where available. Other sources of human factor parameters included information generated by the U.S. Environmental Protection Agency (EPA), which Jacobs adopted and used here based on an understanding of similarities between U.S. and Canadian populations. If a piece of information could not be obtained from a credible source, Jacobs assumed a conservative estimate based on professional and scientific judgment. Section 4.2.3, Exposure Estimates, describes the characteristics of each retained receptor by pathway.

The proposed future use of the RA Property is mixed residential, parkland, and commercial. Based on this proposed future use, the receptors included in the HHRA for quantitative and qualitative assessment are presented in Table 4-8.

Where appropriate, Jacobs used a composite human receptor. This means a lifetime of exposure and risk was evaluated based on adjusted age characteristics calculated using a weighted average for each parameter from each of the five life stages summed to derive a composite value.

Individual descriptions for each receptor considered in the HHRA are as follows:

- **Resident** – The Resident is assumed to be an infant, toddler, child, teen, adult, or composite receptor residing within a proposed residential building. The Resident is anticipated to spend the majority of his or her time indoors but would also spend a limited amount of time outdoors within the RA Property. The Resident could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation), to potable groundwater via direct contact (ingestion of drinking water and dermal contact), via the inhalation of indoor air (that is, the migration of volatile COC vapours from soil and groundwater to indoor air), and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air). The Resident is anticipated to be present onsite 24 hours a day, 7 days a week, 50 weeks per year, for 76 years.
- **Site Visitor** – The Site Visitor is assumed to be an infant, toddler, child, teen, adult, or composite receptor visiting the RA Property for residential, parkland, or commercial purposes. The Site Visitor could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation), to potable groundwater via direct contact (ingestion of drinking water and dermal contact), and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air). Site Visitor exposure to Site media is expected to be less than that of the Resident; therefore, exposure and risk to Site Visitors was qualitatively assessed in terms of the results for Residents. Site Visitors are conservatively assumed to be present onsite for a portion of each day, 7 days a week.
- **Construction Worker** – A Construction Worker is considered to be an adult worker conducting excavation activities extending to the water table, such as those that would occur during construction or redevelopment activities. The Construction Worker could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation); to groundwater via direct contact (incidental ingestion and dermal contact[3]); and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater). The Construction Worker is anticipated to be onsite full-time, 5 days a week, for a limited number of years, and would represent a subchronic subsurface worker exposure scenario.
- **Utility Worker** – The Utility Worker is considered to be an adult worker conducting ground-intrusive activities that extend to the water table, such as those that would occur during the maintenance, installation, or repair of subsurface utilities. The Utility Worker could be exposed to soil via direct contact (incidental ingestion, dermal contact, and dust inhalation); to groundwater via direct contact (incidental ingestion and dermal contact[3]); and via the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater). The Utility Worker is anticipated to be onsite full-time for a limited number of days per year, but for a significant number of years (that is, 56 years), thus represents an intermittent subsurface worker exposure scenario. This assumption is consistent with Health Canada (2004) which indicates 2 weeks per year for a construction worker, with the understanding that this receptor represents a utility worker, despite differences in naming convention.

[3] For the subsurface worker scenarios, it is expected that typical construction worker attire will be worn during these construction activities (for example, per O. Reg. 213/91, as amended [MOL, 1991]). With regards to groundwater contact, it is expected that typical construction activities, such as dewatering, will be performed (for example, per O. Reg. 213/91, as amended [MOL, 1991] which states that, "every excavation that a worker may be required to enter shall be kept reasonably free of water"). Given the use of dewatering techniques at construction sites (regardless of whether they are brownfields or not), which limits the presence of groundwater in construction areas, typical construction worker activities do not lead to extensive skin wetting. These typical construction activities are not considered risk management measures, as they are required by the Province of Ontario on every construction site, regardless of whether contamination is present or not.

- **Outdoor Worker** – The Outdoor Worker is considered to be an adult working primarily outdoors at the RA property to maintain landscaped areas. The Outdoor Worker could be exposed to soil by direct contact (incidental ingestion, dermal contact, and dust inhalation) and via the inhalation of vapours (COC vapour emissions from soil and groundwater) in outdoor air. As the average depth to groundwater (2.70 mbgs) is deeper than 1 mbgs, it is not expected that the Outdoor Worker would come into contact with groundwater during planting activities. The Outdoor Worker is conservatively anticipated to be onsite full-time (9.8 hours per day), 5 days a week, 39 weeks per year, for 56 years to tend to ornamental gardens and perform periodic landscape installations and grounds maintenance.
- **Indoor Worker** - The Indoor Worker is considered to be an adult working indoors within a future generic commercial building, with a limited amount of time spent outdoors. The Indoor Worker could be exposed to Site COCs via the inhalation of indoor air (migration of volatile COC vapours from soil and groundwater to indoor air). Exposures also considered include the inhalation of vapours in outdoor air (COC vapour emissions from soil and groundwater to outdoor air) and direct contact with Site soil (incidental ingestion and dermal contact). However, Jacobs notes that an Outdoor Worker would have greater exposure than the Indoor Worker to inhalation of vapours in outdoor air and direct contact with soil. Therefore, the risk to the Indoor Worker will be qualitatively assessed for these latter two pathways in the context of the Outdoor Worker. The Indoor Worker is anticipated to be onsite full-time (9.8 hours indoors per day), 5 days a week, 50 weeks per year, for 56 years.
- **Offsite Surface Receptors** – This receptor group incorporates offsite surface receptors (that is, receptors not engaged in subsurface excavation activities), such as Indoor Workers, Outdoor Workers, Site Visitors, Residents, patrons of nearby properties, or a combination thereof. Properties adjacent to the RA Property are generally used for industrial and commercial purposes. Approximately four residential properties are located to the west of the RA Property (cross-gradient), across Stevenson Street South. The Offsite Surface Receptors may be exposed to dust (soil particulates) migrating offsite during potential construction activities at the Site in the absence of RMMs. The movement of COCs offsite with groundwater flow may also contribute to a complete VI pathway (both indoors and outdoors) for offsite receptors. Offsite Outdoor Workers, Indoor Workers, Residents, or patrons of nearby properties are anticipated to be present offsite for the same amount of time as the corresponding onsite receptors. Therefore, exposure and risk to these offsite receptors are expected to be less than that of similar onsite receptors. These receptors were qualitatively assessed in terms of onsite Outdoor Workers, Indoor Workers, and Residents. These receptors were qualitatively assessed for the potential for risk from offsite migration of COCs.
- **Offsite Construction and Utility Worker** – This receptor group incorporates Construction and Utility Workers engaged in excavation activities downgradient of the RA Property that may be exposed to groundwater that has migrated offsite from the RA Property. Exposure and risk to these offsite receptors is anticipated to be less than that of similar onsite receptors; therefore, these receptors were qualitatively assessed in terms of the onsite results for Construction and Utility Workers.

Tables 4-9, 4-10, 4-11, and 4-12 present specific receptor assumptions (for example, BW, skin surface area, and ED) for receptors requiring quantitative assessment.

A Pregnant Female receptor was also included in the RA for quantitative assessment of risk related to COCs with developmental effects. For the direct contact pathways, this receptor is used in each quantitatively assessed exposure scenario that does not include a toddler (for example, Indoor Worker, Outdoor Worker, Construction Worker, and Utility Worker). The calculations for pregnant female receptors assume continuous exposure without prorating for exposure frequency (EF) or ED because an exposure limit may be exceeded during any one of many critical developmental periods during pregnancy. The exposure estimates for the Pregnant Female Worker or Pregnant Female Resident for each scenario were

then appropriately carried through for risk evaluation for COCs where Section 4.3.2.1 identifies potential developmental effects.

4.2.2 Pathway Analysis

A complete exposure pathway must exist for risk to be present at a site. An exposure pathway is the means by which a receptor may make contact with a COC from a site. A complete exposure pathway has the following five elements:

1) A source of chemical released to the environment (for example, PHC to soil)
2) A mechanism for release of the source (for example, volatilization of vapours)
3) An environmental transport medium (for example, air)
4) An exposure point (for example, a workplace)
5) A feasible route of exposure (for example, inhalation)

Exposure may occur when environmental media containing chemicals migrate or are physically moved from the site to an exposure point, such as a location where receptors can make contact with chemicals in environmental media. It may also take place when a receptor makes direct contact with the source material containing the COCs. An exposure pathway is complete (that is, there is exposure) if a receptor takes in chemical constituents through ingestion, inhalation, or dermal absorption (contact with the skin).

Direct contact with contaminants occurs when receptors make direct contact with the medium that contains the contaminants (for example, placing hands in water or touching soil with hands). Indirect contact with the contaminants occurs when the contaminants are transported from their presently identified location to a receptor through a variety of mechanisms (for example, the inhalation of indoor vapours originating from soil or groundwater).

This section discusses possible pathways of exposure to COCs by receptors on and off the RA Property. Incomplete or implausible pathways where there can be no exposure are not retained for the RA. Table 4-13 and Section 4.2.2.1 present the rationale for retaining or eliminating these pathways.

The potential soil and groundwater exposure pathways have been evaluated based on current Site conditions and considering future Site conditions following redevelopment.

4.2.2.1 Site-specific Pathway Analysis Summary

Table 4-13 presents the pathway analysis for the HHRA. Based on the Site characterization and chemistry, the current and proposed land use, and the anticipated receptors on the RA Property, Jacobs quantitively assessed the following exposure pathways and receptors:

- Ingestion and dermal contact with soil and groundwater
- Inhalation of volatiles in indoor air (derived from soil and groundwater)
- Inhalation of volatiles in outdoor air (derived from soil and groundwater)
- Inhalation of particulates (dust derived from soil) in outdoor air

Jacobs performed risk calculations for the maximally exposed receptor and pathway scenarios, as indicated in the Rationale column of Table 4-13. Jacobs qualitatively evaluated potential risks to receptors and pathways not specifically modelled from the maximally exposed quantitative results.

The following paragraphs discuss the pathways that are complete but were not quantitatively assessed.

Direct Contact Exposure—Vapour Skin Contact

Dermal exposure to vapours may be a significant pathway of exposure to chemicals in some cases; however, this pathway was not assessed in the HHRA because of the uncertainties associated with the numerous assumptions required to quantify the exposure. For example, the equations available for quantifying dermal absorption of chemical vapours are typically simplistic (and often inaccurate), as they do not account for variability of skin penetration, variability of skin exposure, temperature and humidity, and evaporation from skin following deposition onto skin. As such, while dermal exposure to vapours is a potentially complete pathway at the RA Property, given the uncertainty associated with the quantification of this pathway and the general belief that it does not contribute greatly to a receptor's overall exposure and body burden unless he or she is wearing a respirator (which is not anticipated at the RA Property), this pathway is not quantitatively evaluated. A qualitative assessment of the dermal exposure to vapours pathway is presented in Section 4.4.3.3.

Non-Aqueous Phase Liquid Exposure

As discussed in Section 4.1.2.3, NAPL has been identified at the RA Property, and there is potential for it to remain following redevelopment. The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor and outdoor air). Direct contact exposure to NAPL itself would also be possible where NAPL is present. Section 4.4.3.6, discusses the qualitative assessment of NAPL at the RA Property.

Ingestion Exposure— Home Grown Garden Produce

The ingestion of home-grown garden produce may be a significant pathway of exposure to chemicals in some cases; however, this pathway was not quantitatively assessed in the HHRA because of the uncertainties associated with the numerous assumptions required to quantify the exposure. For example, there is a significant amount of uncertainty associated with the uptake of certain soil COCs into the edible portions of plants. In addition, factors such as the potential yield of an urban garden, the amount and type of produce consumed, and the effects of various methods of food preparation are difficult to quantify. While it is not anticipated that a significant portion of a Resident's normal diet would be derived from home garden produce, potential risks can be mitigated by implementing the use of RMMs that limit or prohibit gardens that produce fruits and vegetables for consumption, or by requiring that home gardens only be grown in containerized plots or aboveground containers. Therefore, this pathway is not quantitatively evaluated. A qualitative assessment of this pathway is presented in Section 4.4.3.7.

Qualitative Assessment of Inhalation of Soil Particulates that are Ingested

Exposure from COCs in soil can occur from inhalation via two primary routes of exposure. Smaller particulates (less than or equal to PM_{10}) may be inhaled into the lungs and larger particulates (greater than PM_{10} and less than PM_{30}) may be trapped in the upper respiratory tract and subsequently swallowed and ingested (MassDEP, 2008). The portion of this pathway where particulates reach the lungs has been quantitatively assessed in Section 4.4.3.8. However, the particulate ingestion portion is considered negligible relative to the ingestion exposure experienced by a receptor via the conventional incidental ingestion of soil pathway (refer to Section 4.4.2.4). Exposure from particulate ingestion may be a significant pathway of exposure to chemicals in some cases; however, for typical construction projects using MECP default assumptions (as is the case for this RA), the exposure and risk from this pathway is negligible. Therefore, this pathway was not quantitatively assessed. A qualitative assessment of this pathway is presented in Section 4.4.3.8.

4.2.3 Exposure Estimates

This section summarizes the methodology and exposure factors used to estimate dose concentration. Exposure estimates were calculated for the human health exposure pathways that were retained through the screening process. Daily intake (DI) and daily uptake (DU) are defined as the product of chemical concentration in the source material, multiplied by the amount of intake or uptake (or source material the body contacts or adsorbs), respectively.

$$Dose = Chemical\ Concentration \bullet Intake\ (or\ uptake) \quad (2)$$

Intake is generally used to describe administered doses (ingestion and inhalation), while uptake refers to absorbed doses (dermal).

Eight basic factors are used to estimate intake (or uptake):

1) C = Chemical concentration (milligrams per kilogram [mg/kg], µg/g, milligrams per litre [mg/L], milligrams per cubic metre [mg/m^3], or micrograms per cubic metre [µg/m^3])
2) CR = Contact rate; the amount of contaminated medium contacted (milligrams [mg], litres [L], or cubic centimetres [cm^3] per hour or day)
3) ET = Exposure time (hours per day) for *continuous* exposures (that is, inhalation)
4) EF = Exposure frequency (days per week, weeks per year)
5) ED = Exposure duration (total years)
6) BW = Body weight
7) AT = Averaging time (associated with the period of exposure and effects)
8) RAF = Relative absorption factor

Daily absorbed or administered dose (DAD) can be described by the following general equation:

$$DAD = \frac{C * CR * ET * EF1 * EF2 * ED * RAF}{BW * AT} \quad (3)$$

In this assessment, intake (or uptake) is normalized for time and BW, and is expressed in milligrams of chemical per kilogram of BW per day (mg/kg/d). This calculation has been completed for all exposure routes except inhalation, according to the MECP (2011b) (after [EPA, 2009]).

The chemical concentration (C) used for each exposure route was determined and discussed in previous sections. The CR for each exposure point is discussed in Sections 4.2.3.2 through 4.2.3.6.

Appendix G1 provides sample calculations for the exposure estimates referenced in this section. Calculations were performed using Microsoft Excel.

4.2.3.1 Dose Estimation for Carcinogens and Noncarcinogenic Effects

The intake of a chemical evaluated for carcinogenic health effects is averaged over an entire lifespan (that is, lifetime average chemical intake) of 56 years for workers. For carcinogens, the lifespan in years is referred to as the AT. The selection of an AT that spans a lifetime is based on EPA guidance (1989): *"The approach for carcinogens is based on the assumption that a high dose received over a short period of time is equivalent to a corresponding low dose spread over a lifetime."*

Typically, EPA recommends 70 years for residents as the AT for carcinogens; however, Health Canada recommends 75 years (Health Canada, 2010). The MECP has used 76 years to account for ages 0 to 75, inclusive, for lifetime exposure of residents (MECP, 2011b); as such this value was applied in this RA for Recreational Users. The MECP has used 56 years to account for ages 20 to 75, inclusive, for lifetime exposure of adult workers (MECP, 2011b); this value was applied in this RA for those receptors. For carcinogens:

$$AT = 56 \text{ years} \times 365 \text{ days/year} \quad (4)$$

The intake of chemicals evaluated for noncarcinogenic health effects uses an AT based on the estimated period of exposure for any given exposure setting.

For noncarcinogens:

$$AT = ED \times 365 \text{ days/year} \quad (5)$$

The noncarcinogenic risk is evaluated for a target receptor (the group within a potentially exposed population with the greatest potential exposure; that is, the group that receives the greatest intake).

Table 4-9 presents general receptor characteristics, such as BW, ED, and ATs. These inputs are also used in the specific equations that estimate dose for dermal, ingestion, and inhalation pathways, which are described in the following sections.

4.2.3.2 Dermal Uptake

Soil

A receptor's average uptake of COCs through dermal contact with soil, or DAD, is estimated using the following equation (based on MECP, 2011b):

$$DAD = \frac{C * DAF * SAF * ESSA * CF * EF1 * EF2 * ED}{BW * AT} \quad (6)$$

Where:

DAD = Daily absorbed or administered dose via dermal contact (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

SAF = Soil adherence factor (mg per square centimetre [cm^2] per day)

DAF = Dermal absorption factor (unitless)

ESSA = Exposed skin surface area (cm^2)

CF = Conversion factor (10^{-6} kilograms per milligram [kg/mg])

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kilograms [kg])

AT = Averaging time (days)

This calculation of DAD via dermal contact assumes one soil contact event per day. Table 4-10 summarizes the values used to estimate the daily dermal uptake from soil.

Groundwater

A receptor's average uptake of COCs through dermal contact with groundwater is estimated using the following equation (based on EPA, 2004):

$$DAD = \frac{DA_{event} * FE * ESSA * EF1 * EF2 * ED}{BW * AT} \quad (7)$$

Where:

DAD = Daily absorbed or administered dose (mg/kg/d)

DA_{event} = Absorbed dose per event (mg/cm^2/event); the equations applied in the derivation of DA_{event} are presented in Appendix G1

FE = Frequency of events (event per day)

ESSA = Exposed skin surface area (cm^2)

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency (weeks per year)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

The value of DA_{event} depends on the physical and chemical properties of the chemical being assessed (for example, dermal permeability factors, organic or inorganic chemical), event duration, concentration of the chemical in groundwater, and other factors. A discussion of the details for modelling exposure from this route can be found in the EPA's final *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment)* (RAGS E) (EPA, 2004). This model estimates the rate of migration of a chemical through a receptor's skin during contact with impacted groundwater. Dermal permeability values (K_p), derived from either experimentally measured or predicted values, are used together with Site-specific receptor exposure characteristics to estimate exposure.

The potential for Construction or Utility Workers to make contact with contaminated groundwater is low, since typical construction methods (that is, dewatering) restrict prolonged contact with groundwater that may be present onsite. Exposure assumptions for Construction and Utility Worker contact with groundwater are included in Table 4-10.

Relative Absorption Factors

Relative absorption factors (RAFs) were used in this assessment. The terms dermal absorption factor (DAF) and gastrointestinal absorption factor (GIAF) are used in this assessment for dermal and ingestion exposures, respectively. The values are consistent with the values used by the MECP in the development of the 2011 Standards (MECP, 2011b) or in EPA RAGS E (2004), if a MECP value was not available. If a suitable RAF value for a COC could not be determined, absorption was assumed to be the same as that in the TRVs critical study (that is, 100 percent or an RAF of 1.0). Table 4-14 presents the RAFs used in the assessment.

Dermal Exposure Estimates

Tables 4-15 and 4-16a/b show the predicted dermal exposures to soil and groundwater (potable and subsurface contact), respectively.

4.2.3.3 Ingestion

Soil

A receptor's average uptake of COCs through incidental ingestion of soil is estimated using the following equation (MECP, 2011b; EPA, 1989):

$$DAD = \frac{C * IR_S * GIAF * CF * EF1 * EF2 * ED}{BW * AT} \quad (8)$$

Where:

DAD = Daily absorbed or administered dose via incidental ingestion (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

IR_S = Quantity of soil ingested daily (milligrams per day [mg/d])

GIAF = Gastrointestinal absorption factor (unitless)

CF = Conversion factor (10^{-6} kg/mg)

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Table 4-14 summarizes the GIAFs used to estimate the ingestion intake from soil.

Groundwater

A receptor's average uptake of COCs through incidental ingestion of groundwater is estimated using the following equation (MECP, 2011b; EPA, 1989):

$$DAD = \frac{C * IR_W * GIAF * FE * CF * EF1 * EF2 * ED}{BW * AT} \quad (9)$$

Where:

DAD = Daily absorbed or administered dose (mg/kg/d)

C = Chemical concentration in groundwater (µg/L)

IRW = Quantity of groundwater ingested daily (L per event)

GIAF = Gastrointestinal absorption factor (unitless)

FE = Frequency of events (events per day)

CF = Conversion factor (0.001 milligram per microgram [mg/µg])

*EF*1 = Exposure frequency (weeks per year)

*EF*2 = Exposure frequency (days per week)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (days)

Table 4-14 summarizes the GIAFs used to estimate the ingestion intake from groundwater (Construction and Utility Workers only). Table 4-11 shows the exposure assumptions for ingestion exposure.

Ingestion Exposure Estimates

Tables 4-17 and 4-18a/b present the predicted exposure from ingestion for soil and groundwater (potable and subsurface contact), respectively.

4.2.3.4 Inhalation

Particulate

The exposure pathway related to the inhalation of fugitive dust derived from soil was evaluated to determine the need, if any, for dust control measures during future construction activities. This evaluation is also protective of exposure during current conditions in the absence of RMMs (that is, no paving or grass covers). The following equation was used to estimate exposure from dust inhalation (MECP, 2011b; Health Canada, 2010a):

$$DAD = \frac{C * PM_{10} * CF * IR_A * FPM_{inh} * EF1 * EF2 * EF3 * ED}{BW * AT} \quad (10)$$

Where:
DAD = Daily adsorbed or administered dose (mg/kg/d)

C = Chemical concentration in soil (mg/kg)

PM_{10} = Particulate concentration in air (µg-soil/m^3)

CF = Conversion factor, 1 kg/10^9 µg

IR_A = Inhalation rate (cubic metres per hour [m^3/hr])

FPM_{inh} = Fraction of particulate matter smaller than 10 microns in diameter (PM10) (unitless); MECP default value of 0.6 is applied herein

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency (weeks per year)

*EF*3 = Exposure frequency (hours per day)

ED = Exposure duration (years)

BW = Body weight (kg)

AT = Averaging time (lifetime or ED in years × 365 days per year)

As discussed in Section 4.1.2.1, the COCs in soil identified for quantitative assessment (that is, estimated maximum concentrations were greater than the MECP S1 component value) have been considered COCs for dust modelling in the HHRA.

Table 4-12 summarizes the receptors, receptor characteristics, and exposure assumptions used to model the dust inhalation pathway. Table 4-19 presents the predicted exposure from dust inhalation for the retained receptors.

Volatiles

For inhalation exposures, the amount of the chemical that reaches the target site is not a simple function of the inhalation rate and BW; therefore, intake equations developed based on these parameters are not recommended for estimating exposures to inhaled contaminants. Instead, an exposure concentration is calculated. The following equation was used to estimate exposure from inhalation of volatiles (MECP, 2011b; EPA, 2009):

$$EC = \frac{(C_{air} * EF1 * EF2 * EF3 * ED)}{AT} \quad (11)$$

Where:

EC = Exposure concentration (mg/m^3)

C_{air} = Volatile contaminant concentration in indoor or outdoor air (mg/m^3); this concentration is obtained through modelling, as described in Section 4.2.3.5 (indoor air) and Section 4.2.3.6 (outdoor air), and Appendixes G2 and G3

*EF*1 = Exposure frequency (days per week)

*EF*2 = Exposure frequency to indoor or outdoor air (weeks per year)

*EF*3 = Exposure frequency (hours per day)

ED = Exposure duration (years)

AT = Averaging time (hours)

The exposure concentration is then compared with the appropriate TRV to determine the level of risk.

Table 4-9 presents general receptor characteristics, such as exposure frequencies, EDs, and ATs, applied to the estimate of volatile COCs dose through the inhalation of indoor or outdoor air for all relevant receptors.

4.2.3.5 Soil and Groundwater to Indoor Air

The RA Property is anticipated to be redeveloped as mixed residential, parkland, and commercial. The Site currently consists of vacant land and all onsite buildings have been razed, with concrete floor slabs still in place. Future building plans for the property are unknown. Based on this information, indoor air exposure was modelled for generic residential and commercial building scenarios. For the residential building scenario, Residents are the maximally exposed receptors and for the residential building scenario, Indoor Workers represent the maximally exposed receptor to indoor air for the commercial building scenario. If exposure is determined to be acceptable, then all other receptors listed in Table 4-13 are considered protected. The onsite Site Visitor, Construction and Utility Workers were not retained for quantitative evaluation in this exposure assessment as it is not expected they would be exposed for any extended period within finished buildings.

Modelled Conditions

In September 1998, EPA developed a series of models to estimate indoor air concentrations and associated health risks from subsurface VI into buildings. These models were based on the analytical solutions of Johnson and Ettinger (J&E) (1991) for contaminant partitioning and subsurface vapour transport into buildings, and were updated in 2004.

For groundwater to indoor air evaluations, the depth to groundwater is used to determine whether the J&E model will be applied to calculate the Site-specific attenuation factor. The presence of contaminated groundwater less than 1.0 m away from a building's foundation precludes the use of the J&E Model for modelling VI from COCs in groundwater. In these cases, estimated indoor air concentrations are developed by applying the MECP's empirically derived attenuation values of 0.02 for a residential scenario and 0.004 for a commercial scenario (MECP, 2011b). Because groundwater elevations can fluctuate from spring to winter, the minimum depth to groundwater was used to account for seasonal variations in the water table to determine whether the MECP default attenuation factor or the J&E Model would be used for concentration calculations.

The calculated separation distance (refer to Table G2-2 in Appendix G2) between the foundation and the minimum depth to groundwater indicates the foundation is less than 1 m above the minimum depth to the water table for slab-on-grade foundations. Based on this, estimated indoor air concentrations for the groundwater-to-indoor-air pathway were derived using the MECP default residential and commercial attenuation factors for the generic residential and commercial building scenarios. J&E-modelled attenuation factors were used for the soil-to-indoor-air pathway for the identified building scenarios.

Appendix G2 presents the J&E input parameter table, as well as DATENTER and INTERCALCS worksheets from this assessment.

Indoor Air Vapour Estimates

Table 4-20 presents the predicted indoor air vapour concentrations from soil and groundwater for the generic residential and generic commercial scenarios.

Soil and groundwater–indoor air modelling was completed for the following scenarios:

- Generic Residential building
- Generic Commercial building

Estimated indoor air concentrations were developed through a two-step process. First, volatile partitioning relationships were applied to soil and groundwater data to produce estimated soil gas concentrations at the source. Second, MECP default and J&E-derived attenuation factors were applied to the soil gas concentrations to estimate indoor air concentrations.

These concentrations were used to derive an exposure concentration for each applicable receptor to be compared with the reference concentration (RfC) or unit risk (UR) (if the parameter was a carcinogen, see Section 4.3, Toxicity Assessment).

Spreadsheets indicating the development of the indoor air concentrations for the generic residential and commercial building scenarios are presented in Appendix G2. Calculations were performed using Microsoft Excel.

Tables 4-21a and 4-21b present the predicted exposure of receptors to COCs through the soil-to-indoor-air pathway for the generic commercial and residential building scenarios, respectively. Tables 4-22a and 4-22b

present the predicted exposure of receptors to COCs through the groundwater-to-indoor-air pathway for the commercial and residential building scenarios, respectively.

4.2.3.6 Soil and Groundwater to Outdoor Air Pathway (All Receptors)

Estimating exposure via this pathway involves calculating the predicted concentration of COCs in outdoor air because of the migration of vapours from subsurface soil layers and from groundwater through unsaturated soil into receptors' breathing spaces. The model described by Sanders and Stern (1994) was used to calculate the flux or emission rate of each individual COC at the boundary between the surface of the soil and ambient air. A box model (EPA, 1989) was then employed as a conservative dispersion model to calculate air concentrations of each predicted COC emission from the soil surface. Appendix G3 presents the model specifics, equations, and calculations used to estimate outdoor air concentrations.

For Construction and Utility Workers, it was assumed that the "box" could also be an excavated trench located within the subsurface. The enclosed nature of an excavated trench leads to decreased air exchange and increased soil surface area for fluxing; thus, results in increased potential exposure to subsurface volatiles via inhalation.

The RA Property is expected to undergo redevelopment in the future. The planned presence of paving and other surface materials will restrict the flow of soil gases and the migration of vapours, as concrete materials are much less porous than soil. However, for this exposure modelling, the presence of surface covers was conservatively ignored.

This assessment also employed the following conservative assumptions:

1) The degradation of COCs in the soil vadose zone was not considered if half-lives were not available.
2) The bulk water flow and infiltration of precipitation were ignored, as both of these would tend to retard the migration of vapours upward; therefore, would predict lesser concentrations.

Using the phase partitioning methods described in *Rationale for the Development and Application of Generic Soil, Groundwater and Sediment Criteria for Use at Contaminated Sites in Ontario* (MECP, 1996), COCs in groundwater were used to derive a "total" concentration, including:

- Concentration of a substance in soil gas phase (air)
- Soil water phase (dissolved)
- Soil particle phase (absorbed)

For this assessment, the predicted total concentration in soil based on the groundwater concentration was compared to the estimated maximum concentration in soil, and the greater of these two concentrations was applied to model volatilization to outdoor air. Tables 4-1 and 4-2 summarize the estimated maximum concentrations of volatile COCs in soil and groundwater, respectively.

Table 4-23 shows the predicted outdoor air concentrations (at ground surface and in a trench) determined as a result of the outdoor air calculations.

The receptors identified may be exposed to COCs volatilizing from soil and groundwater into outdoor air. Residents and Outdoor Workers are only exposed at the surface, whereas Construction Workers and Utility Workers would be maximally exposed in an excavation. The estimated dose for each receptor was calculated based on receptor characteristics and was compared with the RfC or UR (if the parameter was a carcinogen, see Section 4.3, Toxicity Assessment), which implies exposure at that concentration would be continuous over the receptors' lifetime (that is, 24 hours a day, 7 days a week, 52 weeks a year for a lifetime).

Table 4-24 presents the predicted exposure to subsurface volatiles in outdoor air for Residents and Workers above ground surface. Table 4-25 presents the predicted exposure to subsurface volatiles in outdoor air for Construction Workers and Utility Workers during time spent in a trench.

4.2.3.7 Exposure Estimates for Pregnant Adult Female Receptor

To assess the potential risk of exposure to developmental toxicants, an adult female receptor was assumed to be exposed continuously, to estimate exposure during Resident, Construction, Outdoor, and Utility[4]; and Indoor Worker scenarios.

The RA identified the following COCs as developmental toxicants:

- Lead
- B[a]P
- TCE
- Vanadium

4.2.4 Uncertainties—Exposure Assessment

Uncertainty exists in the RA's exposure assessment. Onsite receptors were hypothesized and activities assumed to result in exposures. Taken together, Jacobs developed the assumptions to be conservative and likely overestimate the potential exposure and risk:

- The screening process for volatility (Appendix F2) assumes that a chemical is volatile if the H is greater than 1×10^{-5} atm-m^3/mol or the vapour pressure is greater than 1.0 Torricelli (MECP, 2019). Slightly differing definitions of what constitutes a volatile chemical are available. Even if alternate screening criteria were applied and additional parameters identified as volatile, it is not expected to alter the conclusions of the RA.
- Exposure duration and frequencies for workers were assumed to occur on a regular and long-term basis, despite the reasonable potential that receptors may relocate, may change employment and job descriptions, and are unlikely to contact chemicals on a routine basis. The conservative way receptors have been identified and activities evaluated indicates uncertainties in the exposure assessment most likely allow for an overestimate of exposure, which will lead to an overestimation of risk.
- Exposure duration and frequency of exposure for Residents were assumed to occur on a regular and long-term basis (assumed the person would reside on the RA Property approximately 24 hours per day, 7 days per week, 50 weeks per year for a lifetime), despite the reasonable potential that receptors may move during their lifetime. The conservative way receptors have been identified and activities evaluated indicates uncertainties in the exposure assessment most likely allow for an overestimate of exposure, which will lead to an overestimation of risk.
- The exposure assessment section also defines the concentrations to which potential receptors may be exposed. Within the RA Property boundaries, vapour concentrations have been estimated using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which exposures might occur. This conservative approach likely results in an overestimate of exposure and associated risk to certain receptors. These assumptions impart uncertainty to the RA but are purposely developed to verify that the RA conclusions are, indeed, conservative and protective of human health. Though the use of some assumptions may result

[4] The exposure assumptions for the Pregnant Female Construction, Outdoor, and Utility Worker are identical for all scenarios except dust inhalation; and the TRVs do not differ for the developmental toxicants identified in this RA (that is, the identified chronic and subchronic TRVs are the same). Therefore, these three receptors have been combined into one column in the exposure and risk tables as "Female Construction, Outdoor, or Utility Worker", where appropriate.

in lowering exposure and risk, the net effect of these uncertainties is that risk to potential receptors has likely been overestimated.

- In the assessment of indoor air, the use of soil concentrations and partitioning calculations to determine soil gas concentrations is not generally accepted for use in evaluating VI because there is a great degree of uncertainty associated with the soil partitioning results (EPA, 2002b), which could lead to over- or underestimating risk.
- Potential vapour concentrations in outdoor air were modelled assuming that receptors were chronically occupying the area of the RA property with the estimated maximum soil and groundwater concentrations. This assumption is conservative; therefore, the predicted exposure to COCs through outdoor air inhalation has likely been overestimated, which will lead to an overestimation of risk.
- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas onsite and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their ED; therefore, the predicted exposure and risks have likely been overestimated.
- Potential vapour concentrations inside future RA Property buildings were modelled assuming the buildings are occupied and lie directly over the estimated maximum soil and groundwater concentrations detected at the RA Property (only for volatile COCs). This assumption is conservative; therefore, the predicted exposure to COCs through indoor air inhalation has likely been overestimated, which will lead to an overestimation of risk.
- The selected incidental ingestion rates for soil and groundwater may be different than the experimental basis used to develop them (for example, Construction and Utility Worker incidental ingestion of groundwater is based on exposure while swimming and nonincidental contact while working). Changes in ingestion rate would increase or decrease the predicted exposure and risk.
- The daily dermal events and ingestion exposures were hypothesized to have occurred on the RA Property. Some receptors may spend more time in a day not at the RA Property; therefore, these exposures from soil and groundwater have likely been overestimated. This will lead to an overestimation of risk.
- The assessment of exposure to PHC fraction (F)1, F2, F3, and F4 in soil and groundwater was conducted through application of subfraction proportions outlined in *Canada-Wide Standard for Petroleum Hydrocarbons (PHC) in Soil* (CCME, 2008) and *Federal Contaminated Site Risk Assessment in Canada, Part IV* (Health Canada, 2008). These proportions were specifically developed for soil and groundwater; however, Site-specific subfractions proportions may be different. The application of these proportions in the assessment of exposure to PHC in soil and groundwater adds uncertainty to the assessment and could lead to an overestimation or underestimation of exposure and risk to any subfraction grouping.
- The toxicity, mobility, and bioavailability of metals and metalloids in soil generally depend on several soil factors, including the following: pH, redox potential, iron and manganese content, and calcium carbonate content. Interactions between these soil factors can increase or decrease the toxicity, mobility, and bioavailability of these chemicals; however, the extent of the effects is unknown.
- The biodegradation of parent compounds to VC in groundwater is affected by site-specific geochemical parameters (redox potential, pH, and such), microbial activity, and chemical-specific parameters. These parameters can increase or decrease the biodegradation of chlorinated ethylenes to VC. Therefore, adding 10 percent of the parent compounds' maximum concentrations to the maximum VC concentrations may over- or underestimate the exposure to, and risks from, VC at the RA Property.

- The calculation of B(a)PE did not include contributions from methylnaphthalene 2- (1-), naphthalene, or others. Although some evidence of carcinogenicity has been identified for these parameters, it has not been confirmed in all cases, or for all routes of exposure. Accepted TEFs have not been established for these parameters. The exclusion of these parameters from the B(a)PE calculation could lead to an underestimation of exposure to B(a)PE.
- The uptake of vapours through skin was not assessed quantitatively and was considered negligible, compared with exposure of vapours through inhalation. The exclusion of this pathway could lead to an underestimation of exposure and risk.
- Lead was identified as a developmental toxicant for direct contact exposures, but was not assessed quantitatively via the Pregnant Female receptor. The exclusion of this toxicant-receptor scenario could lead to an underestimation of exposure and risk for developmental effects.
- The exposure assessment assumes worker exposure to groundwater would be limited to the hands, since dewatering is a typical construction practice that limits the presence of groundwater in construction areas. Additional body parts, such as forearms, may occasionally be exposed to groundwater, if accidental splashing were to occur. This scenario would increase the potential exposure area; however, an increase in the exposure area is unlikely.
- The Utility Worker receptor represents a worker who would be involved in the maintenance, installation, or repair of subsurface utilities or tunnels at the RA Property. As such, the Utility Worker is anticipated to be onsite full-time for only a limited number of days per year (assumed to be 2 weeks), but could return to the RA Property each year for additional work. The assumption of 2 weeks per year could over- or underestimate exposure in the short-term, but is unlikely to significantly underestimate risk in the long-term.
- The J&E modelling assumes an infinite source and does not account for the degradation of or removal processes for constituents, potentially significantly overestimating indoor air concentrations for soil.

4.3 Toxicity Assessment

This section describes the types of adverse effects a substance can cause following different routes of exposure (for example, ingestion, inhalation, or dermal), and the nature and severity of such effects associated with various levels of exposure, where increased exposure leads to increased risk of adverse effect (that is, dose-response relationship).

4.3.1 Nature of Toxicity (Hazard Assessment)

Two broad categories of adverse effects are considered: (1) threshold effects and (2) nonthreshold effects. For the threshold effect category, a substance is not expected to cause risk of an adverse effect at less than a certain dose (that is, the threshold dose). For nonthreshold effects, it is assumed that a substance may cause an adverse effect at any dose greater than zero. The former category is usually associated with noncancer effects, and the latter category is generally associated with cancer effects.

Chemicals assumed to exhibit threshold-type dose-response relationships exhibit a no-observed-adverse-effect level (NOAEL). At less than this threshold of exposure, the risk of adverse effect is essentially zero. This threshold is the basis for a TRV called a reference dose (RfD), which incorporates the use of safety factors, uncertainty factors (UFs), modifying factors, or a combination thereof. The magnitude of a factor depends on the confidence in the data and study used to derive the NOAEL and to account for inter- and intraspecies differences, EDs, and overall data quality of available data and information. The factors can easily span several orders of magnitude. The analogous exposure limit for airborne chemicals is called an RfC.

Chemicals that exhibit a nonthreshold-type dose-response are assumed to have no adverse effect only when the exposure or dose is zero. This dose-response model is generally applied to genotoxics (affects genetic material in biological cells) and carcinogens (causes cancer). Mathematical modelling is usually required to extrapolate cancer risk from animal studies to hypothetical human exposures. For chemicals that exhibit nonthreshold-type hazards, slope factors (SFs) and URs are used to determine the incremental lifetime cancer risk (ILCR) from exposure.

Many chemicals exhibit both types of dose-response relationships, exhibiting different adverse-effect end-points. Some COCs that are the subject of this assessment are assumed to have shown both threshold and nonthreshold adverse effects.

The following definitions have been extracted from the EPA's Integrated Risk Information System (IRIS) documentation (EPA, 2016a,b):

- **Reference Concentration (RfC):** An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, lowest-observed-adverse-effect level (LOAEL), or benchmark concentration, with UFs generally applied to reflect limitations of the data used. This estimate is generally used in EPA's noncancer health assessments.
- **Reference Dose (RfD):** An estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a NOAEL, LOAEL, or benchmark dose, with UFs generally applied to reflect limitations of the data used. This estimate is generally used in the EPA's noncancer health assessments.
- **Slope Factor (SF):** An upper bound, approximating a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg/d, is generally reserved for use in the low-dose region of the dose-response relationship (that is, for exposures corresponding to risks less than 1 in 100).
- **Unit Risk (UR):** The upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 µg/L in water or 1 µg/m^3 in air. The interpretation of UR would be as follows: if UR = 1.5×10^{-6} µg/L, 1.5 excess tumours are expected to develop per 1,000,000 people if exposed daily for a lifetime to 1 µg of the chemical in 1 L of drinking water.

Chemical-specific toxicity profiles in Appendix H include a description of the hazard assessment indicating the potential adverse health effects from exposure to the COCs in this assessment.

4.3.2 Dose Response Assessment

The TRVs were obtained from regulatory agencies, including the MECP and EPA (IRIS). Other TRVs cited in the Rationale Document (MECP, 2011b), such as those developed by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, the Agency for Toxic Substances and Disease Registry, the Netherlands National Institute of Public Health and Environmental Protection, or the World Health Organization, were also considered. TRVs were obtained from published toxicity databases. If a database did not have a published value, an alternate source was reviewed. The TRVs used from other credible jurisdictions (as listed) meet the requirements as set out in Section 4.3.2 of *Procedures for the Use of Risk Assessment under Part XV.1 of the Environmental Protection Act* (MECP, 2005).

Noncarcinogenic TRVs (that is, RfDs and RfCs) can be based on several different toxicological end-points, including systemic effects, developmental toxicity, neurotoxicity, and reproductive effects. Typically, the

most sensitive end-point is selected for the derivation of the TRV (that is, the end-point associated with the least of the available LOAELs). Thus, the noncarcinogenic TRVs can generally be considered protective of all toxicological end-points. Furthermore, because a UF is typically applied during the TRV derivation process to account for intraspecies differences, the noncarcinogenic TRVs can generally be considered protective of all receptors (that is, including sensitive subgroups within the human population). Taken together, the noncarcinogenic TRVs can be viewed as protective of all toxicological end-points and all receptors, including, for example, developmental toxicity and pregnant women.

Table 4-26 lists the TRVs used in this RA and also briefly describes the potential health effects on human receptors associated with their exposure to those contaminants. There is great confidence that the TRVs selected for this assessment are relevant and protective of human health. RfDs and RfCs used in this assessment are considered protective of the human population (including sensitive subgroups) at continuous exposure levels (that is, 24 hours per day, 7 days per week). The human receptors identified in the problem formulation are likely to have exposure that is less continuous (that is, 40-hour work week); therefore, the RA provides another layer of conservatism. Similarly, URs and SFs used herein were derived by their respective agencies to account for continuous exposure.

Where more than one TRV is presented in Table 4-26 for the same route and effect (that is, threshold or nonthreshold) the available TRVs were applied as follows:

- **Sub-chronic TRVs** - Where available, sub-chronic TRVs (RfD and RfC) were applied only to the Construction Worker receptor.
- **Vinyl Chloride** - Two sets of carcinogenic TRVs (SF and URF) were selected for vinyl chloride. The TRVs specific to "continuous lifetime exposure from birth" were applied to the Composite Resident receptor for residential exposures, while the TRVs specific to "continuous lifetime exposure during adulthood" were applied to the Indoor Worker, Construction Worker, and Utility Worker receptors for job-related exposures (as these receptors are assumed to be adults per Section 4.2.1).

Chemicals with RfD and RfC TRVs are considered to have "threshold-acting" characteristics, while those with SFs and URs are considered to exhibit carcinogenic or nonthreshold characteristics. Contaminants with both RfD and RfC and SF and UR TRVs have been identified by the reporting regulatory agency as a chemical that can exhibit both types of health effects.

Appendix H presents toxicity profiles, which include a description of the chemical, health effects, assessment of carcinogenicity, and basis of the selected TRV for the chemicals and TRVs not presented in the Rationale Document (MECP, 2011b) or in the updated TRVs provided by the MECP (Pagliarulo, 2017, pers. comm.; Blok, 2018, pers. comm).

For the assessment of Pregnant Female Workers, the following COCs were identified as developmental toxicants:

- Lead
- B[a]P
- TCE
- Vanadium

There are uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at blood lead levels (BLLs) less than the current Canadian BLL intervention level of 10 micrograms per decilitre (µg/dL). As a result, the RA has not quantitatively assessed exposure and risk to lead via the direct contact route. Lead has also been identified as a developmental toxicant, but risk was

not assessed quantitatively for the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus are available.

4.3.3 Uncertainties—Toxicity Assessment

Without exception, the toxicity indices employed in this RA have been developed in a conservative fashion to facilitate the protection of human health, as follows:

- Indices, such as cancer SFs and noncancer RfDs, are intentionally developed to be protective of human health. Cancer SFs are developed assuming that a threshold for effects does not exist. RfDs are frequently derived using several UFs (ranging from 1 to 10) and modifying factors (ranging from 10 to 10,000) that, in effect, lessen the dose responsible for the toxic effects. Furthermore, additional modifying factors are applied, depending on the confidence level of the database used to derive a toxicity limit. If confidence is low (that is, because of limited information, variations within the test species populations, or differences between the test species and humans), the factor applied is relatively high and accounts for the lack of knowledge.
- Jacobs built in an additional consideration of uncertainty into this RA by including a separate developmental toxicity-based TRV evaluation for a Pregnant Female receptor exposure scenario.
- Jacobs evaluated PAHs for nonthreshold (carcinogenic) effects if they were identified to have carcinogenicity or genotoxicity, or both, as described by EPA, and International Programme on Chemical Safety (WHO, 1998) classifications for this group of chemicals. The aromatic PAHs were not identified as genotoxic or carcinogenic chemicals, do not have common mechanisms of action to cause toxicity as the carcinogenic PAHs, or do not have a well-established TEF. Therefore, Jacobs did not include them in its TEF approach for B(a)PE estimations; however, the uncertainty associated with the risk estimation for the B(a)PE is likely to be minimal.
- The evaluation of B(a)PE assumes that the toxicological endpoint for all identified carcinogenic PAHs are the same as B(a)P. This may result in an under or over estimation of potential risks associated with exposure to carcinogenic PAHs.
- The MECP uses route-to-route extrapolation to derive an RfC value, typically from RfD values for chemicals without readily published RfC values. Additionally, Jacobs conducted a literature search for RA Property COCs to identify published RfC values from other agency guidance documents. Table 4-26 lists the identified selected TRVs. However, some chemicals did not have RfC values because such chemicals are not an inhalation exposure concern, most likely due to low volatility or lack of toxicity through inhalation route of exposure. Thus, uncertainty associated with the absence of RfC or URF values for such chemicals is considered minimal.
- Over time, as more information from studies and research become available, toxicological information for constituents is updated. As a result, TRVs are expected to change over time. If TRVs are updated, changed, or added, they could inherently change the estimated risk.
- Due to uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at BLLs less than the current Canadian BLL intervention level of 10 µg/dL, Jacobs has not quantitatively assessed exposure and risk to lead via the direct contact or inhalation exposure routes in this RA. Lead has also been identified as a developmental toxicant but was not assessed quantitatively via the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus is available.
- In the absence of TRVs developed specifically for intermittent exposures, Jacobs adopted chronic TRVs to assess risks to the Utility Worker. This may result in an under or over estimation of potential risks to this receptor.

4.4 Risk Characterization

4.4.1 Interpretation of Health Risks

The risk characterization stage integrates the results of the exposure assessment with the information obtained during the toxicity analysis. Jacobs derived risk estimates for noncarcinogens (threshold toxicity response) by comparing the exposure intake results to the TRVs.

A comparison of the estimated exposure and estimated air concentration for each chosen substance to the appropriate RfD and RfC, respectively, will provide an estimate of the potential health risk associated with each. If the modelled exposure or air concentrations are less than the appropriate RfD or RfC, adverse health impacts are not expected. The comparison estimates are as described by the following ratios:

$$Exposure\ Ratio = \frac{Predicted\ Exposure\ Rate}{Reference\ Dose\ (RfD)} \quad (12)$$

or

$$Exposure\ Ratio = \frac{Predicted\ Air\ Concentration}{Reference\ Concentration\ (RfC)} \quad (13)$$

Exposure ratios (ERs) are also referred to as hazard quotients (HQs). The MECP considers an ER or HQ of 0.2 to be acceptable for any one environmental medium, if multimedia exposure is possible (MECP, 2011b). The target HQ used in this assessment for all COCs except PHC and TCE (for inhalation only) was 0.2. The target HQ for PHC fractions and TCE (inhalation only) was 0.5 (CCME, 2008; MECP 2016b). MECP (2016b) guidance states that an HQ of 0.5 is acceptable for "TCE exposure inhalation of indoor air (and possibly also outdoor air)" because intake of TCE from other pathways (that is, ingestion in food, groundwater, and soil; and dermal contact with soil) is negligible in comparison (for non-potable sites). It is the QPRA's opinion that the HQ of 0.5 for TCE is also appropriate to apply to the outdoor air inhalation pathway because inhalation (in general terms) is the primary route of exposure to TCE where a potable groundwater use is not present. It is noted that the RA Property has a potable groundwater condition, and therefore, the use of the HQ of 0.5 would typically not be acceptable. However, while groundwater is considered potable in general, impacted groundwater at the Site is not used as a potable resource. RMMs are included in Section 7 to prevent potable water use from RA Property groundwater. As such, the use of the HQ of 0.5 for TCE (for inhalation pathways only) is considered appropriate for the assessment.

The MECP (2011b) HQ of 0.2 is equal to one-fifth of the applicable noncancer TRV. The RfD and RfC define either the exposure rate or concentration of chemical in air that humans, including sensitive individuals, may be exposed to over a lifetime without an appreciable risk of experiencing an adverse effect (which is equivalent to an HQ of 1.0 [EPA, 2000]). If HQs are shown to be greater than 1.0, this does not imply that an adverse effect will result, only that there is a potential for an adverse effect. Because of the conservative nature of the assumptions underlying the calculation of exposure and air concentrations, there is an inherent tendency to overpredict exposure. Furthermore, the scientific principles employed to derive RfD and RfC values are based on selecting the most sensitive end-point observed in the most sensitive gender of the most sensitive species and consider uncertainties in the toxicology assessment database. Overall, these TRVs are expected to be protective of human health.

UFs that span several orders of magnitude (for example, often 1,000-fold or greater) are placed on dose-response models in animal toxicity studies to protect human health. Often, the TRV is developed from the NOAEL in animal studies, which is a dose that does not cause harm to an animal. The greater the uncertainty

in the toxicological study, the larger the UF that is employed. Taken together, the overprediction of exposure and the minimization of the toxicity value provide a comprehensive approach to the protection of human health and the environment.

Estimates of risk for carcinogens (nonthreshold response) are derived by the following relationship, where the ILCR is calculated:

$$ILCR = Exposure\ Estimate \times Cancer\ SF \quad (14)$$

or

$$ILCR = Exposure\ Concentration \times UR \quad (15)$$

For the ILCR, values between 1×10^{-6} and 1×10^{-4} are typically considered to be a negligible increase of risk. The MECP has selected a target ILCR of 1×10^{-6} (1 in 1 million) as the acceptable level of risk, which was used in this assessment.

Based on the hazard assessment, some COCs may act toxicologically the same or in a similar manner on biological systems (that is, carcinogenic PAHs or chlorinated volatile organic compounds [cVOCs]). For this RA, Jacobs calculated the cumulative risk for PAHs in soil and groundwater and cVOCs in groundwater to conservatively address the potential for exposure to these groups of substances.

4.4.2 Quantitative Interpretation of Health Risks

4.4.2.1 Dermal Contact with Soil

Table 4-27 shows the predicted risks from dermal contact with soil. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents and Outdoor Workers, respectively (refer to Section 4.4.3.1). Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• B(a)P • Copper • Iron • Zinc • PHC F3	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-Cd)Pyrene • B(a)PE
Outdoor Worker	• B(a)P	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-Cd)Pyrene • B(a)PE
Construction Worker	• None	• B(a)P • B(a)PE

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Utility Worker	• None	• Arsenic • B(a)P • B(a)PE
Pregnant Female Resident	• B(a)P	• Not applicable
Pregnant Female Worker (Outdoor, Construction, or Utility)	• None	• Not applicable

Based on the assessment of risks from dermal contact with soil, risks greater than the target cancer risk are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in soil; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.2 Dermal Contact with Groundwater

Table 4-28a shows the predicted risks from Resident dermal contact with groundwater as potable drinking water. Table 4-28b shows the predicted risk from Construction and Utility Worker dermal contact with groundwater while working in the subsurface. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents (refer to Section 4.4.3.1). Risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers (refer to Section 4.4.3.2).

For potable groundwater, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• 2-(1-)Methylnaphthalene • Benzene • B(a)P • Cis-1,2-dichloroethene • Fluoranthene • Phenanthrene • Pyrene • TCE • VC • PHC F2 • PHC F3	• Acenaphthene • Arsenic • Benzene • Benzo(a)anthracene • B(a)P • Benzo(b+j)fluoranthene • Benzo(k)fluoranthene • Chrysene • Fluoranthene • Pyrene • TCE • VC • B(a)PE
Pregnant Female Resident	• B(a)P • TCE	• Not applicable

For incidental contact with groundwater, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• TCE • PHC F2 • PHC F3	• B(a)P • TCE VC • B(a)PE
Utility Worker	• PHC F2 • PHC F3	• B(a)P

		• TCE VC • B(a)PE
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

Based on the assessment of risks from dermal contact with groundwater (drinking water and incidental), risks greater than the target cancer risk are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in groundwater; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.3 Uncertainties—Dermal Contact

Uncertainties related to the estimation of dermal exposure and risk are as follows:

- The relative DAF and SAFs may be different than the experimental basis used to develop them. This may over- or underestimate the risk.
- The model does not account for the removal of soil contaminants from the receptors' hands by brushing off or washing them off. This may overestimate the risk from exposure.
- Concentrations of contaminants are not distributed uniformly across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations may appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- Site users were assumed to have access to the maximum detected concentrations of chemicals (regardless of depth) on an ongoing and constant basis. Under normal circumstances, only a Construction or Utility Worker would have access to soil located at depths impacted with COCs at maximum detected concentrations.
- The exposure assessment assumes worker exposure to groundwater would be limited to the hands. Additional body parts, such as forearms, may occasionally be exposed to groundwater, increasing potential exposure area; however, a significant increase in the exposure area is unlikely.
- The likelihood is low that Construction or Utility Workers would have their hands submerged continuously in groundwater even for one 5-minute event per day for the duration of the construction period. Typical construction activities include the dewatering of excavations. Therefore, it is unlikely that these receptors would have significant exposure to groundwater when using typical construction practices.
- The K_p used in this RA has uncertainty and could overestimate exposure for highly lipophilic compounds and underestimate exposure from other organic compounds, such as chlorinated compounds. The risk estimates could be higher or lower. Peer-reviewed estimates of chemical physical properties were used where available.

4.4.2.4 Incidental Ingestion of Soil

Table 4-29 shows the predicted risks from incidental ingestion of soil. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents and Outdoor Workers, respectively (refer to Section 4.4.3.1). Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Arsenic • B(a)P • Cadmium • Cobalt • Copper • Iron • PCB, Total • Thallium • TCE • Vanadium • Zinc • PHC F3	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Chrysene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-cd)pyrene • TCE • B(a)PE
Outdoor Worker	• B(a)P • Cadmium • Cobalt • Thallium	• Arsenic • Benzo(a)anthracene • B(a)P • Benzo(b)fluoranthene • Benzo(k)fluoranthene • Chrysene • Dibenzo(a,h)anthracene • Fluoranthene • Indeno(1,2,3-cd)pyrene • B(a)PE
Construction Worker	• Cadmium	• Arsenic • B(a)P • B(a)PE
Utility Worker	• None	• Arsenic • B(a)P • B(a)PE
Pregnant Female Resident	• B(a)P •	• Not applicable
Pregnant Female Worker (Outdoor, Construction, or Utility)	• None	• Not applicable

Based on the assessment of risks from incidental ingestion of soil, risks greater than the target cancer and noncancer risks are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in soil; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.5 Ingestion of Groundwater

Table 4-30a shows the predicted risks from Resident ingestion of RA Property groundwater as potable drinking water. Table 4-30b shows the predicted risks from Construction and Utility Worker incidental ingestion of groundwater while working in the subsurface. Risks to Site Visitors and Indoor Workers were indirectly assessed through the modelling for onsite Residents (refer to Section 4.4.3.1). Risks to offsite receptors (that is, offsite Construction and Utility Workers) were indirectly assessed through the modelling for onsite Construction and Utility Workers (Section 4.4.3.2).

For potable water, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• 2-(1-)Methylnaphthalene • Arsenic • Benzene • B(a)P • Cis-1,2-dichloroethene • Phenanthrene • Trans-1,2-dichloroethene • TCE • Zinc • VC • PHC F2 • PHC F3 • PHC F4	• 1,1-dichloroethane • Acenaphthene • Arsenic • Benzene • Benzo(a)anthracene • B(a)P • Benzo(b+j)fluoranthene • Benzo(k)fluoranthene • Chrysene • Fluoranthene • Pyrene • TCE • VC • B(a)PE
Pregnant Female Resident	• B(a)P • TCE •	• Not applicable

For incidental ingestion, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• TCE • PHC F2 • PHC F3	• Arsenic • TCE • VC
Utility Worker	• TCE • PHC F3	• Arsenic • TCE • VC
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

Based on the assessment of risks from ingestion of groundwater (drinking water and incidental), risks greater than the target cancer and noncancer risks are possible. RMMs are, therefore, required to reduce the potential risks to acceptable levels. Jacobs did not conduct a quantitative assessment of lead in groundwater; Section 4.4.3.5 provides the qualitative assessment.

4.4.2.6 Uncertainties—Ingestion

Uncertainties related to the estimation of ingestion exposure and risk are as follows:

- The amount of water assumed to be ingested by Construction and Utility Workers in this assessment is equivalent to the amount considered to be ingested during swimming activities (50 millilitres [mL], based on EPA [1989]). The actual ingestion of groundwater is likely to be insignificant. The assumption will likely overestimate the risk to Construction and Utility Workers.

- Typical construction activities include dewatering excavations; therefore, it is unlikely that Construction or Utility Workers will be exposed to groundwater. Less exposure will result in lesser risk estimates.
- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- Site users were assumed to have access to the maximum detected concentrations of chemicals (regardless of depth) on an ongoing and constant basis. Under normal circumstances, only a Construction or Utility Worker may have access to soil or groundwater deep enough to be impacted with COCs at maximum detected concentrations.
- The incidental ingestion rates may be different than the experimental basis used to develop them. Changes in ingestion rate would increase or decrease the predicted risk.

4.4.2.7 Summary of Direct Contact (Dermal and Ingestion) with Soil

Table 4-31 shows the calculated combined risk from dermal contact and ingestion with soil. Adding the two exposure pathways resulted in the addition of the following COCs and receptors with risks greater than MECP target levels:

- Phenanthrene, PHC F2, and PHC F4 exceed the target noncancer risk for the Toddler Resident
- TCE exceeds the target cancer risk and copper and iron exceed the noncancer risk for the Outdoor Worker.
- Benzo(b)fluoranthene and dibenzo(a,h)anthracene exceed the target cancer risk for the Utility Worker.
- Copper, iron, and zinc exceed the target noncancer risk for the Construction Worker.

Risks associated with dust were not included in Table 4-31. This is because the risks associated with dust inhalation are minor compared to the dermal or ingestion pathways. While there is uncertainty associated with excluding dust from these tables, its inclusion does not affect the conclusions of the assessment or the RMMs required for the RA Property. Section 4.4.3.8 provides a qualitative assessment of inhaled soil particulates that are ingested.

4.4.2.8 Summary of Direct Contact (Dermal and Ingestion) with Groundwater

Tables 4-32a and 4-32b show the calculated combined risk from dermal contact and ingestion with groundwater for the RA Property for potable water by Residents and subsurface contact by Workers, respectively. Adding the two exposure pathways resulted in the addition of the following COCs and receptors with risks greater than MECP target levels:

- Fluoranthene exceeds the target noncancer risk for the Infant Resident
- Trans-1,2-dichloroethene exceeds the target noncancer risk for the Child Resident.
- Phenanthrene and pyrene exceed the target noncancer risk for the Adult Resident.

4.4.2.9 Inhalation of Fugitive Dust

Table 4-33 shows the predicted risks from inhalation of particulates (dust) originating from RA Property soil both during construction activities and following redevelopment. Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• None	• None
Outdoor Worker	• None	• None
Construction Worker	• B(a)P • Cobalt • Zinc	• None
Utility Worker	• None	• None
Pregnant Female Resident	• None	• Not applicable
Pregnant Female Worker (Outdoor)	• None	• Not applicable
Pregnant Female Worker (Construction or Utility)	• B(a)P	• Not applicable

Based on the assessment of risks from inhalation of particulates (dust), risks greater than the target noncancer risks are possible for pregnant subsurface workers during construction activities. RMMs are, therefore, required during construction activities to reduce the potential risks to acceptable levels.

It was not possible to quantitatively assess lead or iron for the dust inhalation pathway due to a lack of toxicity criteria for these parameters. For these COCs, the background soil values are considered appropriate to determine whether concentrations at the RA Property may pose a greater risk to human health than that expected at an Ontario property that has not been impacted by anthropogenic activities (refer to Section 4.4.3.5 for a qualitative analysis). Based on the qualitative analysis of lead and iron, RMMs are also required to reduce the potential risks from exposure to these COCs to acceptable levels.

4.4.2.10 Uncertainties—Dust Inhalation

Uncertainties related to the estimation of dust inhalation exposure and risk are as follows:

- Inhalation RfDs and URs were derived from RfCs and URFs using a default inhalation rate of 20 cubic metres per day (m^3/d) and a BW of 70 kg to assess risks from dust inhalation as a dose. This conversion is specific to adults; therefore, risks from dust inhalation may be underestimated for nonadult receptors. However, since an elevated risk is already estimated for the pathway, the conclusion that RMMs are required is not affected by this uncertainty.
- Risk to offsite receptors would likely be less than experienced by Site users, since the concentration of COC-impacted fugitive dusts diminishes rapidly with dispersion and dilution in air and with distance (EPA, 2002a).
- The total dust in the air is highly variable; as a result of the uncertainty in the dust concentrations, Jacobs used a conservative value, likely resulting in an overestimate of exposure and risk.
- A suitable noncancer TRV for inhalation of lead and iron are not currently available; therefore, Jacobs could not estimate the noncancer inhalation risks from lead and iron in dust. As RMMs are required for this pathway for other COCs, the potential for noncancer risks greater than MECP targets from lead in dust will be managed as part of the RMP.

4.4.2.11 Inhalation of Indoor Air

Tables 4-34a and 4-34b show the predicted risks from inhalation of vapours migrating from soil to indoor air for all retained receptors under commercial building and residential building scenarios, respectively.

For the generic commercial building soil to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Indoor Worker	• Benzene • Naphthalene • TCE • PHC F2	• Benzene • TCE
Pregnant Female Indoor Worker	• TCE	• Not applicable

For the generic residential building soil to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Benzene • Mercury • Naphthalene • PHC F2 • TCE • Xylenes, total	• Acenaphthene • Benzene • TCE
Pregnant Female Resident	• TCE	• Not applicable

Tables 4-35a and 4-35b show the predicted risks from inhalation of vapours migrating from groundwater to indoor air for all retained receptors under commercial building and residential building scenarios, respectively.

For the generic commercial building groundwater to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Indoor Worker	• Benzene • 1,1-dichloroethene • Cis-1,2-dichloroethene • Trans-1,2-dichlorothene • n-hexane • TCE • VC • PHC F1 • PHC F2	• Benzene • 1,1-dichloroethane • TCE • VC

Pregnant Female Indoor Worker	• TCE	• Not applicable

For the generic residential building groundwater to indoor air scenario, risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Resident	• Benzene • 1,1-dichloroethane • 1,1-dichloroethene • Cis-1,2-dichloroethene • Trans-1,2-dichlorothene • n-hexane • (2-)1-Methylnaphthalene • Naphthalene • Tetrachloroethylene • 1,1,1-trichloroethane • TCE • VC • PHC F1 • PHC F2	• Acenaphthene • Benzene • 1,1-Dichloroethane • Tetrachloroethylene • TCE • VC
Pregnant Female Resident	• TCE	• Not applicable

Based on the assessment of risks from inhalation of vapours in indoor air originating from soil and groundwater for the modelled building scenarios, unacceptable risks are possible for the generic commercial and residential building scenarios. RMMs are, therefore, required to reduce the potential risks to acceptable levels for the generic commercial and residential building scenarios.

4.4.2.12 Uncertainties—Indoor Air

Uncertainties related to the estimation of inhalation exposure and risk are as follows:

- The degradation of organic compounds along the transport path was ignored. If degradation was included, the chemical concentration would decrease, which would decrease the estimated risks.
- For indoor air assessments, it is not generally acceptable to use soil concentrations and partitioning calculations to determine soil gas concentrations while evaluating VI because there is a great degree of uncertainty associated with the soil-partitioning results (EPA, 2002b), which could lead to over- or underestimating risk.
- The exposure assessment section also defines the concentrations of COCs to which potential receptors may be exposed. Within the RA Property boundaries, Jacobs estimated potential indoor air vapour concentrations by using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which a receptor might be exposed. The selection of conservative assumptions regarding Site-specific inputs may result in an overestimate of exposure and associated risk to certain receptors. These assumptions all impart uncertainty to the

RA but are purposely developed to yield RA conclusions that are, indeed, conservative and protective of human health.

- Vapour concentrations inside future RA Property buildings were modelled assuming the buildings are occupied, and the VI pathway is complete, meaning soil vapours can enter the structure. This assumption is conservative because the exposure pathway may not actually be complete or significant; therefore, there may be no or little associated risk.
- Exposure modelling for indoor air conservatively assumes the structure lies directly over the estimated maximum soil and groundwater concentrations for volatile COCs detected at the RA Property. It is also assumed that the source is infinite, and the modelling does not account for degradation of constituents. These factors may significantly overestimate indoor air concentrations and risk.
- A source of uncertainty in indoor air vapour concentration model results is the use of partitioning coefficients from other media into soil vapour to predict subslab soil vapour concentrations of COCs and, in turn, to assess potential indoor air concentrations. Modelling results based on ideal chemical properties of the COCs may not appropriately represent true portioning between media that occurs on a site-specific basis. This results in uncertainty in the model results that could over- or underestimate risk.

4.4.2.13 Inhalation of Outdoor Air Volatiles

Table 4-36 shows the predicted risk for Residents and Workers from inhalation of subsurface volatiles migrating to outdoor air above the ground surface at the RA Property. Risks to each receptor were estimated to be less than the MECP target noncancer and cancer risks for the retained COCs. RMMs are, therefore, not required at the RA Property to reduce the potential risks to acceptable levels. Risks to onsite Indoor Workers and offsite receptors (that is, offsite Surface Receptors, and Construction and Utility Workers) were indirectly assessed through the modelling for onsite Residents and Workers (Sections 4.4.3.1 and 4.4.3.2).

Table 4-37 shows the predicted risk for Utility and Construction Workers from inhalation of subsurface volatiles migrating to outdoor air in an excavated trench for the RA Property. Risks were estimated to exceed the MECP target risks as follows:

Receptor	Exceeds MECP Target Noncancer Risk	Exceeds MECP Target Cancer Risk
Construction Worker	• Naphthalene • TCE • PHC F2	• None
Utility Worker	• None	• None
Pregnant Female Worker (Construction or Utility)	• TCE	• Not applicable

RMMs are required during excavation activities at the RA Property to reduce the potential risks to acceptable levels.

Table 4-38 shows the combined predicted risk for Utility and Construction Workers from the inhalation of subsurface volatiles migrating to outdoor air above ground surface and in an excavated trench. Adding the two pathways did not result in any COCs exceeding the MECP target risk levels for any receptor.

4.4.2.14 Uncertainties—Outdoor Air Volatiles Inhalation

Uncertainties related to the estimation of outdoor air inhalation exposure and risk are as follows:

- The comparators used to predict risk (that is, RfC and UR) are values considered protective of lifetime exposure to chemicals—24 hours per day, 7 days per week, 52 weeks per year, for 70 years—and include adjustments for sensitive individuals in the human population. Therefore, for any human receptor, risks are overestimated for short-term exposure to volatile chemicals that may be present in air, since no person will occupy the RA Property for a duration consistent with the duration used to develop the comparators. Adjustment of the comparator for shortened duration would likely result in a decreased risk for receptors.
- Risk to offsite receptors, included Residents, would likely be less than experienced by Site users, since the concentration of volatile COCs in air diminishes with dispersion and dilution in air rapidly with distance (EPA, 2002a).
- As outline in Appendix G3, outdoor air concentrations in a trench have been modelled based on an assumed wind speed and the assumed presence of a worker in a trench. Actual concentrations may be under- or overestimated. However, typical practices for trench excavation prohibit entry because the trench is considered a confined space. Therefore, exposure estimates are likely to overestimate risks in this case.

4.4.3 Qualitative Interpretation of Health Risks

This section discusses parameters and exposure scenarios that were qualitatively assessed in the HHRA.

4.4.3.1 Qualitative Assessment of Additional Onsite Receptors

Site Visitors of all ages may also be present at the RA Property under future conditions. These receptors may also be exposed to RA Property impacts; however, their exposure will be less than that of the receptors included for quantitative assessment. Similarly, Indoor Workers were not included for quantitative assessment for pathways other than indoor air inhalation, because they have less exposure to outdoor air and direct contact with Site soils relative to a full-time Outdoor Worker. It is understood that if risks to the quantitatively evaluated receptors are identified, risks to these onsite receptors are also possible through relevant exposure pathways.

The following risk conclusions have been made for quantitatively evaluated receptors and are understood to possibly exist for the qualitatively evaluated onsite receptors:

- Unacceptable risks from direct contact with soil are possible for Indoor Workers, Site Visitors, and for non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from incidental ingestion of soil are possible for Indoor Workers, Site Visitors, and non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from ingestion of groundwater as potable water are possible for Indoor Workers and ingestion of drinking water for Site Visitors and non-Toddler Residents (infant, child, teen, and adult) and Indoor Workers.
- Unacceptable risks from inhalation of volatiles in outdoor air above ground are not expected for Indoor Workers, Site Visitors, and non-Toddler Residents (infant, child, teen, and adult).
- Unacceptable risks from dust inhalation are possible for non-Toddler Residents, Site Visitors, and Indoor Workers from lead and iron.

4.4.3.2 Qualitative Assessment of Offsite Receptors

Offsite receptors may also be exposed to Site media if impacted soil particulates, vapours, or groundwater migrates beyond the RA Property boundaries; however, their exposure will be less than that of the onsite receptors included for quantitative assessment. If risks to the quantitatively evaluated onsite receptors are identified, then risks to these offsite receptors are also possible through relevant exposure pathways.

The following risk conclusions have been made for quantitatively evaluated onsite receptors (Section 4.4.2) and are understood to possibly exist for the qualitatively evaluated offsite receptors should offsite migration of dust (from onsite soils) or groundwater occur:

- Unacceptable risks from dust inhalation are possible for offsite Surface Receptors from lead and iron, offsite Construction and Utility Workers from B(a)P, cobalt, zinc, B(a)P, and lead and iron; and offsite Female Construction and Utility Workers from B(a)P.
- Unacceptable risks from dermal contact or incidental ingestion of groundwater are possible for offsite Construction and Utility Workers.
- Unacceptable risks from dermal contact or ingestion of groundwater as potable drinking water are possible for offsite Surface Receptors.
- Unacceptable risks from inhalation of volatiles from soil or groundwater to indoor air are possible for offsite Surface Receptors in residential or industrial/commercial buildings. The following bullets provide additional interpretation:
  - Residential receptors are not present directly to the south or east, closest to where the highest concentrations of volatile COCs in soil have been detected.
  - Per the updated draft MECP document entitled *Technical Guidance for Soil Vapour Intrusion Assessment* (MECP 2021) "soil vapour migration tends to be insignificant at distances of approximately 30 m from the edge of the subsurface contamination" for recalcitrant chemicals, and approximately 10 m for readily-biodegradable chemicals such as PHCs and BTEX. .
  - Considering the distances cited by the MECP (2021) and using the generic S-IA components for an offsite ICC land use, the Site soil data was further evaluated for potential issues to offsite commercial buildings (no residences are located within 30 m of a location with a volatiles exceedance). Per Table 3-34a, onsite risks to occupants of commercial buildings were predicted to be greater than MECP target risk values only for benzene, naphthalene, TCE, and PHC F2 in soil. Therefore, these COCs were examined further, as follows:
    - All concentrations of benzene in soil onsite are less than the Table 2 ICC S-IA component value. Risk from lateral gas movement offsite of benzene from onsite soil sources is unlikely.
    - One soil location has concentrations of naphthalene greater than the Table 2 ICC S-IA component (OW07-34D), located approximately 26 m from the southern property boundary. Risk from lateral gas movement offsite of naphthalene from onsite soil sources is unlikely to low based on a single exceedance of the S-IA component and distance of this location to the property boundary.
    - Twelve locations have TCE concentrations in soil greater than the generic Table 6 SCS[5], all locations are within the northeast corner of the Site within 16 m of the property boundary, co-located with highest TCE impacts in groundwater. Risk from lateral gas movement offsite of TCE from onsite soil sources is possible, based on the proximity to the property boundary. However, considering the associated groundwater concentrations in this area, the primary

[5] The Table 2 ICC S-IA component is less than background; therefore, the generic Table 6 SCS was used.

source of potential TCE vapours in this corner are associated with groundwater. RMMs are proposed to mitigate risks to receptors in offsite buildings from offsite groundwater migration.

- One soil location has concentrations of PHC F2 greater than the Table 2 S-IA component (BH07-40), located approximately 25 m from the eastern property boundary. Risk from lateral gas movement offsite of PHC F2 from onsite soil sources is unlikely to low based on a single exceedance of the S-IA component and the distance of this location to the property boundary.

– Based on this evaluation, the potential for risk from lateral soil gas movement offsite of benzene, naphthalene, and PHC F2 from onsite soil sources is considered unlikely to low.

– Soil gas concentrations typically decrease rapidly with distance from the source due to various processes (such as degradation and adsorption); therefore, soil gas generated from impacted soil onsite is less likely to pose a risk to offsite receptors than soil gas generated from impacted groundwater that has migrated offsite (as the "source" would be moving closer to the receptor).

– Considering the existing and future Site conditions and current lack of identified preferential pathways in the vadose zone, the primary migration mechanism for soil gas would be expected to be diffusion and as a result the potential for risks to offsite receptors via the lateral migration of soil gas from soil sources is considered low. Utility corridors can provide a preferential path for contaminated groundwater or volatile transport. Based on the depth of groundwater, the typical depth of underground utilities (1.5 mbgs or deeper), and the presence of permeable materials onsite to the shallow onsite bedrock, COCs are most likely to be transported (that is, to migrate) via groundwater. RMMs are proposed to mitigate risks to receptors in offsite buildings from offsite groundwater migration.

- No unacceptable risks from inhalation of volatiles in outdoor air are expected for offsite Surface Receptors but unacceptable risks are possible for offsite Construction and Utility Workers working in trenches if impacted groundwater migrates offsite.

4.4.3.3 Qualitative Assessment of Direct Contact Exposure – Vapour Skin Contact

Dermal exposure to vapours can be an important pathway in HHRAs—particularly for occupational settings where receptors are wearing a respirator because most of the body burden would likely be derived from dermal exposure. However, with few exceptions, dermal exposure to vapours is generally not considered in HHRAs, as supported by the following documents:

- EPA, 1989 — *Risk Assessment Guidance for Superfund* (RAGS): "Dermal absorption of vapour phase chemicals is considered to be lower than inhalation intakes in many instances and generally is not considered in Superfund exposure assessments."
- EPA, 1992 — *Dermal Exposure Assessment: Principles and Applications*: "Current studies suggest that dermal exposure may be expected to contribute no more than 10% to the total body burden of those compounds present in the vapour phase."
- McDougal and Boeniger, 2002 — "Methods for assessing risks of dermal exposures in the workplace": "In most cases, vapour absorption through the skin would not be of concern unless a respirator is worn because the majority of the body burden would come from inhalation."
- EPA, 2007 — *Dermal Exposure Assessment: A Summary of EPA Approaches*: "Dermal exposures to chemicals present in air are considered unlikely, in most cases, to provide more than 10% of aggregate exposure."

Numerous regulatory documents and scientific journals provide methodologies and equations that can be used to estimate the dermal absorption of chemical vapours (for example, EPA, 1992; McDougal and Boeniger, 2002). At least four different methods can be used to predict an internal dose once an external dose has been estimated. The methods differ in the type and quantity of information required for the calculations, in the simplifying assumptions that are made, and in the reliability of the results. Internal dose can be predicted from external dose based on the following:

- The empirical measurement of fraction of applied dose absorbed
- Measured (or estimated by correlations) steady-state flux or permeability
- Steady-state flux or permeability adjusted by the square root of time
- Biologically based mathematical models (McDougal and Boeniger, 2002)

The equations available for quantifying dermal absorption of chemical vapours are typically simplistic (and often inaccurate), as they do not account for many exposure factors, including the following:

- Individual variability of skin penetrability due to age of the individual and skin condition (for example, broken or damaged skin)
- Variances in the penetrability of the skin in different areas of the body
- Individual variability in the amount of skin available for exposure (that is, clothing or gloves worn)
- Temperature and humidity (both have been shown to affect dermal absorption of chemical vapours)
- Evaporation from skin following deposition onto skin

Estimates of internal dose often rely on information gained from animal studies. However, rodents (frequently used as a model for human exposure and risk) have a different, more permeable skin structure than humans; and, in most cases, there is more penetration data for rodents than for humans. This usually necessitates the use of physiologically based pharmacokinetic modelling, which can further increase the uncertainty of internal dose estimates. Therefore, while dermal exposure to vapours is a potentially complete pathway at the RA Property, Jacobs did not quantitatively evaluate this pathway, given the uncertainty associated with its quantification and the general belief that it does not contribute greatly to a receptor's overall exposure and body burden unless the receptor is wearing a respirator (which is not anticipated at the RA Property).

4.4.3.4 Qualitative Assessment of Contaminants of Concern with Concentrations Less than MECP Component Values

As outlined in Section 4.1.2, a secondary screening against MECP-derived human health component values (MECP, 2011b) was completed for the COCs to determine which would be evaluated quantitatively or qualitatively in the HHRA. Tables 4-1 and 4-2 present the results of this screening for soil and groundwater, respectively. Qualitatively assessed COCs include those with maximum concentrations greater than the Table 6 SCS, but estimated maximum concentrations less than the MECP-derived human health component values (direct contact pathways), or maximum theoretical indoor air concentrations less than HBIAC values and maximum concentrations less than the human health component values (for inhalation pathways). For these COCs, risks to receptors (including Pregnant Females) are considered to be less than the MECP target cancer and noncancer risk levels. Therefore, the proposed human health PSSs are based on the estimated maximum concentration of each COC.

4.4.3.5 Qualitative Assessment of Parameters without Toxicity Data

Lead

Lead was retained as a COC in soil and groundwater for quantitative evaluation in the HHRA, since the estimated maximum concentrations in both media were greater than the Table 6 SCS. Recent science suggests any exposure to lead may result in an adverse effect, especially to infants and children. The current Canada BLL "intervention level" is 10 µg/dL; however, there is evidence to suggest adverse impacts at lesser BLLs (as low as 1 to 2 µg/dL) (Health Canada, 2013). Therefore, there are uncertainties associated with TRVs that have not considered the potential adverse health effects associated with lower BLLs, including those used to derive the generic MECP standards.

The Rationale Document (MECP, 2011b) acknowledges that lead was an exception in the development of the generic standards and human health component values:

> *"For some substances, a threshold for non-cancer effects may not exist, or may not be possible to discern. In such instances, establishing a guideline or standard cannot be based on target HQ. Instead, the guideline or standard may be based on a policy decision regarding an acceptable level of adverse effect or uncertainty. Lead is an example of such a substance."*

In response to the changing science, various regulatory agencies, including EPA and Health Canada, are in the process of reassessing their previously published policies, TRVs, and soil and groundwater quality guidelines for lead. As a result, Jacobs did not quantify exposure and risk from oral and dermal contact with lead in soil or groundwater within the HHRA.

A qualitative evaluation of oral, dermal, and inhalation (dust) exposures to lead has been conducted using the MECP *Table 1 Full Depth Background Site Condition Standards* (Table 1 Standard) (MECP 2011c), which represent background conditions in Ontario. The background soil and groundwater values are considered appropriate to determine whether lead concentrations measured at the RA Property may pose a risk to human health greater than that expected at an Ontario property that has not been impacted by anthropogenic activities. The estimated maximum concentration of lead in soil at the RA Property is 12,000 µg/g, which is 100 times greater than the MECP Table 1 Standard for lead of 120 µg/g. Seventy-six soil samples (approximately 33 percent of soil samples analyzed for metals) had concentrations of lead exceeding 120 µg/g. Therefore, this elevated lead concentration in soil may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers.

The estimated maximum concentration of lead in groundwater at the RA Property is 17 µg/L, which is 9 times greater than the MECP Table 1 Standard for lead of 1.9 µg/L. Four groundwater samples (approximately 2 percent of groundwater samples analyzed for metals) had concentrations of lead exceeding 1.9 µg/L. Therefore, this elevated lead concentration in groundwater may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers.

To mitigate the potential risks from direct contact with lead in soil and groundwater, and inhalation of lead in soil, RMMs to prevent or reduce contact with lead-impacted soils and groundwater are recommended as part of the RMP (Section 7). As RMMs will be implemented, the proposed human health PSSs for lead are based on the estimated maximum concentration of lead currently remaining onsite.

Bismuth

A literature search was performed to identify one of more of: Ontario or Canadian background concentrations for bismuth, human health soil screening values, or agency-approved TRVs for bismuth. As a result of this search, only one human health specific soil screening value was identified. The Texas Commission on Environmental Quality (TCEQ), as part of their Texas Risk Reduction Program, has derived a Protective Concentration Level (PCL) (TCEQ 2021) for bismuth for residential receptors. The PCLs consider direct contact (ingestion and dermal) with soil and ingestion of vegetables grown in impacted soil. The PCL derived by TCEQ for bismuth is 37,000 µg/g for residents based on the direct contact pathways only. The value is based on non-carcinogenic risk using an RfD (oral) of 5.0E+01 mg/kg/day. The source of the TRV is listed as being derived directly by TCEQ; the supporting documentation for the derivation of this TRV was not readily available online. Due to the lack of information available for bismuth and the known low toxicity to humans via the intake of medicinal products (Wang et al.), the TCEQ value was determined to be adequate for use in the qualitative assessment. The TCEQ PCLs are based on a HQ of 1.0 (TCEQ 2008); therefore, the PCL was divided by 5 to adjust to a target HQ of 0.2 for use in this RA. Therefore, the adjusted soil screening level used for the qualitative assessment of bismuth is 7,400 µg/g.

The estimated maximum concentration of bismuth in soil at the RA Property is 180 µg/g, which is approximately 40 times lower than the adjusted soil screening value of 7,400 µg/g. Of the 103 soil samples analyzed for bismuth (12 samples as part of historical investigations and 91 samples as part of recent investigations), only 12 samples had detected concentrations, ranging from 1.7 µg/g to 150 µg/g. Therefore, the bismuth concentrations in soil are unlikely to pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers from oral, dermal, and inhalation (dust) exposures.

As RMMs will be implemented across the property for other COCs and no adverse impacts from bismuth are anticipated, the proposed human health PSS for bismuth is based on the estimated maximum concentration of bismuth currently remaining onsite.

Iron (Dust Only)

A qualitative evaluation of inhalation (dust) exposures to iron has been conducted using the MECP *Ontario Typical Range* (OTR) values (MECP 2011c), which represent background conditions in Ontario. The background soil values are considered appropriate to determine whether iron concentrations measured at the RA Property may pose a risk to human health greater than that expected at an Ontario property that has not been impacted by anthropogenic activities. The estimated maximum concentration of iron in soil at the RA Property is 150,000 µg/g, which approximately 4 times greater than the OTR for iron of 38,000 µg/g. Twenty-five of 135 soil samples (approximately 19 percent of soil samples analyzed for iron) had concentrations of iron exceeding 38,000 µg/g. Therefore, elevated iron concentrations in soil may pose a risk to onsite receptors at the RA Property and offsite Surface Receptors and Workers via the inhalation of dust. The known health effects from exposure to iron via inhalation associated with occupational exposures (such as welding activities) may include "irritation to eyes, skin, and respiratory tract" (from inhalation of aerosols or mists of soluble iron salts); "siderosis, a benign pneumoconiosis" and "accumulation of iron dust in the lungs" (from inhalation of ferric oxide dusts and fumes) (EPA, 2006).

To mitigate the potential risks from inhalation of iron in soil, RMMs to prevent or reduce dust generation are recommended as part of the RMP (Section 7). As RMMs will be implemented, the proposed human health PSS for iron is based on the estimated maximum concentration of iron currently remaining onsite.

Ecological Contaminants of Concern

One parameter that was not applicable to human health was retained as soil a COC via the screening process outlined in Section 3: EC. This parameter is included in the ERA presented in Section 5 of this RA. As human health toxicity data have not been developed for this parameter, Jacobs based the proposed human health PSS on the estimated maximum concentration.

Essential Nutrients

Essential nutrients are needed to maintain basic life functions. Because these chemicals are essential nutrients and they have relatively low toxicity to human health, TRVs may not have been developed for them. The physiologically essential levels for these nutrients are recommended for daily intakes from various health agencies worldwide. Values adopted by Health Canada (2010b) were used in the current assessment. Values used to determine the intake of essential nutrients at the Site include:

- Tolerable Upper Intake Level (UL) – The UL is the highest average daily nutrient intake level likely to pose no risk of adverse health effects to almost all individuals in a given life-stage and gender group.

- Adequate Intake (AI) – The AI is the average recommended daily allowance (RDA) of a nutrient based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people who are assumed to be maintaining an adequate nutritional state.

Using the UL and AI values described, the intake of essential nutrients detected at the RA Property (specifically, calcium and magnesium in soil) were calculated (Table 4-39) for a Toddler based on the soil ingestion rates used in the RA to determine if the intake from Site soil represents a significant proportion of the UL or AI values. The following subsections describe the results.

Calcium

Calcium occurs abundantly in nature as least soluble calcium compounds. Several foods are rich in calcium such as milk, cheese, green leafy vegetables, soybean products, fortified flour, and various nuts. The concentration of calcium in natural drinking water varies from less than 100 mg/L in soft water to 300 mg/L in hard water areas. Calcium intake is required for healthy bone formation, and the reference nutritional intake of calcium is 350 mg/day to 1,000 mg/day. Calcium is beneficial to health in reducing cell proliferation that is a precursor to certain forms of cancers and in reducing hypertension among adults. It is essential for skeletal structure and also is a cofactor in various enzyme metabolisms. TRVs were not developed for calcium as it is a nutritionally essential element and has relatively low toxicity (NIH 2021a)

- Calcium in Soil: The UL for calcium is 2,500 mg/day, and RDA/AI is 750 mg/day (based on a child 1-3 years old). Assuming a soil ingestion rate of 200 mg/day (based on the toddler soil ingestion exposure), with the estimated maximum concentration of calcium in soil of 260,000 mg/kg, receptor intake is estimated to be 52 mg/day, which is less than both the UL and the RDA/AI values. The proportion of the UL and RDA/AI, are approximately 2% and 7%, respectively. Therefore, detected concentrations of calcium in RA Property soil are unlikely to result in an adverse effect to human receptors at the Site.

Magnesium

Magnesium is the eighth most abundant element in the earth's crust and is ubiquitous in foods such as: leafy vegetables, grains, nuts, meats, and dairy. Magnesium is also used in antacids and as a food additive or supplement. It is essential for normal cell functioning as a cofactor for many enzyme systems and is required for "protein synthesis, muscle and nerve function, blood glucose control, and blood pressure regulation". Magnesium regulates the movement "of potassium and calcium ion across cell membranes". Magnesium is an important element in the metabolism and action of vitamin D and is essential for the synthesis and secretion of parathyroid hormone (NIH 2021b). Thus, TRVs have not been developed for magnesium.

- Magnesium in Soil: The UL for magnesium is 65 mg/day, and RDA/AI is 80 mg/day (based on a child 1-3 years old). The UL for magnesium does not account for food of water intake; therefore, the value appears to be biased low as it is less than the RDA/AI. Assuming a soil ingestion rate of 200 mg/day (based on toddler soil ingestion exposure), with the estimated maximum concentration of magnesium in soil of 140,000 mg/kg, receptor intake is estimated to be 28 mg/day, which is less than the UL and RDA/AI values. The proportion of the UL and RDA/AI, are approximately 35% and 43%, respectively. These proportions are higher than the analogous 20% of the TRV (HQ) used for evaluating noncancer risks. However, as magnesium is not volatile, daily exposures may be sourced from soil, water, food, and consumer products; therefore, assuming that a slightly higher proportion from soil would not result in an adverse effect may be appropriate. In addition, U.S. dietary surveys indicate that approximately 48% of people consume less than the RDA/AI of magnesium from food and beverages, with adolescents of both ages "most likely to have low intakes" (NIH 2021b). Considering this information, the detected concentrations of magnesium in RA Property soil are unlikely to result in an adverse effect to human receptors at the Site.

4.4.3.6 Qualitative Assessment of NAPL

The presence of NAPL has been confirmed at the RA Property in a limited area. Three monitoring wells (all screened within the overburden and bedrock contact zone aquifer unit) in the eastern portion of the Site have measured NAPL floating on the water table located right at or below the overburden and bedrock contact (refer to Figures 6-15, 6-15a, and 6-15b in Appendix D3). Therefore, additional consideration of potential risks related to NAPL, and the potential need for additional RMMs due to the presence of NAPL, is warranted. The MECP SCS and component values considered in the evaluation of COCs for the RA Property, and the equations applied in the calculations of risk and hazard, are based on the assumption that the petroleum hydrocarbons are distributed between the dissolved, vapour, and sorbed phases (that is, three phases are considered). With the limited area of NAPL present at the RA Property, nonaqueous-phase hydrocarbon could be present in addition to the dissolved, vapour, and sorbed phases (that is, four phases are present).

The presence of NAPL could have implications for the risk evaluations that rely on the application of partitioning equations (that is, movement to indoor air and outdoor air). Direct contact exposure to NAPL itself would also be possible in areas where NAPL is present. The quantitative assessment of risks due to impacts in soil and groundwater (Section 4.4.2) has already indicated unacceptable risks are present along the following pathways for PHCs:

- Human direct contact with soil (dermal and ingestion)
- Human direct contact with groundwater (dermal and ingestion)
- Inhalation of indoor air

The exposure pathways for which the estimated exposure and risk could be affected by the presence of NAPL include direct contact with soil and groundwater (dermal and ingestion) and inhalation (indoor and

outdoor). The inhalation of dust pathway is believed to be insignificant in the context of NAPL, as saturated soils would not become airborne. Each of these pathways is discussed below:

- Direct contact with Soil - As the MECP direct contact component values do not rely on partitioning equations (which may be invalidated by the presence of NAPL), the exposure and risk estimates previously presented (Section 4.4.2.1 and 4.4.2.4) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.
- Direct contact with Groundwater – As the MECP direct contact component values do not rely on partitioning equations (which may be invalidated by the presence of NAPL), the exposure and risk estimates previously presented for Workers in contact with groundwater(Section 4.4.2.2 and 4.4.2.5) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.
- Inhalation of Indoor Air – Risks to receptors in existing and future buildings were predicted from PHCs from both soil and groundwater sources. The exposure and risk estimates previously presented (Section 4.4.2.11) for PHCs for this pathway are considered an estimate of the minimum risks that may occur in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective where localized NAPL is present.
- Inhalation of Outdoor Air –The highest estimated outdoor air risk from PHC F2 was an HQ of 0.1 (for the Construction and Outdoor Worker, at the ground surface). This HQ is five times less than HQ for PHCs of 0.5. Considering the conservative assumptions that were assumed for the outdoor air modelling (for example, Jacobs selected the lowest average windspeed at the surface, ignored degradation and infiltration, and assumed receptors are exposed to the maximum soil or groundwater contraction for all exposures) and the limited extent of NAPL onsite, risks from outdoor air with respect to NAPL is considered low. Therefore, no RMMs are recommended for the outdoor air pathway for receptors at the surface even where NAPL is present. For Workers in a trench, the highest estimated outdoor air risk from PHC F2 for the Construction Worker was an HQ of 3.0, which greater than the acceptable HQ of 0.5 for PHCs. Therefore, it is possible that risks could be even greater for Workers in a trench in the presence of NAPL. RMMs (Section 7) were recommended for this pathway to reduce the risks to acceptable levels; the proposed RMMs will also be protective if NAPL is present.

In summary, the RMMs proposed in Section 7 for the protection of the direct contact with soil, groundwater, and vapour intrusion pathways are also adequate to protect receptors where NAPL is managed in place. Based on the qualitative evaluation of the localized presence of NAPL, additional RMMs are proposed to protect subsurface workers in contact with groundwater and working within trenches (outdoor air inhalation).

4.4.3.7 Qualitative Assessment of Ingestion Exposure - Home Garden Produce

As discussed in Section 4.2.2.1, there are significant uncertainties associated with quantifying exposure to home garden produce. As concentrations of COCs are present at levels greater than the Ontario background concentrations (that is, the Table 1 Standard [MECP, 2011c]), there is assumed risk from ingestion of produce grown on the RA Property. Therefore, RMMs will be proposed that prohibit the planting of fruit or vegetable gardens at the RA Property except in containerized plots or aboveground containers.

4.4.3.8 Qualitative Assessment of Inhalation of Soil Particulates that are Ingested

MassDEP (2008) provides guidance on assessing the ingested portion of soil (dust) particulates (greater than PM_{10} and less than PM_{30}). The fraction of inhaled particulate matter that is ultimately swallowed is assumed to be 1.4, which represents the fraction of all particles in air greater than PM_{10} and less than PM_{30} that are ingested (assumed to be 100% or a fraction of 1) plus the fraction of PM_{10} that is not deposited into the lungs (100% minus 60% [using the MECP assumption of 0.6] = 40% or a fraction of 0.4). Considering a sensitive receptor (pregnant female construction worker) and using other MECP defaults for the particulate concentration in air, body weight, inhalation rate, and exposure duration combined with an assumed contaminant concentration in soil of 1 µg/g, the particulate ingestion dose is approximately 3.E-09 mg/kg/day. Incidental ingestion exposure based on Site-specific COC concentrations in soil for this receptor are several orders-of-magnitude higher, ranging from 3.E-06 to 1.E-01 mg/kg/day. Adding the estimated exposure for the two ingestion pathways results in an insignificant change to the overall ingestion exposure. These results indicate that the particulate (dust) ingestion pathway does not contribute significantly to the overall risk for ingestion when default MECP assumptions are applied. This conclusion may differ under certain scenarios where PM_{10} concentrations could be generated at levels greater than the typical MECP default. For the current RA, the risk estimates based on the conventional incidental soil ingestion pathway are sufficient to base risk management decisions on. Since the contribution of soil ingestion to the overall exposure is considered negligible for this sensitive receptor/COC combination, it is assumed to be negligible for all other less sensitive receptor/COC combinations.

4.4.3.9 Qualitative Assessment of Soil Odour Pathway

The Rationale Document (MECP, 2011b) contains aesthetic criteria for soil odour (S-Nose component) which contemplates a receptor smelling soil while gardening. A qualitative assessment was completed to determine the potential for aesthetic effects associated with onsite soils. The following COC had an estimated maximum concentration in soil greater than the S-Nose component[6]:

- Methylnaphthalene 1,2- (9 samples with concentrations greater than the S-Nose component)

Based on this comparison to the S-Nose values, the potential for elevated soil odour cannot be ruled out; however, it is noted again that the S-Nose values were evolved to be protective of a scenario where a receptor may smell a handful of soil at close range while gardening. Given that RMMs (specifically, capping and administrative controls) have been determined to be required to prevent direct contact with existing Site soils based on the quantitative evaluation, and gardening of home produce has been prohibited in Site soils, the potential for soil odour to cause an adverse effect at the Site is limited. With the implementation of these RMMs, Site soils with concentrations exceeding the S-Nose component values are expected to be located beneath a cap. Additionally, to address the potential for odour issues in soil used for fill caps, an olfactory screening step has been included in the soil management process for the construction of fill caps (Sections 7.2.2 and 7.2.3.2).

4.4.3.10 Qualitative Assessment of Potable Groundwater Odour Pathway

The Rationale Document (MECP, 2011b) contains aesthetic criteria for potable groundwater odour (GW1-Odour component). A qualitative assessment was completed to determine the potential for aesthetic effects associated with the use of onsite groundwater as a potable water source. The following COCs have an estimated maximum concentration in groundwater greater than the GW1-Odour component (Appendix F, Table F1-6):

[6] In the absence of a soil component table for Table 6 (MECP, 2011b), the S-Nose components from the table entitled *Soil Components for Table 2 – Full Depth, Potable Water Scenario* (Coarse Textured Soil, Residential/Parkland Land Use) was used.

- Methylnaphthalene 1,2-
- Naphthalene
- Trichloroethylene

Based on this comparison to the GW1-Odour values, the potential for groundwater odour cannot be ruled out if groundwater at the Site is used as a potable resource. Given that RMMs (specifically, a restriction on the installation of potable and commercial wells) have been determined to be required to prevent potable water use of the existing Site groundwater based on the quantitative evaluation, the potential for groundwater odour to cause an adverse aesthetic effect at the Site is limited. As the groundwater odour pathway is considered minor in comparison to the health-based direct contact pathway (quantitatively assessed in Section 4.4.2), no specific RMMs have been proposed to address the potential for groundwater odour. Section 7.2.3.6 describes the proposed potable and commercial well restriction RMM for the Site based on the results of the quantitative assessment.

4.4.3.11 Qualitative Assessment of Soil Leaching to Potable Groundwater

The MECP (2011b) has published soil values that are protective of human receptors from COCs in soil leaching to groundwater with subsequent use as potable water (S-GW1). Table F1-7 in Appendix F1 presents the S-GW1 component values (Table 2 values were used in the absence of Table 6-specific values); note, the MECP did not develop S-GW1 values for metals and inorganics (except for mercury), as these analytes are not considered mobile or are not significantly mobile under normal soil conditions (for example, if soil pH is within the acceptable range).

Based on the comparison to the S-GW1, 14 soil COCs were identified with estimated maximum concentrations in soil greater than the S-GW1 component value within the RA Property:

- Acenaphthene
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Ethylbenzene
- Fluoranthene
- Naphthalene
- PHC F3
- Phenanthrene
- Pyrene
- Trichloroethylene

The S-GW1 values are calculated using GW1 values, combined with partitioning and transport models. As an intermediate step in the MECP's calculation of the S-GW1 soil values, concentrations of COCs in groundwater that have leached from soil are estimated. However, site-specific groundwater data are available to directly consider groundwater concentrations, as data from 94 monitoring well locations across the RA Property are included in the RA dataset (refer to Appendix D2). These measured groundwater concentrations provide a more direct and site-specific reflection of actual groundwater conditions, including potential leaching from soil. Of the 14 COCs with soil concentrations greater than the site-specific S-GW1, all but one parameter (dibenzo[a,h]anthracene) were retained for further assessment in groundwater based on their maximum observed groundwater concentrations exceeding the generic Table 6 SCS (refer to Table F1-2 in Appendix F1). The maximum measured concentration of dibenzo[a,h]anthracene in groundwater was half the Table 6 SCS value based on 189 samples from 55 monitoring wells; therefore, this analyte was not retained as a groundwater COC. Leaching of this analyte from soil does not appear to be of concern at the Site.

Contamination at the RA Property resulted from historical sources. The RA considers groundwater data from 2007 to 2020; therefore, the past and present potential for contaminant leaching to groundwater is reflected by the currently measured groundwater concentrations. Based on this information, potential risks to human receptors from RA Property potable groundwater use were evaluated primarily by comparing measured groundwater concentrations to the GW1 values. Table F1-4 in Appendix F1 presents the GW1 component values. As the quantitative assessment of the direct contact with potable groundwater pathway considers all the soil COCs[7] which had concentrations greater than the S-GW1, the risk to human health has been appropriately assessed. No specific RMMs have been proposed for this pathway. Section 7.2.3.6 describes the proposed potable and commercial well restriction RMM for the Site based on the results of the quantitative assessment.

4.4.4 Human Health Standards Based on Quantitative and Qualitative Interpretation of Health Risks

The quantitative and qualitative assessment of exposure pathways indicate health risks are possible to current and future receptors for the exposure scenarios discussed. The rationales for the development of the PSSs that are protective of human health are discussed in this section. Risk management is proposed where the assessment indicated a potential risk at the PSS.

4.4.4.1 Development of Property-specific Standards

Jacobs selected the estimated maximum concentration, defined as the maximum plus 20 percent (of detected values) or the maximum reported detection limit (RDL), for each COC to be representative of a reasonable upper-estimate of actual soil and groundwater concentrations remaining on the RA Property. COCs were selected based on the Table 6 SCS and the shallow bedrock conditions have been considered in setting the PSS for the Site. Proposed PSSs for soil and groundwater applicable to human health were selected as described in the following subsections.

4.4.4.2 Soil

PSSs for COCs identified in soil were based on the following:

- The estimated maximum if no unacceptable risks were predicted in the quantitative or qualitative assessment
- The estimated maximum if unacceptable risks were predicted in the quantitative or qualitative assessments, and exposure pathways with risk exceeding target levels are eliminated using RMMs

Table 4-40 presents the PSS values selected for soil to be protective of human health.

4.4.4.3 Groundwater

PSSs for COCs identified in groundwater were based on the following:

- The estimated maximum if no unacceptable risks were predicted in the quantitative or qualitative assessment
- The estimated maximum if unacceptable risks were predicted in the quantitative or qualitative assessment, and exposure pathways with risk exceeding target levels are eliminated using RMMs

Table 4-40 presents the PSS values selected for groundwater to be protective of human health.

[7] Apart from dibenzo(a,h)anthracene, which is not a COC in groundwater.

4.4.5 Special Considerations

The special conditions for environmentally sensitive areas, shallow soil properties, and water bodies cited under Sections 41 and 43.1 of O. Reg. 153/04 apply to the RA Property. Specifically, due to shallow bedrock conditions on a portion of the property, the RA Property is considered a shallow soil property under Section 43.1. This condition was considered in the initial screening of chemicals by using the Table 6 SCS to determine the COCs to be assessed for the RA Property (Section 3.3). As such, the proposed PSSs for human health have accounted for the conditions cited under Section 43.1 of O. Reg. 153/04. Section 41 (for environmentally sensitive areas) and Section 43.1 (specifically with respect to water bodies) do not apply to the RA Property.

4.4.6 Interpretation of Off-Site Health Risks

The proposed PSSs for soil COCs (presented in Table 4-40) are not anticipated to result in a concentration exceeding the applicable generic MECP standard (inferred to be the Table 6 SCS) at the nearest offsite property. Soil has the potential to migrate offsite via dust originating from soils at the RA Property; however, this mechanism is unlikely to result in a material change to offsite soil concentrations. In addition, elevated risks from dust inhalation were identified only for the Pregnant Female Workers (Construction or Utility) for B(a)P and for the Construction Worker for B(a)P, cobalt, and zinc during construction activities. Elevated risks from lead and iron in dust were identified for all receptors, based on the qualitative assessment. The RMMs required during construction activities to reduce the potential risk to acceptable levels onsite would prohibit transmission of PAH- and metals-containing dust offsite.

The proposed PSSs for groundwater COCs (presented in Table 4-40) could result in concentrations exceeding the applicable generic MECP standards (Table 6 SCS) at the nearest downgradient offsite property if groundwater containing COCs at PSS concentrations greater than the applicable SCS migrates offsite. Table 4-41 lists the groundwater COCs for the RA Property and assesses whether the proposed PSSs are likely to result in an offsite exceedance of the Table 6 SCS (inferred to apply to the nearest downgradient offsite properties), and whether the parameter is mobile[8]. If the potential for an offsite exceedance could not be ruled out, the nearest offsite human receptor was identified.

Groundwater flow direction was considered in this assessment. As discussed in Section 3.2, the predominant groundwater flow direction in the Overburden and Bedrock Contact Zone is from the northeast to the southwest, with localized flow from west to east on western portion of the Site and localized flow from east to west on the eastern portion of the Site. Groundwater in the Eramosa Formation (Potentiometric surface), appears to flow predominantly to the east.

As indicated in Table 4-41, the potential for an offsite exceedance of the applicable generic MECP standard for several parameters cannot be ruled out. As these parameters have a PSS greater than the Table 6 SCS and can potentially be mobile in groundwater, they have the potential to pose a risk to a downgradient offsite property. Groundwater monitoring is proposed on Site for these parameters (Section 7).

Offsite groundwater quality can be addressed onsite by monitoring groundwater movement, allowing natural attenuation, and notifying appropriate stakeholders in the event of offsite migration.

[8] The potential for contaminant of concern (COC) mobility in groundwater was assessed using professional judgement considering the Site history, distribution of COCs in soil and groundwater, as well as the individual COC's physical and chemical properties. Guidance from the New Jersey Department of Environmental Protection (NJDEP, 2008) related to the mobility of chemicals based on the organic carbon partition coefficient was also considered. In general, volatile organic compounds (VOCs), "light" polycyclic aromatic hydrocarbons (PAHs), and "light" petroleum hydrocarbons (PHCs) were considered potentially mobile, while "heavy" PAHs and "heavy" PHCs are unlikely to be mobile.

4.4.7 Discussion of Uncertainty

By its very nature, RA is an uncertain endeavour. Assumptions must be made regarding receptors that are potentially exposed. Often, exposure point concentrations must be estimated via modelling or other estimation methods. Without exception, toxicity indices are developed by credible government agencies and are purposefully calculated in a conservative fashion to monitor that benchmarks for estimating toxicity effects have a sufficient margin of safety to protect human health.

4.4.7.1 Hazard Analyses and Problem Formulation

Hazard analyses and problem formulation are conservative in nature and are developed so potential elevated risks are identified at the RA Property. This section qualitatively evaluates the extent to which chemicals at the RA Property may cause adverse health effects on receptors of concern.

COCs have been detected in soil and groundwater at the RA Property, indicating a potential risk exists. The screening process is conservative and could lead to the identification of COCs (and their inclusion in the RA) that do not actually indicate a potential risk at the RA Property. The inclusion of these COCs in the RA has little effect on the conclusions of the evaluation.

4.4.7.2 Exposure Assessment

Uncertainty exists in the exposure assessment of the RA. Onsite receptors were hypothesized, and activities assumed to result in exposures, as follows:

- EDs and EFs were assumed to occur on a regular and long-term basis, despite the reasonable potential that receptors may relocate residences; therefore, may change recreational places, may change employment or job descriptions, and are unlikely to contact chemicals on a routine basis. The conservative way receptors have been identified and activities evaluated indicates that uncertainties in the exposure assessment most likely allow for an overestimation of risk.
- The exposure assessment section also defines the concentrations to which potential receptors may be exposed. Within the RA Property boundaries, vapour concentrations have been estimated using conservative models that incorporate general fate and transport factors intended to conservatively overestimate vapour concentrations to which exposures might occur. This approach results in an overestimate of exposure and associated risk to certain receptors. These conservative assumptions likely overestimate exposures to the COCs and, correspondingly, overestimate risk. These assumptions impart uncertainty to the RA but are developed to confirm the RA conclusions are conservative and protective of human health. The net effect of these uncertainties is that risk to potential receptors has likely been overestimated.
- Estimated maximum concentrations of chemicals in soil and groundwater were used in the modelling. Concentrations of contaminants are not uniformly distributed across the RA Property. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentrations present at the Site over their lifetime; therefore, the predicted risks have likely been overestimated.
- The selected incidental ingestion rates for soil and groundwater may be different from the experimental basis used to develop them (for example, Construction and Utility Worker incidental ingestion of groundwater is based on exposure while swimming and not incidental contact while working). Changes in ingestion rate would increase or decrease the predicted exposures and risk.
- The conditions at a site may not match the conditions during the study upon which the dermal adherence factor is based. For example, studies have found finer particles adhere preferentially to the hands unless soils are greater than 10 percent moisture. Some studies have found soil particles

greater than 250 micrometres (μ) do not adhere readily to skin (EPA, 2004). Thus, the soil type, including moisture content, can affect the adherence of soil. In addition, the specific activity that occurs in the site-specific exposure scenario may not directly match the activities on which adherence factors were based. These factors can introduce uncertainties into the exposure assessment.

4.4.7.3 Toxicological Information

There is a limited amount of toxicological information on the effects associated with human exposures to low levels of chemicals in the environment. What human information is available is generally based on epidemiological studies of occupationally exposed workers. These studies are generally limited in scope and provide results that may not apply to chronic or continuous exposures to low levels of chemicals. Because human toxicological information is limited, RfDs and cancer potency estimates for many compounds are based on the results of dose-response assessment studies using animals.

The use of experimental animal data to estimate potential biological effects in humans introduces uncertainties into the evaluation of potential human health effects. These estimations require that several assumptions be made, including:

- The toxicological effect reported in animals is relevant and could occur in humans.
- The extrapolation from high-dose studies to low-dose environmental exposures adequately represents the shape of the dose-response curve in the low-dose exposure range.
- Short-term exposures used in animal studies can be extrapolated to chronic or long-term exposures in humans.
- The uptake of a compound from a test vehicle (including drinking water and food) in animals will be the same as the uptake of the chemical from environmental media (soil, sediment, airborne particulate matter) in humans.
- The pharmacokinetic processes that occur in the test animals also occur in humans.

There are clearly a number of uncertainties associated with extrapolating from experimental animal data to humans. To address these weaknesses, regulatory agencies, such as Health Canada and EPA, incorporate several conservative assumptions to try and account for the uncertainties associated with this process. The uncertainties are accounted for by using UFs that serve to reduce the RfD to far less than the level at which adverse health effects have been reported in the test species. UFs are generally applied by factors of 10 and are used to account for the following types of uncertainties:

- Variation within the population (protection of sensitive members of the population)
- Differences between humans and the test species
- Differences in using short- or medium-term studies to estimate the health effects associated with long-term or chronic exposures
- Limitations in the available toxicological information

The magnitude of the UFs applied by the various regulatory agencies indicates the level of confidence that should be placed in the reference value. UFs typically range between 100 and 10,000, although some can be less than 10. The latter values are found for a few chemicals where sound and substantial human toxicological information is available to enable setting a toxicological end-point solely on the basis of human epidemiological information.

The application of UFs is intended to address technical uncertainties in toxicological data, and to confirm, as much as possible, that limited exposures that exceed the RfC will not result in adverse human health effects.

Because RAs that use these regulatory limits incorporate the conservatism used in the development of the toxicological information, the results can generally be viewed as being extremely conservative.

4.4.7.4 Risk Characterization

The risk characterization phase of the RA integrates toxicity and exposure information to determine the potential for adverse health effects. In large part, the uncertainty resulting at this phase of the RA is a direct result of those uncertainties that have been discussed previously. As such, based on the foregoing evaluation, health risk is largely overestimated. However, it is important to note that benchmarks constituting substantial risk are arbitrarily selected and, as such, become value judgments as to their significance. In all instances, the risks deemed to be significant (that is, one in a million cancer risks for exposures from source related chemicals) are small relative to health risks associated with typical activities in a modern society (that is, approximately one in three cancer risks from all societal exposures). This does not diminish the importance of the excess risk noted in this report. The following summarizes uncertainties relating to the assessment at the RA Property (included in Section 4.4.2):

- Concentrations of contaminants are not uniformly distributed across the RA Property. The estimated maximum detected values for chemicals in soil and groundwater were used in the modelling. These concentrations appear in localized areas on the RA Property and represent the greatest concentration based on judgmental sampling. Receptors would not consistently be exposed to the maximum concentration present at a site over their lifetime; therefore, the predicted risks have likely been overestimated.
- The incidental ingestion rates may be different than the experimental basis used to develop them. Changes in ingestion rate would increase or decrease the predicted risk.
- The model does not account for the removal of contaminants (from soil) from the receptors' hands by brushing or washing off. This overestimates the risk from exposure.
- The amount of groundwater assumed to be incidentally ingested by Construction and Utility Workers during construction activities in this assessment is equivalent to the amount considered to be ingested during swimming activities (50 mL, as specified by EPA [1989]). The actual ingestion of groundwater is likely to be insignificant.
- Typical construction activities include dewatering excavations; therefore, it is unlikely that Construction and Utility Workers will be exposed to groundwater. Less exposure will result in lesser risk estimates.
- The comparators used to predict risk (that is, RfC and UR) are values considered to be protective of lifetime exposure to chemicals—24 hours per day, 7 days per week, 52 weeks per year, for 70 years—and include adjustments for sensitive individuals in the human population. Therefore, for a human receptor, risks are overestimated for short-term exposure to chemicals that may be present in air from dust, as no person will occupy the RA Property for any duration consistent with the duration used to develop the comparators. Adjustment of the comparator for shortened duration would likely result in a decreased risk for receptors.
- Risks from dust to offsite receptors would likely be less than experienced by RA Property users, since the concentration of COC-impacted fugitive dusts diminishes with dispersion and dilution in air rapidly with distance (EPA, 2002a).
- Vapour concentrations inside a generic commercial or generic residential building were modelled assuming the structure lies directly over the estimated maximum soil or groundwater concentration detected at the RA Property (only for volatile COCs). This assumption is conservative; therefore, the predicted risks from indoor air inhalation have likely been overestimated.

- While developing indoor air and outdoor air volatile concentrations, the degradation of organic compounds was ignored. If degradation was included, the chemical concentration would decrease, resulting in a decrease the estimated risks.
- Due to uncertainties associated with the available TRVs for lead, which may not consider the potential adverse health effects at BLLs less than the current Canadian BLL intervention level of 10 µg/dL, exposure and risk to lead via the direct contact and inhalation routes have not been quantitatively assessed in the RA. Lead has also been identified as a developmental toxicant but was not assessed quantitatively via the Pregnant Female receptor, as no TRV protective of developmental effects to a foetus is available.
- Due to a lack of appropriate TRVs, risks to bismuth have been qualitatively assessed using an adopted soil screening value. The lack of a quantitative assessment for this COC has little effect on the conclusions of the evaluation. Since an elevated risk has already been determined for onsite receptors from other COCs, the recommendation that RMMs should be implemented at the RA Property is not affected by this uncertainty.

4.4.8 Risk-based Concentrations for Fill Caps

The fundamental approach to preventing contact with contaminated soils is to construct a cap or soil barrier where RMMs are required. The cap or barrier must prevent human exposure to COCs and prevent mobilization of the contaminants. The purpose of the barrier is to prevent direct contact without relying on personal protective equipment (PPE) or clothing. Cap risk-based concentrations are developed for the anticipated future land use scenario as mixed residential and commercial.

Risk-based concentrations (RBCs) for fill caps were developed based on dermal contact and incidental ingestion exposure to soil by the Resident, Construction Worker, Utility Worker, Outdoor Worker, Indoor Worker, and Pregnant Female Worker, for a future mixed residential and commercial land use scenario.

Soil RBCs based on inhalation, dermal, and ingestion exposures were developed by applying a target ILCR of 1×10^{-6}, a target HQ of 0.2 for all COCs except PHC, and a target HQ for PHC fractions and TCE (inhalation pathways only) of 0.5. The soil RBCs apply for soil pH ranges of 5 to 9.

Tables 4-42a and 4-42b present the soil RBCs relevant to human health based on the direct contact pathway (dermal contact and ingestion) for the residential land use scenario for residents and subsurface workers, respectively. MECP generic soil direct contact component values (that is, S1) were adopted as the direct contact RBCs for any COC not retained for quantitative assessment in the HHRA.

Tables 4-43a and 4-43b present the soil RBCs relevant to human health based on the inhalation of indoor air pathway for residential and commercial building uses, respectively. MECP generic soil-to-indoor-air component values based on building type (that is, the S-IA) were adopted as the inhalation RBCs for volatile COCs not retained for quantitative assessment in the HHRA.

Table 4-44 shows the selection and basis of the overall soil RBCs protective of human health for a mixed residential, parkland, and commercial land use. If the calculated direct contact or inhalation RBC was less than the Table 6 SCS, the Table 6 SCS was selected as the overall soil RBC. VI RMMs are required for all future buildings at the RA Property (Section 7).

Fill cap target concentrations are presented in Section 6 of this document.

Additional human health RBCs were calculated to support the requirement to report the percentage reduction in COC concentrations associated with the proposed RMMs (Section 7).

Tables 4-45a and 4-45b present the dermal groundwater contact RBCs for potable water contact and Worker incidental contact in the subsurface, respectively.

Table 4-46a and 4-46b present the groundwater RBCs for the inhalation of indoor air pathway for the generic commercial and residential scenarios, respectively.

Table 4-47 presents the inhalation of trench air RBCs. Values are derived for the media (soil or groundwater) that was driving the risk for this pathway for each COC.

RBCs were developed based on the TRVs presented in Section 4.3. Uncertainties associated with variations in the TRVs could increase or decrease the RBC estimates. However, the conclusion that these RBCs are protective of Site receptors can be considered valid despite changes to the TRV, since the derivation of TRVs includes modifying factors and UFs that may span several orders of magnitude.

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N

0 10 20 30

Metres

- Monitoring Well
- Excavated Monitoring Well
- Existing Monitoring Well with NAPL Present
- Former IMICO Property Boundary
- Excavated Area
- Historical Excavation area, EarthTech, 1999
- Potential NAPL Area (See Administrative Requirements in Section 7.2.3.5)

Notes:
1. Service Layer Credits: Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
2. Historical locations are approximate. All samples, including those within excavation areas that have been removed (i.e. prior to 1999) have been shown for screening purposes.
3. NAPL = nonaqueous phase liquid

Figure 7-2
Administrative Requirements - NAPL
Risk Management Plan
Former IMICO Foundry Facility
200 Beverley Street, Guelph, Ontario

Jacobs

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